10

BASIC DESIGN FOR PARKING GUIDANCE SYSTEM AND PUBLIC TRANSPORT INFORMATION SYSTEM

10.0 BASIC DESIGN FOR PARKING GUIDANCE AND PUBLIC TRANSPORT INFORMATION SYSTEM

10.1 System Architecture

10.1.1 Parking Guidance System

Parking guidance system collects parking availability information from parking areas and provides it to the drivers on the roads nearby looking for a parking space. It is a closed system consisting of a group of parking areas, which are located within a certain distance, and operates independently from other parking guidance systems. Availability information will be sent to the ITIS Centre for dissemination to pre-trip traveller. But information is only indicative, because there is always a time lag between the information provided at the time of inquiry and the actual parking availability upon arrival. *Figure 10.1.1* illustrates the overall network configuration of the parking guidance system and *Figure 10.1.2* shows a typical system configuration.

The system consists of information collection, information processing, and information sub-systems. These sub-systems are located within a short distance. Thus, data communication between the equipment will be made through a self-owned cable network except for the guidance signs for which the use of a leased line is found to be more economical. The connection of each parking guidance system with ITIS Centre will be made through a leased telephone line as shown in the figure.

10.1.2 Public Transport Information System

Public transport information system is a customer service to bus passengers. It collects the bus location information from the bus on the road and provides it to bus passengers waiting at bus stop.

For detection of bus location, GPS based method will be adopted. Bus location can be determined with an average error of 70meter to 100meter, which is sufficient for bus location application. Error can be reduced to 10meter if differential GPS is used. Bus location data is sent by on-board transmitter to a bus operation centre, together with other data such as bus ID, operation mode and route number. Considering the current bus operation practised by bus operators in the study area, an on-board device, which consists of a GPS receiver and a data transmitter, must be a portable device easily transferred from one bus to another.

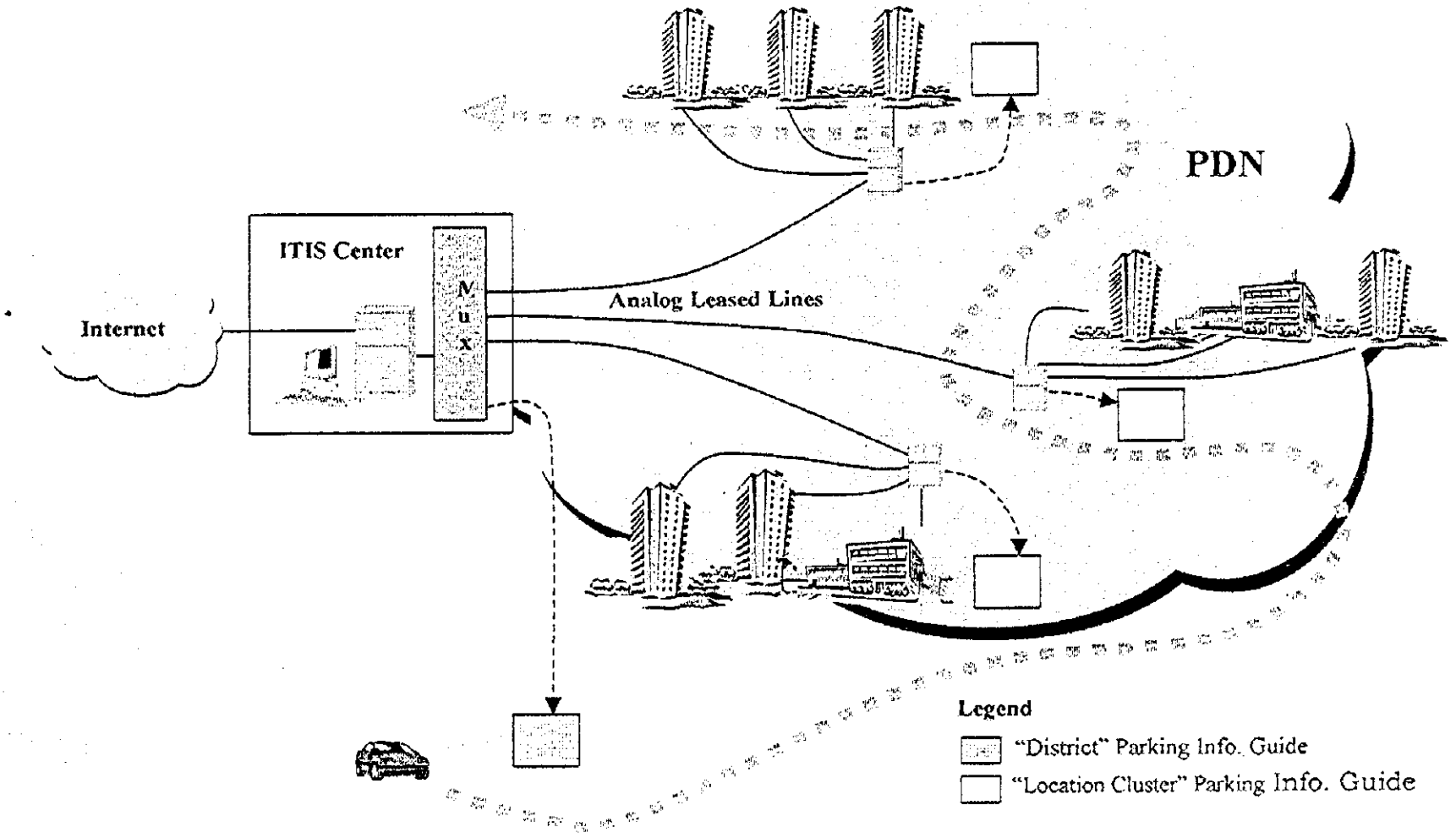


Figure 10.1.1: Network Configuration for Parking Guidance System

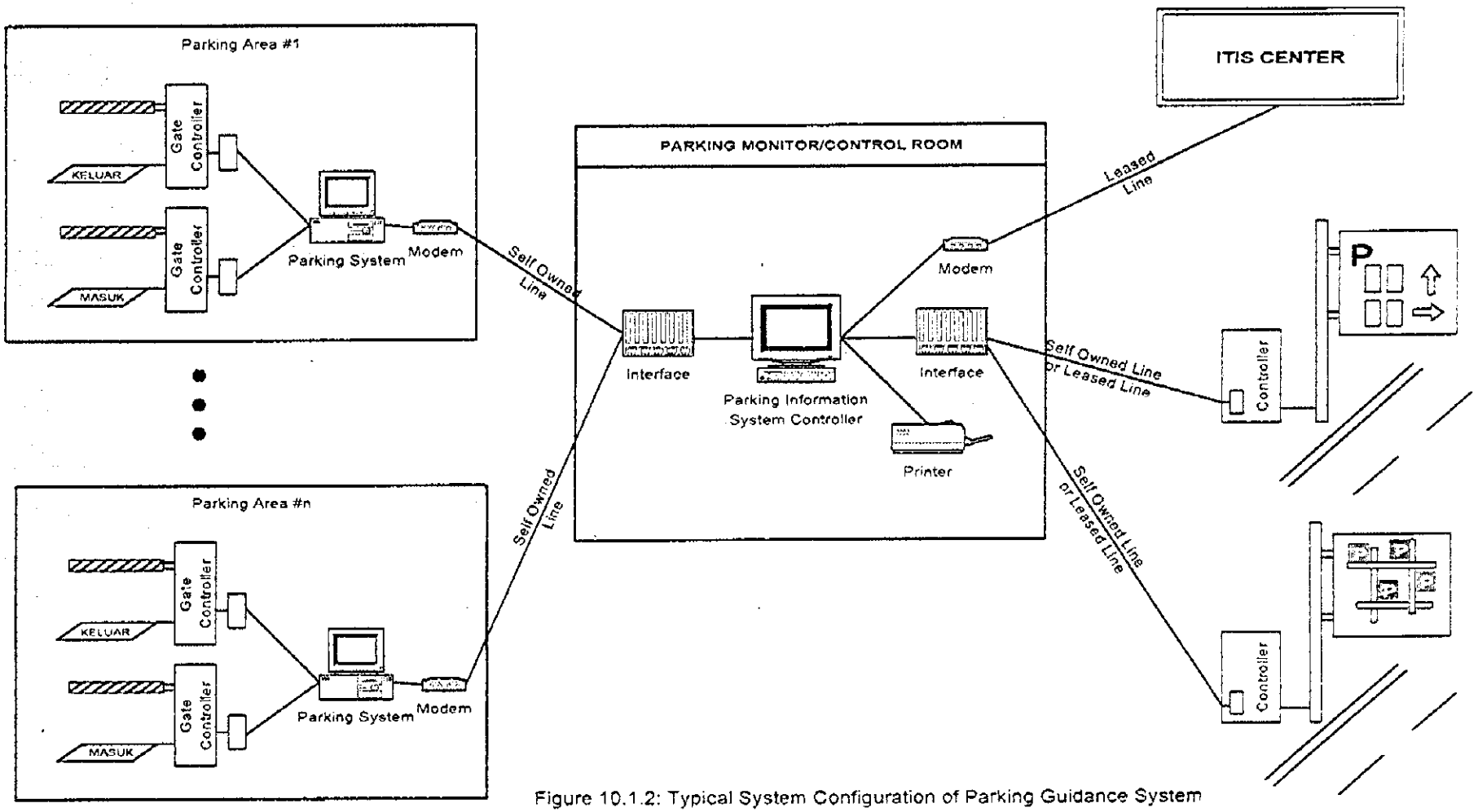


Figure 10.1.2: Typical System Configuration of Parking Guidance System

There are two methods that can be utilised in designing a public transport information system. The two network options are:

- Via the trunk radio system as illustrated in *Figure 10.1.3.*
- Via the cellular mobile short messaging system (SMS) as illustrated in *Figure 10.1.4.*

Both methods can work equally well if properly dimensioned and all associated costs will depend on final negotiations with the relevant service provider.

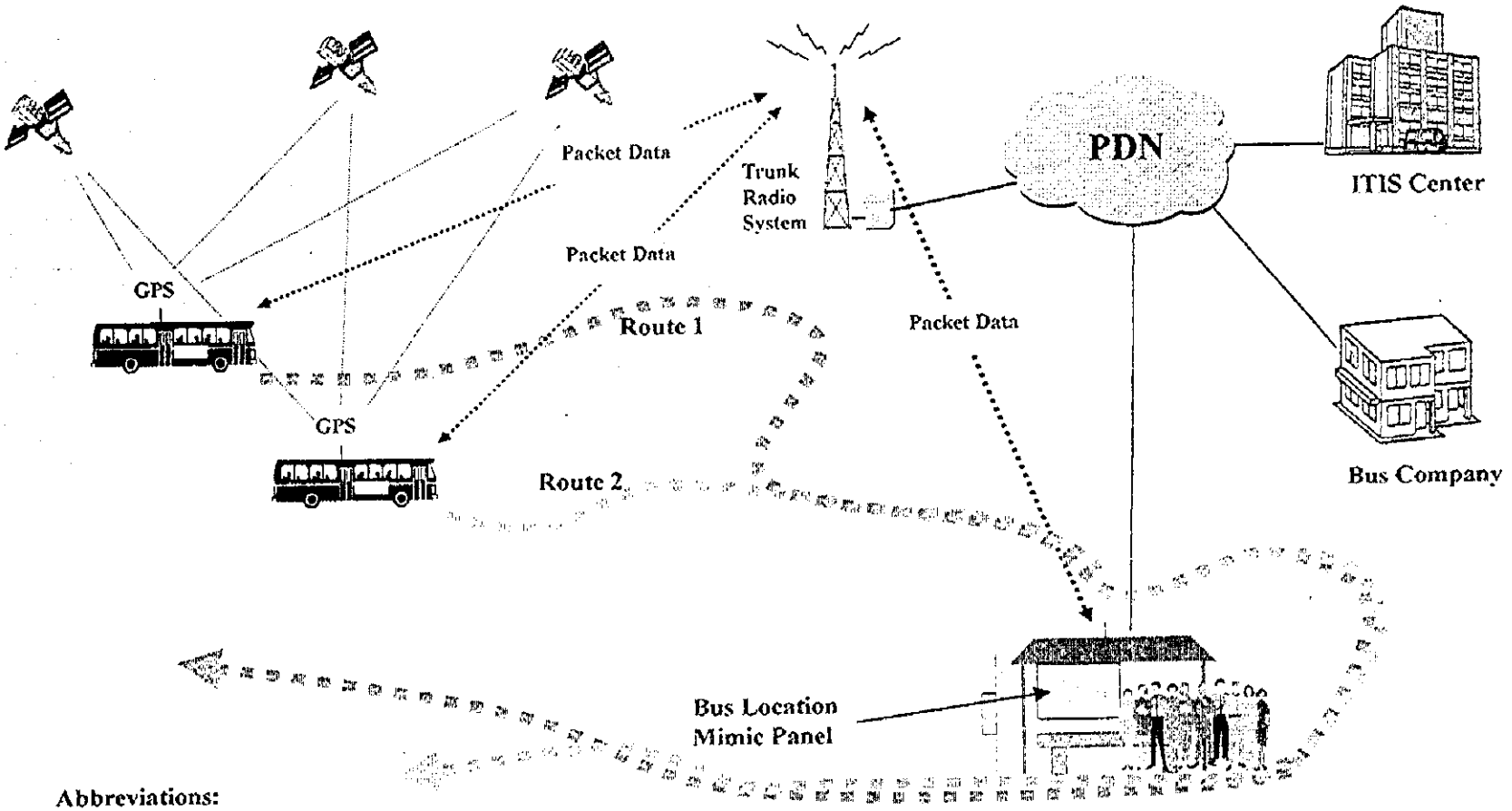
The trunk radio system may be more susceptible to external wave interference and is based on a polling methodology. As it is more likely that buses are already fitted with trunk radios, this method would probably be cheaper to implement, but would have to contend with sharing "air time" with the occasional audio communication.

The SMS method offers a more "interference free" communication method and is based on exception reporting. This method requires the use of a mobile phone on the bus but the messaging system operates on separate data channels from the voice channels.

From a cost evaluation perspective, provided that the public transport system already utilises trunk radios in buses, such a solution is deemed to be easier and cheaper to implement for the near to medium term as compared with the SMS method.

In the medium to longer term, as the number of buses required to be fitted with the trunk radio system grows, migrating to the SMS method would serve the needs of the bus location system better from a dimensioning and system sophistication perspective.

Data transmission from the bus operation centre to bus stops will adopt either the wireless method as used for data transmission from bus to the centre, or alternatively a fixed line method using telephone lines leased from a telephone company. The system configuration of the public transport information system is shown in *Figure 10.1.5.*



Abbreviations:
GPS - Global Positioning System
ITIS - Integrated Transport Information System
PDN - Public Data Network

Figure 10.1.3: Proposed Network for Public Transport Information System (using Trunk Radio System)

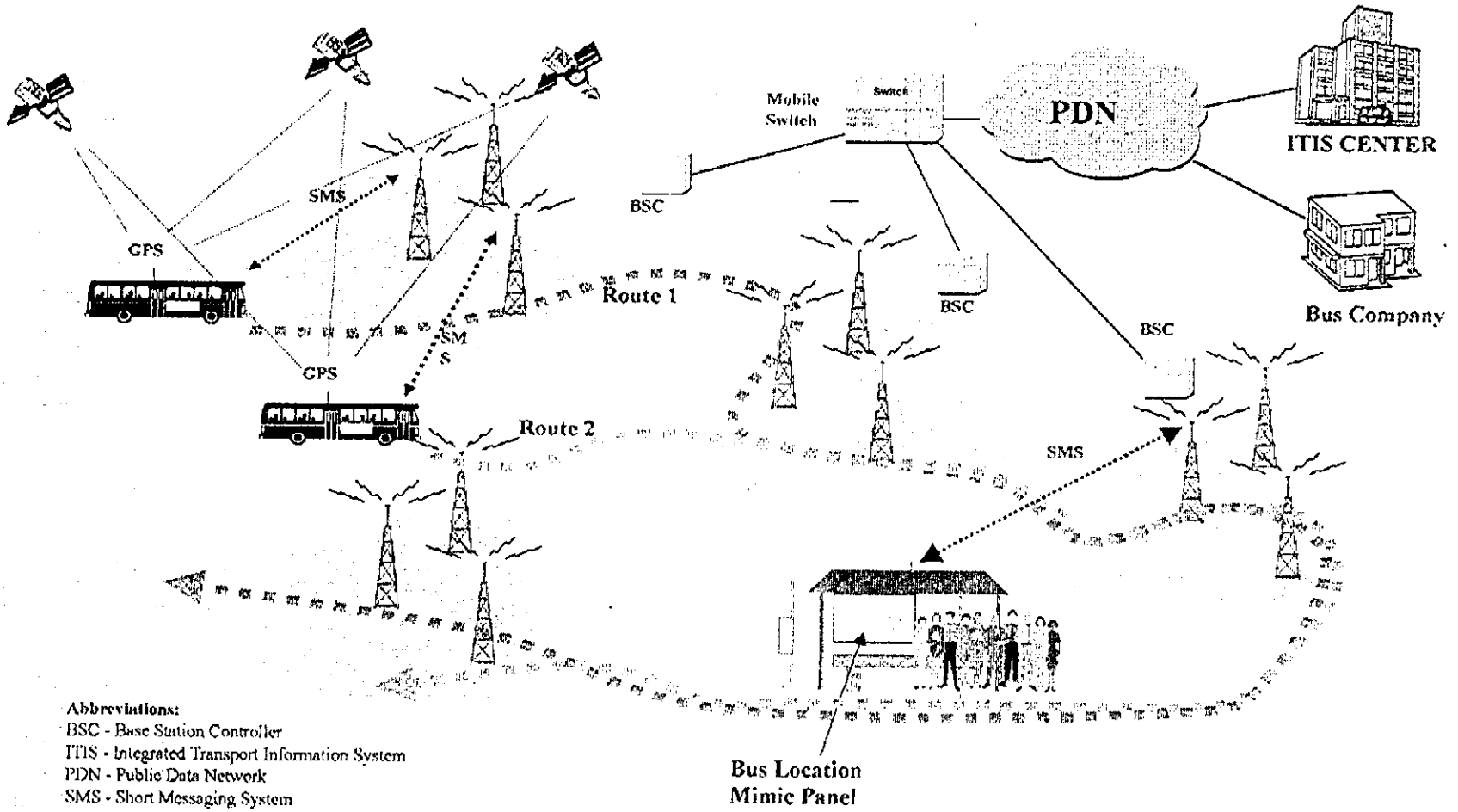


Figure 10.1.4: Proposed Network for Public Transport Information System (using GSM 900/1800 Short Messaging System)

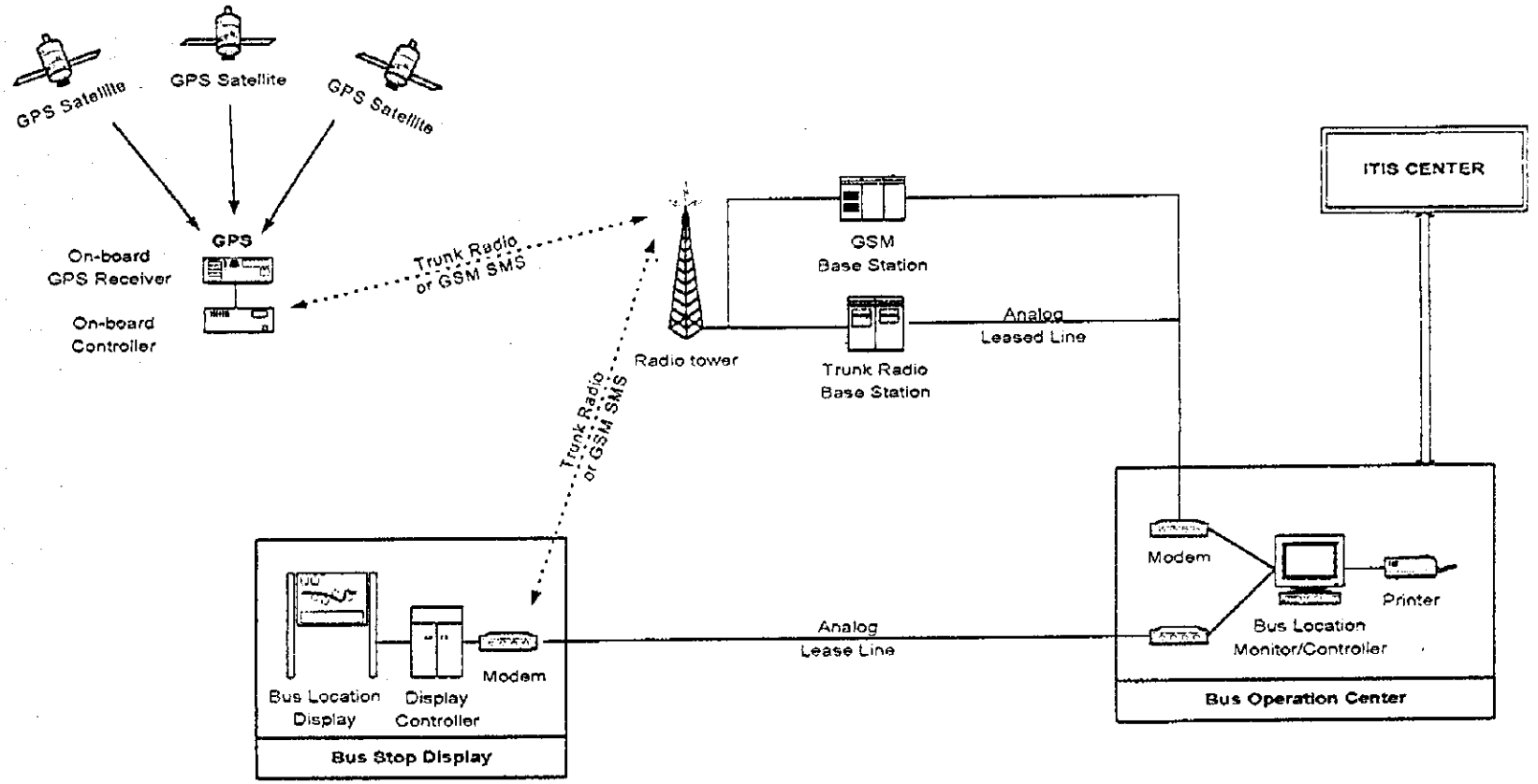


Figure 10.1.5: Typical Configuration of Public Transport Information System

10.2 Information Collection and Dissemination

10.2.1 Parking Guidance System

It is assumed that parking management system at each building already has the parking availability information based on the number of vehicles entered and exited the parking facility. A cluster of buildings is individually connected to a localised parking guidance system processor probably located in one of the cluster of buildings itself. Each building regularly transmits information to this localised processing system on its available car parking space.

The information obtained is then processed locally and relayed to designated parking guidance display panels informing motorist on the availability of car parks for a given cluster of buildings. The information is also sent back to the ITIS Centre for further dissemination to the public through Internet.

10.2.2 Public Transport Information System

Different data collection method is applied to gather bus location information. A polling method is used in trunk radio system method (refer to *Figure 10.1.4*), where all buses are polled in sequence to determine the location of each respective bus. Each bus is given a unique identification address.

The proposed SMS method works "independently" in that the bus updates its location (provides its GPS co-ordinates) to the bus operation centre at fixed intervals or if the bus have progressed significantly along its route.

In both data collection methods, bus location expressed in co-ordinate is processed at the bus operation centre and the bus location along its route is determined. The location information is then relayed to all relevant "Bus Location Mimic Panels" along the bus route. The mimic panel will light up the relevant light emitting diode (LED) on the route map to inform passengers the exact location of the bus at any time. Data storage function is required for the mimic panel, as a number of buses ply the same section of road so that bus location must be displayed separately for different route. Route selection buttons will be provided to the mimic panel for bus passenger to select the route for which he/she wants to know the bus location.

The ITIS Internet Web site can also disseminate the locations of buses to the public.

10.3 Case Study of Parking Guidance System At Bukit Bintang/Lot 10

10.3.1 Selection of Case Study Area

Parking guidance system becomes ineffective if it tries to cover a large area. Users would not want to park at a parking facility too far from his destination. A parking guidance system therefore needs to cover only parking facilities within a comfortable walking distance from the destination.

In Kuala Lumpur, the case of the shopping district in Jalan Bukit Bintang faces shortage of parking during weekends at times. Because of the one-way circulation traffic operation along Jalan Bukit Bintang, drivers who fail to find a parking lot at the first attempt may have to circulate for a distance before he tries again. Such unwanted traffic looking for vacant parking can be avoided if a parking guidance is implemented and in an effectively way.

For this purpose, a simple survey of the parking facility was conducted to find out the location of parking facilities, their entry/exit points, capacity, management companies and the traffic circulation to/from parking entrances/exits.

Parking facilities in office building are often not accessible to the public. Parking in hotels is deemed too expensive for shoppers. These two categories as well as on-street parking is therefore not included in this case study. Only parking facilities in shopping complexes are studied.

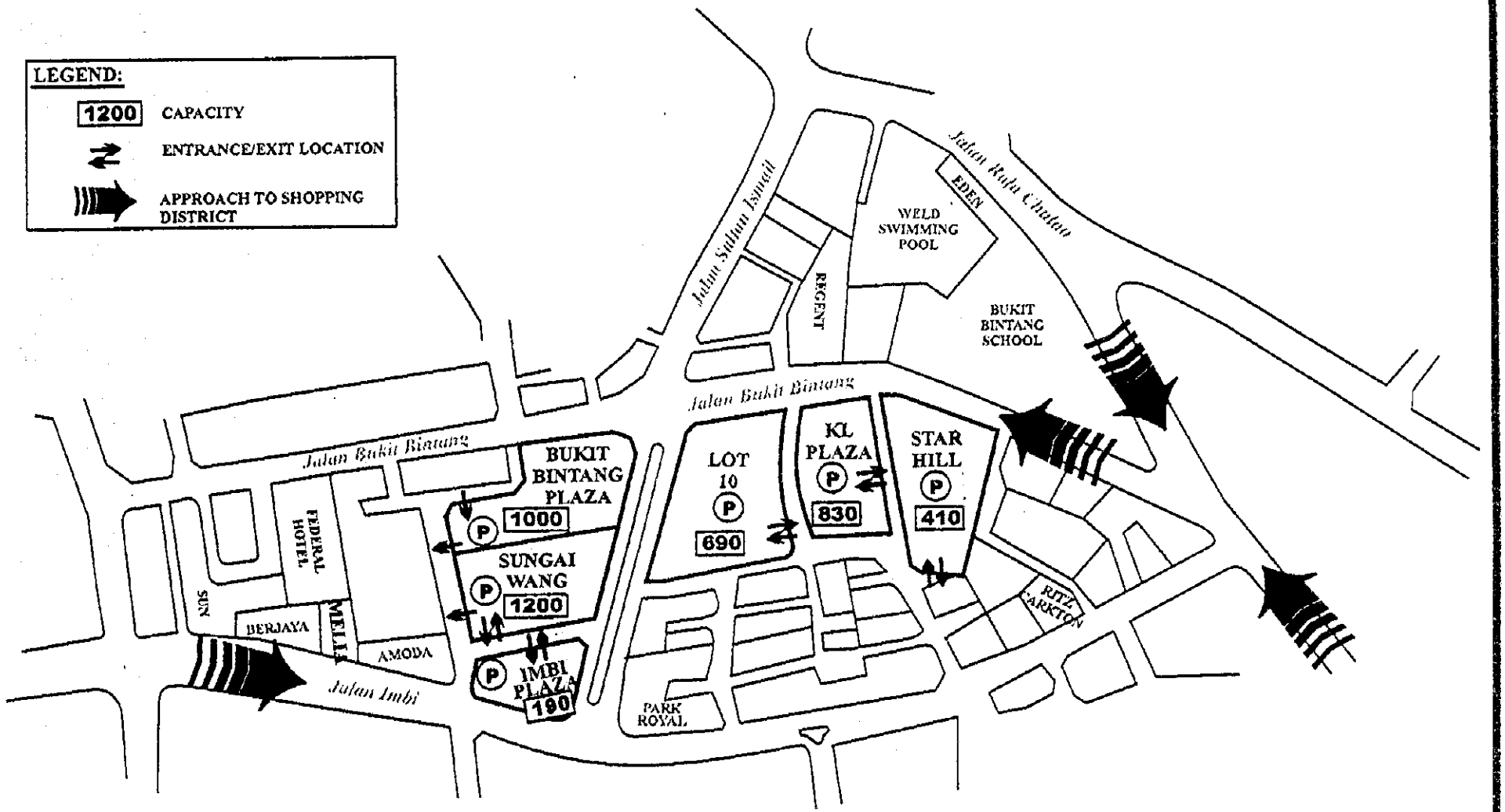
10.3.2 Parking Location and Capacity in Bukit Bintang/Lot 10 Area

The parking capacity of the 6 shopping complexes in this area is about 4,320 lots. *Figure 10.3.1* shows the location of these parking facilities and their capacity.

Table 10.3.1 Parking Facility in Case Study Area

No.	Complex Name	Parking Capacity	Management Company	Parking Rates
1	BB Plaza	1,000	Wilson Parking	Rm 2.50 1st hr Rm 1.00 sub.hr
2	Sg. Wang Plaza	1,200	Sg. Wang Plaza Parking	Rm 2.50 1st hr Rm 1.00 sub.hr
3	Imbi Plaza	190	Wilson Parking	Rm 3.50 1st hr Rm 3.00 sub.hr
4	Lot 10	690	Secure Parking	Rm 2.10 1st hr Rm 2.10 sub.hr
5	KL Plaza	830	KL Plaza Parking	Rm 2.10 1st hr Rm 1.05 sub.hr
6	Star Hill	410	Secure Parking	Rm 2.10 1st hr RM1.05 sub.hr
Total		**4,320**		

** source : study's own survey*



PARKING CAPACITY OF SIX SHOPPING COMPLEXES

Figure no :

10.3.1

10.3.3 Traffic Circulation and Approach To Shopping District

The traffic circulation situation is given in *Figure 10.3.2*. Traffic on the periphery roads namely Jalan Bukit Bintang is one-way towards Jalan Pudu. Except for a short section, Jalan Imbi is a two-way traffic circulation road. Jalan Sultan Ismail is however a divided two-way road.

By nature of the traffic circulation plan of the peripheral roads leading to the case study area, there are just 2 major approaches to the complexes. These are

1. Jalan Imbi from the southwest direction
2. Jalan Bukit Bintang from the east

By analysing the accesses to the 6 parking facilities, they can in fact be clustered into two groups:

1. BB Plaza, Sg. Wang Plaza and Imbi Plaza.
   (BB Plaza and Sg. Wang Plaza parking are in fact connected by ramps)
2. KL Plaza, Lot 10 and Star Hill.

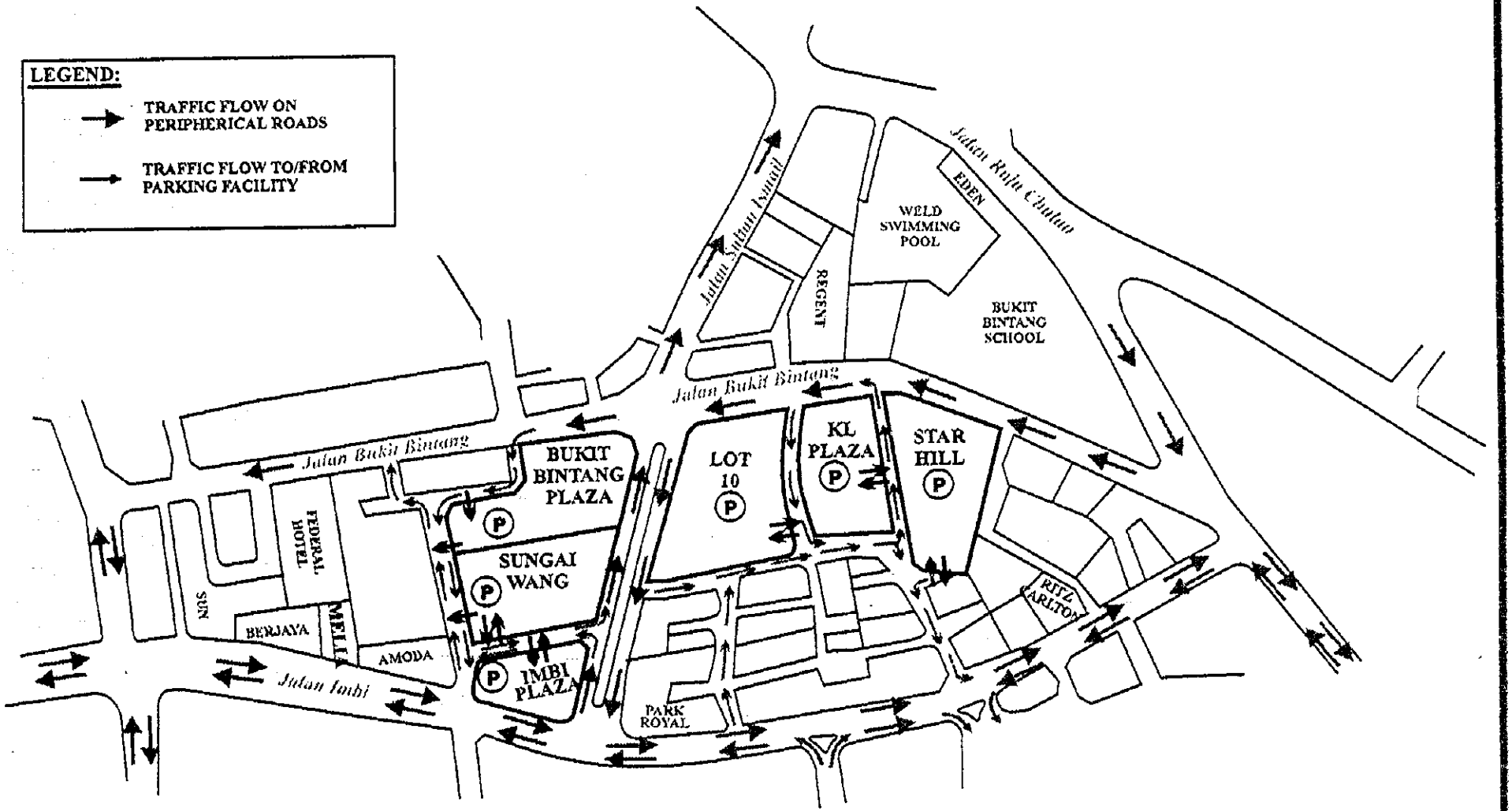
This grouping of parking facilities would simplify information to be given to users and be easily understood at a glance. By clustering them, users will find it easy to approach the complexes.

There are three accesses to parking facilities at Lot 10, KL Plaza and Star Hill complexes cluster. They are one way access streets namely:

- Lrg Walter Grenier from Jalan Imbi (next to Park Royal Hotel)
- Private access (between KL Plaza and Wisma Peladang) from Jalan Bukit Bintang.
- Jalan Walter Grenier from Jalan Sultan Ismail.

Three accesses to parking facilities at BB Plaza, Sg. Wang and Imbi Plaza complex cluster are:

- Two way access via Jalan Bulan 1 from Jalan Imbi (next to Amoda Building)
- One way access via Jalan Bulan 1 from Jalan Bukit Bintang
- Two way access via Jalan Bulan 2 from Jalan Sultan Ismail.



TRAFFIC CIRCULATION IN CASE STUDY AREA

Figure no :

10.3.2

10.3.4 Levels of Parking Guidance

Conceptually there shall be four levels of guiding information to be provided to drivers, en-route to the parking facilities in response to a user's need for parking information. The sequential provision of information to satisfy such need is illustrated in the chart below:

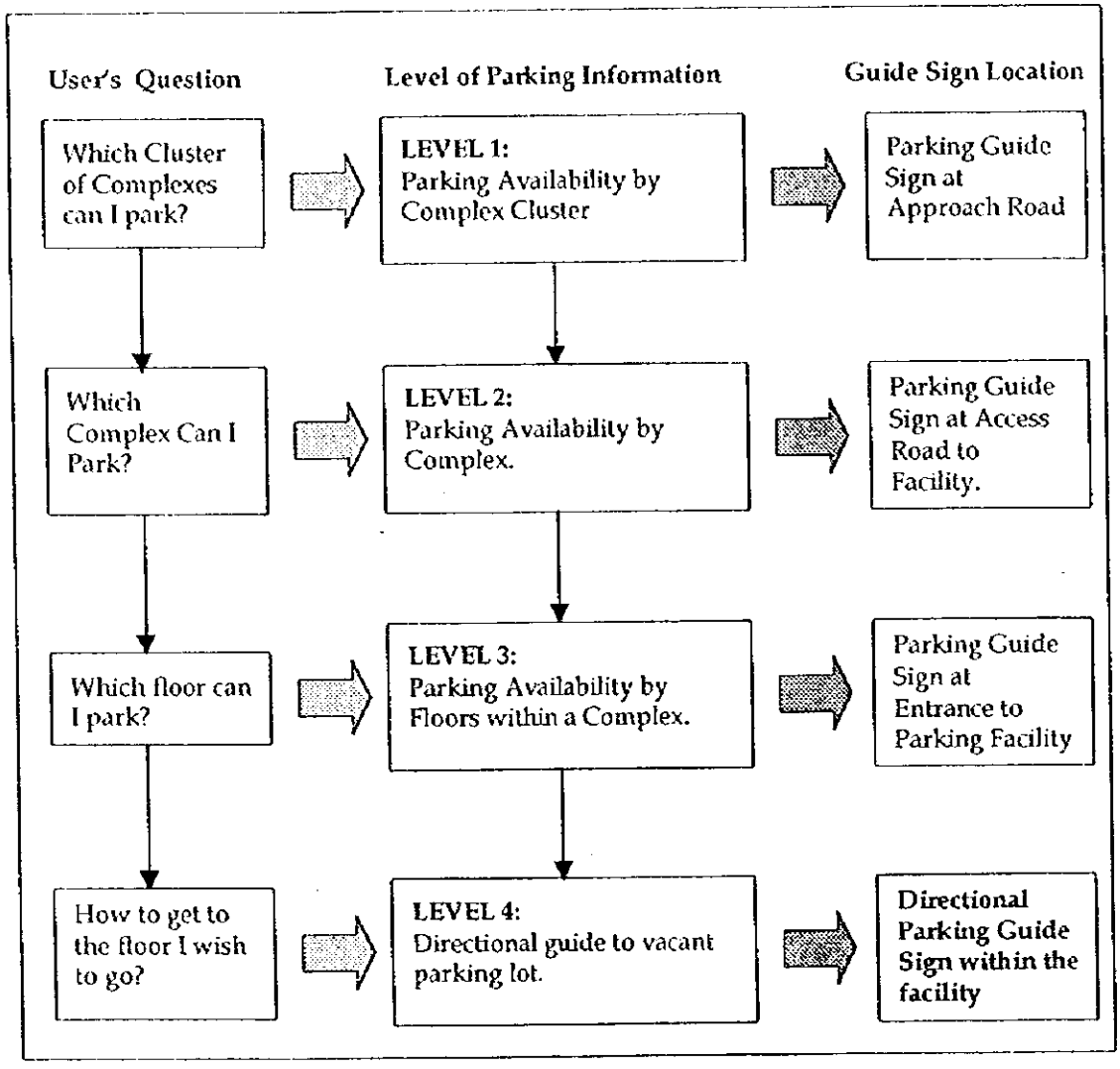


Figure 10.3.3 Concept of Parking Guidance Signage System

As a parking user approach the shopping district, the first decision he is going to make is which cluster of complexes he would like to park his vehicle. A parking guide sign informing of parking availability at the Lot 10/KL Plaza/Starhill or the BB Plaza/Sg. Wang/Imbi Plaza is therefore required. Now, once he has decided to park at the Lot 10 area, then the next decision he has to make is which complex should he park and thus he wants to know whether parking is still available at Lot 10, or KL Plaza or Starhill. A parking guide sign to this effect is therefore required.

When he has reached the entrance of the parking facility of his choice, he is now ready to be guided to his parking lot at the available floor and finally at the vacant lot. Signs guiding him to the floor and lot are therefore required. These signs must be carefully deployed to provide the information at suitable timing and thus location to the users.

Signs should be of consistent type and design. Sizes are to be carefully decided based on visibility and site requirements or constraints. Such signs should also be preferably be of the LED type signs.

10.3.5 Location of Parking Guidance Board Along Approaches

The first level of parking guidance shall be installed at approaches to the shopping area indicating the number of parking lots available by cluster. For easy identification, colours like red lettering for the number of lots shall be used. Signs should also be outstanding, clearly visible from a distance not less than 10m. They should also be simple to understand with directional graphics. The numbers of available lots are rounded-up to 5 or 10s. Users should not be required to slow down or even stop to read the signs so that a smooth traffic flow can be maintained. Shoppers approaching the area shall be informed of the cluster of complexes having available parking lots. An example of such sign is given below.

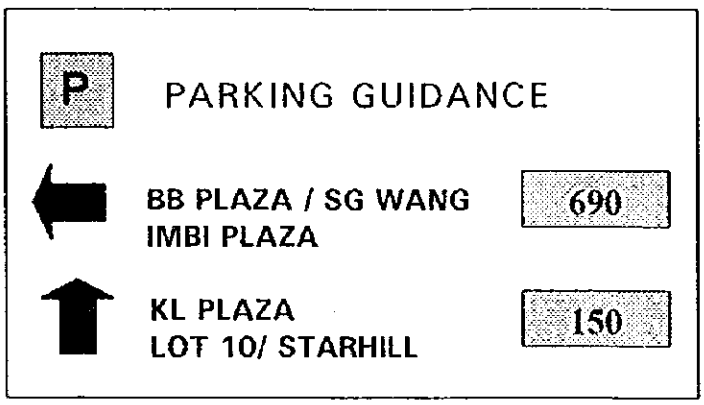


Figure 10.3.4 **An Example of a Level 1 Parking Guidance Sign Showing Available Lots by Cluster of Complexes**

10.3.6 Parking Guidance at Access Road to Facility

The second level of guidance shall be the use of similar signs as those in Level 1 to guide the users to the complex with parking availability. These signs should also be simple and clear. They shall be installed at upstream to the entrance of access roads such as Jalan Bulan 1 and 2, Jalan and Lorong Walter Grenier leading to the cluster of complexes. An example of such sign is given below:

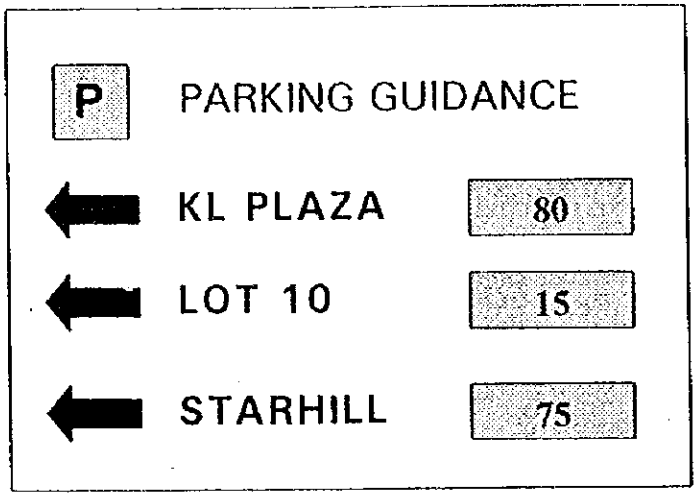


Figure 10.3.5 **An Example of a Level 2 Parking Guidance Sign Showing Available Lots in Individual Complex**

10.3.7 Parking Guidance at Entrance to Facility

The next level of parking guidance shall be the provision of information of parking availability within the complex. This involves giving the users on the availability of parking lots on the different floors or sections of the parking facility. Such signs are to be erected at the entrance to the parking facilities.

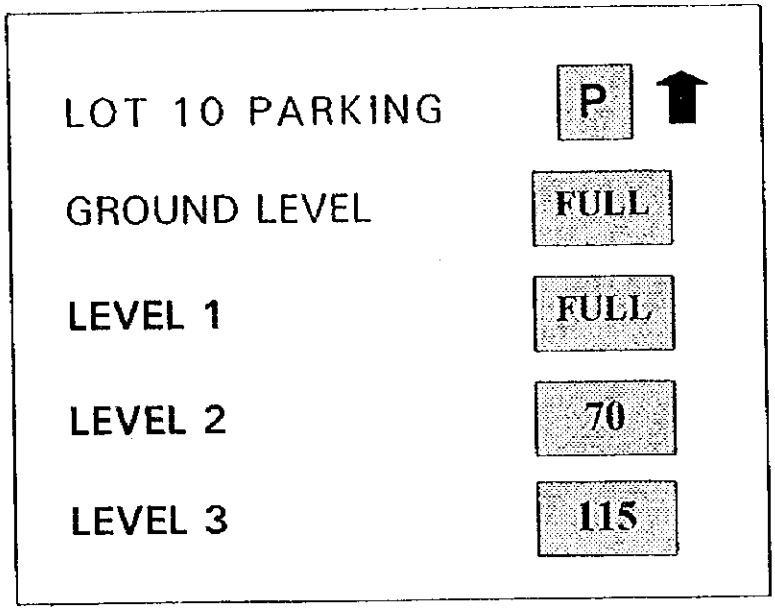


Figure 10.3.6 **An Example of a Level 3 Parking Guidance Sign Showing Available Lots by Floor**

10.3.8 Parking Guidance within the Facility

Finally, the users shall be guided to the appropriate level of the building to park his vehicle. Guide signs in the facility should be appropriately placed to guide the users up or down ramps to the floor having vacant lots. Examples of such signs are given below.

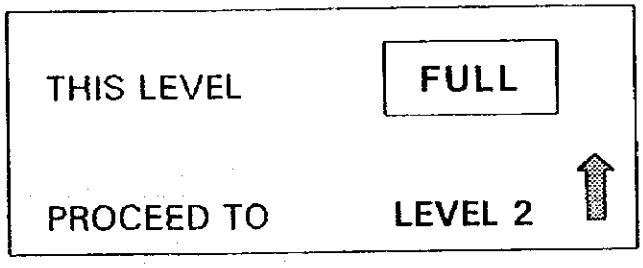


Figure 10.3.7a **An Example of a Level 4 Parking Guidance Sign**

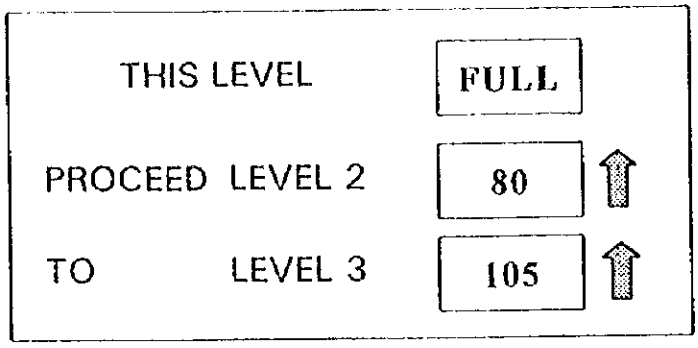


Figure 10.3.7b Another Example of a Level 4 Parking Guidance Sign

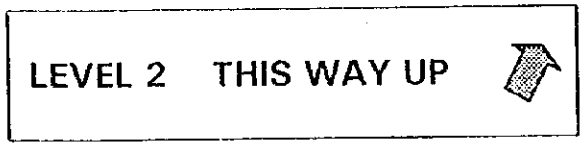


Figure 10.3.7c Another Example of a Level 4 Parking Guidance Sign

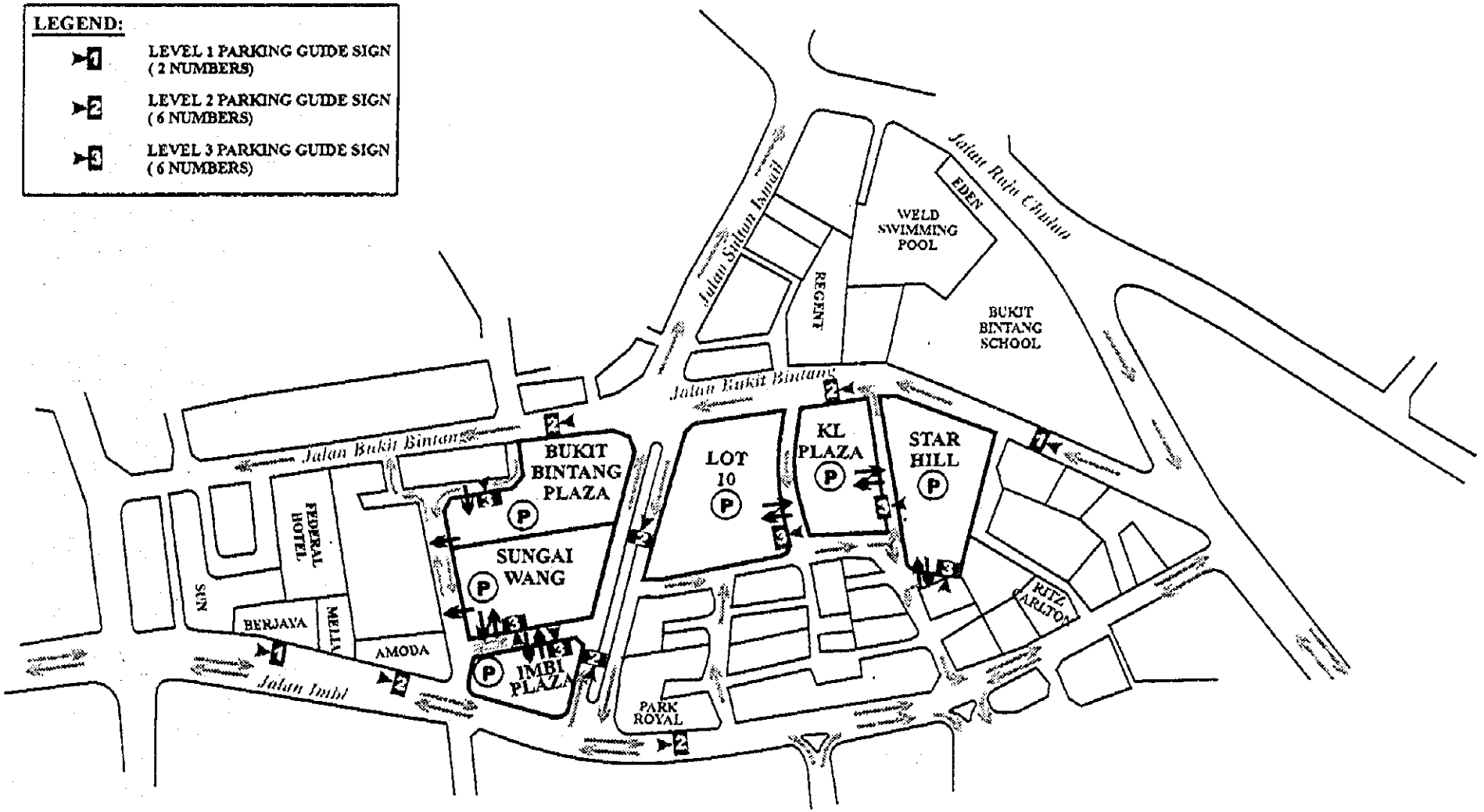
10.3.9 Proposed Location of Parking Guidance Signs

Figure 10.3.8 shows the proposed location of en-route parking guidance signs to the parking facility in the Bukit Bintang/Lot 10 shopping district.

Two Level 1 signs are proposed to be located at Jalan Imbi approach and the other at Jalan Bukit Bintang approach. The Jalan Imbi Approach sign should be deployed at about 100-200 m from the entrance to Jalan Bulan 1. The other should be deployed at 100-200 m from exit from Jalan Gading. The exact location of these signs is very important and therefore requires more detailed determination on site. Survey must be conducted on site to ensure no blockage of signs by any structures or other signage.

Six Level 2 signs are proposed at about 10m to 30m depending on site situations, just before the access road entrances to the parking facilities. Two shall be deployed along Jalan Imbi, two along Jalan Bukit. Bintang and two along Jalan Sultan Ismail.

1. Entrance to Jalan Bulan 1 from Jalan Imbi,
2. Entrance to Lrg. Walter Grenier from Jalan Imbi,
3. Entrance to Lot 10 access road (Wisma Peladang) from Jalan Bukit. Bintang,
4. Entrance to Jalan Bulan 1 from Jalan Bukit. Bintang
5. Entrance to Jalan Walter Grenier from Jalan Sultan Ismail and
6. Entrance to Jalan Bulan 2 from Jalan Sultan Ismail.



PROPOSED INSTALLATION LOCATION OF PARKING GUIDE SIGNS

Figure no :

10.3.8

Six Level 3 signs are required each at the respectively parking facility, namely, BB Plaza, Sg. Wang Plaza, Imbi Plaza, Lot 10, KL Plaza and Starhill Plaza. If any of the plazas have multiple entrances in future, such sign should also be deployed at the additional entrance.

The number and location of Level 4 signs are not proposed here as it shall depend on the facility internal floor design, floor height, ramp location and other factors. Among the Level 4 signs are also the EXIT signs, which are also very important for guiding users out of the parking facility in a smooth and clear manner.

10.3.10 Estimated Costs of System

The parking guidance system as studied above will cost an estimated sum of RM2.85 million to implement. (Table 10.3.2)

This cost includes one time centralised processing system cost. This centralised processing system can cater to multiple guidance systems depending on the size of the systems (up to 30 - 50 subsystems). The remote system cost is the cost of the various guidance panels or signs. The costs estimated include all the wiring costs within reasonable distances. The central processing system also includes requirements for providing information to users through the Internet.

Table 10.3.2 Estimated Cost for Parking Guidance System

No.	Descriptions	Capital Expenses (RM)	Operation Expenses (RM/Year)
1	Centralised Processing System	750,000	80,000
2	Remote System (per sub-system or district)		
a.	Level 1 guide signs (2 nos)	300,000	6,000
b.	Level 2 guide signs (6 nos)	900,000	18,000
c.	Level 3 guide signs (6 nos)	900,000	18,000
TOTAL		2,850,000	122,000

Note : estimate by study team

The system will also require a yearly operational cost of about RM122,000 assuming no replacement of the panels. This operation cost covers only the standard power consumption and replacement of standard consumables.

It should be noted that the above estimate is based on a trial system (i.e. a potentially 'one-off' system only). The cost for the remote system portion can be lowered by up to about 30% if there is 'volume' deployment. It should also be noted that this cost is for a standard design system with basic requirements and functions as described in the preceding sections.

10.4 Case Study of Public Transport Information System Along Jalan Ampang

To examine how the Public Transport Information System can work to improve service level of public transport, a case study of a Bus Transport Information System along a popular bus corridor is carried out in this Study.

10.4.1 Selection of Bus Route

On examining the various major bus service routes in Kuala Lumpur, Jalan Ampang is selected for a case study for the provision of Bus Information System. Bus service on Jalan Ampang is relatively simpler than the other major bus corridors like Jalan Cheras or the Federal Highway. Most of the buses "stayed on" Jalan Ampang between KLCC to the intersection of Jalan Ampang with MRR (II) (Ampang Point Intersection) except for 3 services that branch off to Jalan Jelatek. The other buses branch off to serve the residential areas like Taman Bukit Indah, Kg. Tasek Permai, Tmn Ampang Jaya and others after they the Ampang Point Intersection.

Jalan Ampang is seriously congested during the peak hours. Due to physical constraint, bus priority lane is not been implemented along Jalan Ampang. As a result, bus service level on this major arterial can not be improved by this measure.

The travel time survey also reveals that travel speed along Jalan Ampang during the peak hours is below 30kph. As buses have to compete with other vehicles, travel speed for buses along Jalan Ampang is even lower on account of their need to stop at the bus stops.

10.4.2 Bus Transport Service Along Jalan Ampang

A one day simple bus observation survey was carried out along Jalan Ampang to collect the following information:

- Location of all bus stops
- Observation at a selected stop of all arrival time of buses by service number,
- Estimate occupancy (full, ½ full, ¼ full, empty)
- Record bus registration plate numbers.

Observation on bus arrival time, occupancy was conducted at the bus stop in front of Ampang Walk, about mid way along Jalan Ampang. Jalan Ampang has 16 bus services by Intrakota, Cityliner, Metro bus companies. (Table 10.4.1) The recently opened PUTRA LRT Feeder Buses also serve a short stretch of Jalan Ampang. The table below shows the bus services along Jalan Ampang by the three major bus companies. Some of these services have similar destination and origin. Bus No.23 by Intrakota (Pasar Seni to Tmn Bukit Indah) and No.183 by Cityliner (Lebuh Ampang to Tmn Bukit. Indah) have similar destination. Although their origins namely Lebuh Ampang and Pasar Seni in downtown Kuala Lumpur differ, they are close to each other. So are Intrakota 34D and Cityliner 182; Intrakota 24 and Cityliner 178.

Table 10.4.1 Bus Service Routes Along Jalan Ampang

Bus Company	No.	Bus Service No.	Service Points
Intrakota	1	23	Pasar Seni to Tmn Bukit Indah
	2	24	Pasar Seni to Kg.Tasek Permai
	3	24A	Chow Kit to Kg. Tasek Ampang
	4	24C	Terminal S.Mohd to Kg.Tasek Ampang
	5	34A	Chow Kit to Lembah Jaya
	6	34D	Pasar Seni to Lembah Jaya
	7	66	Lot 10 via KLCC to Ampang
	8	259	Lot 10 to AU3 Tmn Keramat
	9	279	Lot 10 to Setiawangsa
	10	326	Pasar Seni to Wangsa Maju Sec.10
City Liner	11	176	Lebuh Ampang to Tmn Sri Muda
	12	178	Lebuh Ampang to Kg.Tasik Permai
	13	182	Lebuh Ampang to Lembah Jaya
	14	183	Lebuh Ampang to Tmn Bkt Indah
	15	185	Lebuh Ampang to Tmn Sri Watan
Metro	16	28	Ampang to Jalan Tunku A. Rahman

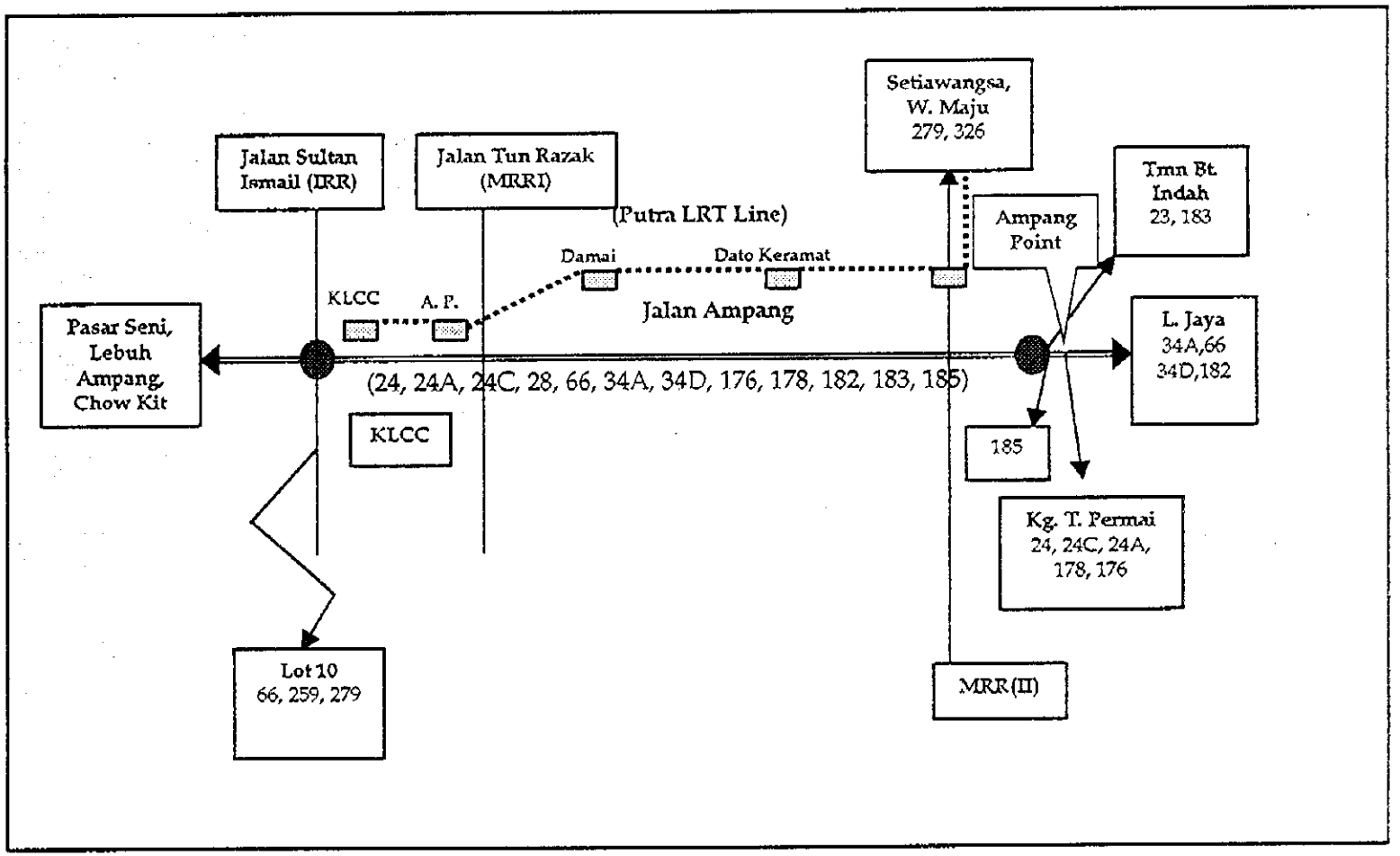


Figure 10.4.1 Bus Services Along Jalan Ampang

As illustrated in *Figure 10.4.1* above, out of the 16 bus services, 12 travel on the same road section between Ampang Point Intersection and KLCC junction. This situation offers a bus user many alternative buses to take if he is informed of the fact that the particular bus he is waiting for is not due to come soon. For instance, if a user wishes to go to Lot 10 and if the Bus Transport Information Sign tells him that bus No.66 or 259 or 279 are not coming soon, he can therefore take other buses to the KLCC junction and transfer or even walk from there. And if the sign tells him that a bus 66 is only 200m away, then he will feel less uneasy and wait for this bus to come.

10.4.3 Bus Service Frequency

The simple survey reveals some fairly important points on bus services along Jalan Ampang.

- Buses do not follow any fix time tables or schedules after the first run,
- Some buses run on different service routes at different time of the day.
- While bus frequency on some service routes are good (at an average of 10minutes to 15minutes interval) others can be very poor.

Table 10.4.2 shows the frequency, the shortest and longest headways as well as the observed occupancy rates of buses along Jalan Ampang from 7.30am to 10.00pm on a typical workday.

Table 10.4.2 Service Level of Inbound Buses Along Jalan Ampang

No.	Bus Co.	Service No.	Frequency	Headway (min) Shortest	Headway (min) Longest	Occupancy Rate Crush	Full	½	¼	E
1	Intrakota	23	34	2	145	4	11	13	6	-
2		24	10	7	238	-	-	6	4	-
3		66	22	10	160	-	5	8	7	2
4		259	17	24	138	2	3	5	6	1
5		270	15	30	156	-	2	6	5	2
6		326	8	25	205	-	2	4	1	1
7		24A	23	2	76	-	5	11	7	-
8		24C	24	13	75	-	6	9	8	1
9		34A	33	10	53	-	11	15	7	-
10		34D	24	3	85	-	7	7	8	2
11	Metro	28	71	1	46	3	14	35	17	2
12	Cityliner	176	54	1	65	5	15	17	13	4
13		178	34	2	87	3	4	11	13	3
14		182	37	1	65	-	12	8	13	4
15		183	22	14	60	-	3	8	9	2
16		185	21	1	133	-	7	5	8	1

Note : results of one-day survey between 7am to 10am only
Occupancy rates are observation estimates.

The entire 'crushed' situations in buses occurred during the morning peak hours. 24% of the 449 buses observed had 'full' occupancy and 37.4% had 'half full' occupancy rate. Including the 'crushed' cases, about a third of the observed total buses were fully occupied. Together the 'crushed', 'full' and 'half full' make up more than 65% of all buses. This shows that buses on Jalan Ampang are generally crowded.

Figure 10.4.2 shows the scattering pattern of bus arrival time by route number of some of the bus services. For the inbound bus services, for example, there were more than 70 runs by Metro 28 buses but only 10 by Intrakota 24 during the time period of 7am to 10pm. For the Intrakota 24 service, there are large time gaps between services for the time periods 1pm - 4:30pm and again at 5.30pm - 7.30pm. Frequency between buses thus varies greatly.

The bus service situation along Jalan Ampang may or may not represent the general bus service situation in the Klang Valley, but it shows that bus users are often subjected to infrequent and irregular service, bus services that do not follow any fixed timetable and thus unpredictable services.

There are many potential bus service improvement measures that can be implemented to address these problems. One of course is to widen Jalan Ampang and implement a bus priority lane to ensure better travel time for buses. The others are management measures to improve bus frequency and to operate the service on fixed timetables.

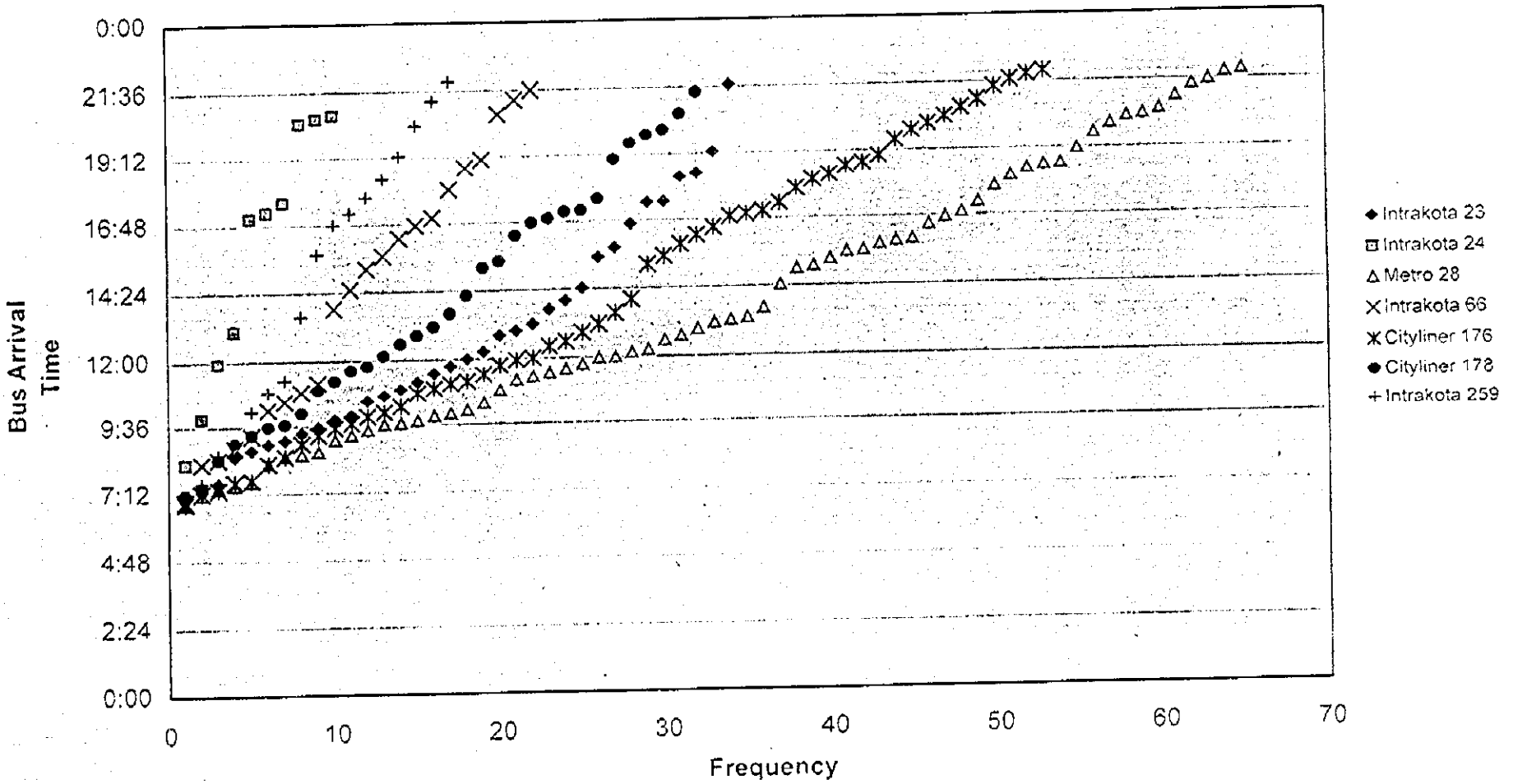
In terms of ITIS system contribution, a simple bus information system that can provide bus users some information on the bus movement along Jalan Ampang can be implemented to improve the service level of buses. It must be noted however that such a system is not a total solution to the bus service problem. It merely helps to uplift the 'service level' of bus transport to the users.

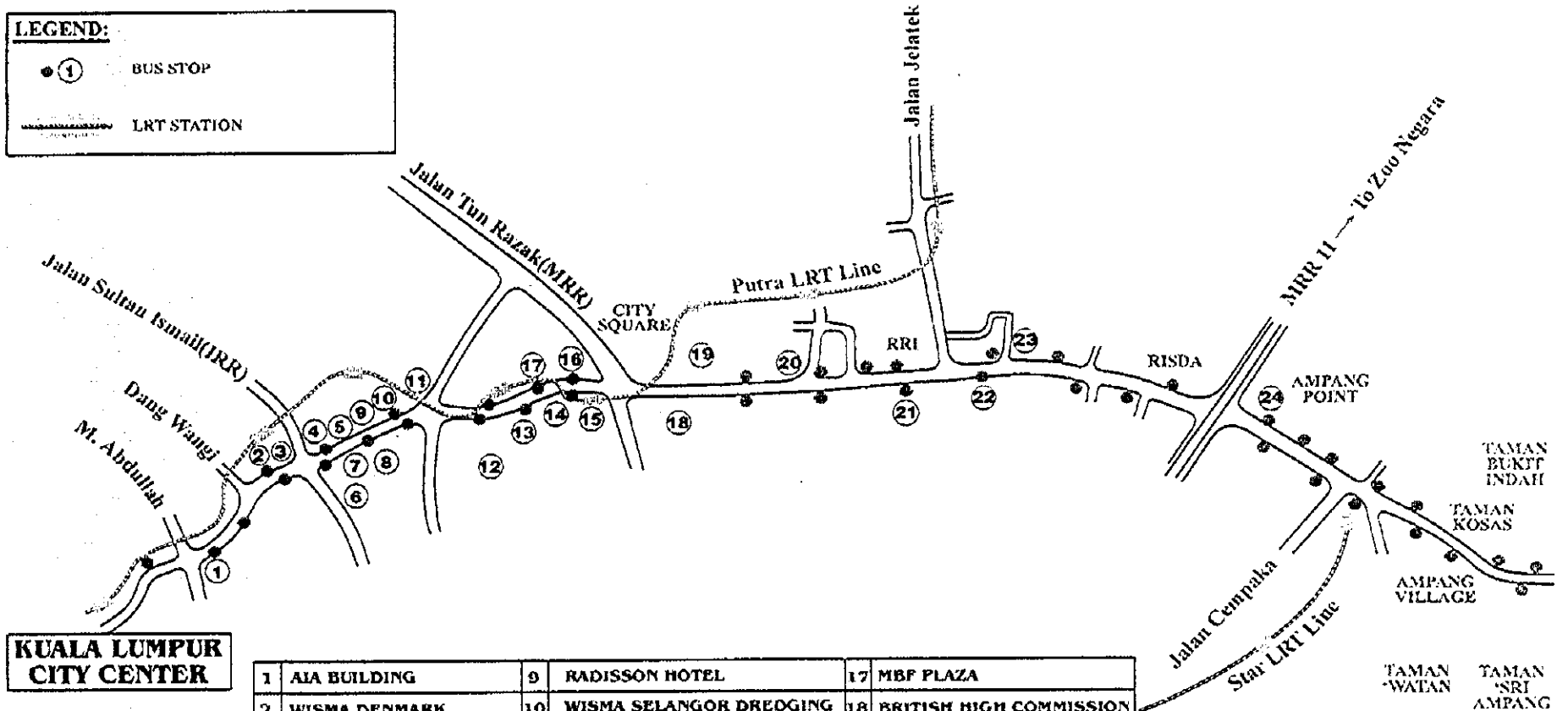
10.4.4 Location of Bus Stops

Figure 10.4.3 shows the location of bus stops along Jalan Ampang. There are a total of 20 stops outbound and 21 stops inbound along the 11km section of Jalan Ampang between Jalan Munshi Abdullah and Tmn Bukit Ampang. The average interval of bus stops is therefore around 500m.

Due to the occurrence of possible bus jamming at bus stops, buses of different companies sometimes stop at different locations. An example is in front of Ampang Park Shopping Complex. In effect, there is only one stop, although there may physically be three bus stop signs put up for the three different bus companies.

Figure 10.4.2: Service Frequency of Inbound Buses on Jalan Ampang





1	AIA BUILDING	9	RADISSON HOTEL	17	MBF PLAZA
2	WISMA DENMARK	10	WISMA SELANGOR DREDGING	18	BRITISH HIGH COMMISSION
3	GRAND HYATT HOTEL	11	MENARA PUBLIC BANK	19	FRENCH EMBASSY
4	RENNAISSANCE HOTEL	12	KLCC	20	AMPANG WALK
5	NEW WORLD HOTEL	13	MENARA TR	21	WISMA PEKERSO
6	CONCORD HOTEL	14	MENARA LION	22	BARRACK
7	MATIC	15	NIKKO HOTEL	23	GLEN EAGLE HOSPITAL
8	B.S.N. BUILDING	16	AMPANG PARK	24	AMPANG POINT

LOCATION OF BUS-STOPS ALONG JALAN AMPANG

Figure no :

10.4.3

Bus stop on the outbound stretch between Jalan Munshi Abdullah and Jalan Dang Wangi are no longer functional due to the fact that the stretch of Jalan Ampang is now a one-way operation road.

10.4.5 Concept of Bus Location System

The Bus Information System proposed here is a form of Bus Location System whereby buses are equipped with identifying antennas so that they can be tracked and monitored by a system operator in a control centre. The location of these buses can then be displayed on a map showing where they are along a particular chosen route. Such information are then send to sign boards installed at major bus stops or the terminals. User can request the information on the location of the next or coming bus(es) in relation to his location.

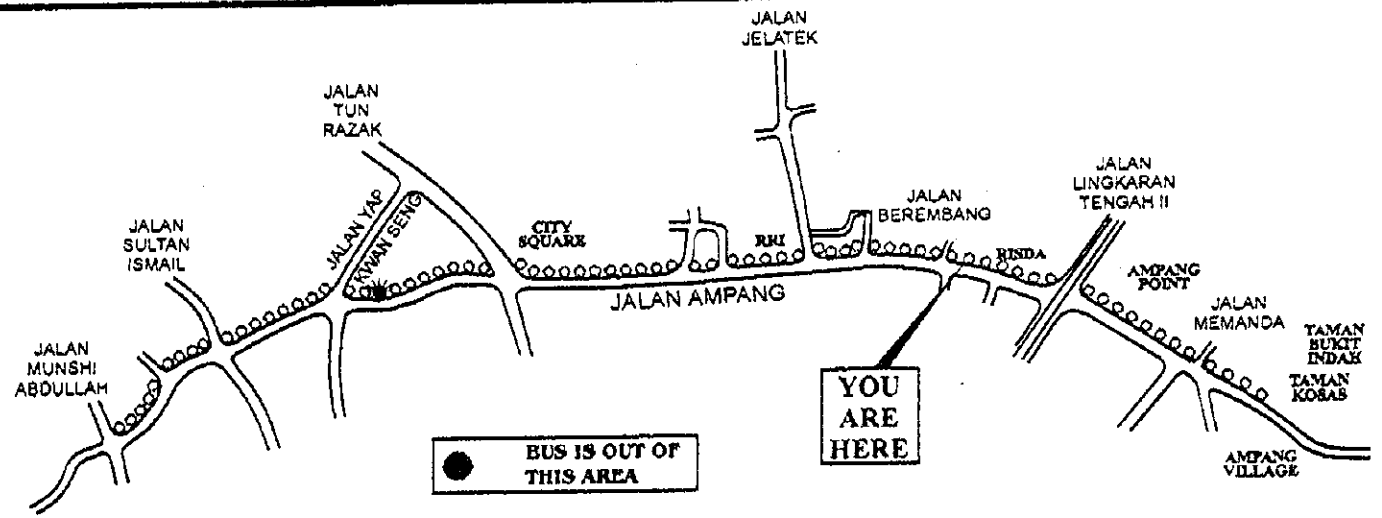
The objective of such a system is to provide bus users information on the position of the bus he is waiting for, whether it is a few hundred meters away or otherwise. Such information can reduce the feeling of uneasiness or uncertainty of bus users. It can also help the user to make his decision of whether to wait for a particular bus to come, or to use an alternative bus but transfer at another stop; or use a taxi instead.

10.4.6 Example of A Bus Transport Information Sign At Selected Bus Stops

Figure 10.4.4 shows an example of a Bus Information Sign to be deployed at selected major bus stops. The example shown here consists of a route diagram of Jalan Ampang with LED indicator lights on the sides of the road. Each light represents a distance of about 200m.

The signs are equipped with request buttons by bus routes. Since there are as many as 16 bus services, those with similar O and D may share a single button. E.g. Intrakota 23 and Cityliner 183 can share one button. A user wishes to know the location of bus number 23 or 183 could simply press down this button and the locations of these buses, if they are within the road section shown on the route diagram, will light up. The location of the user must be indicated on the sign. For easy reference a 'You are here' indication will be clearly marked on the sign for users to judge the position of the required buses in relation to his position.

BUS INFORMATION SYSTEM



INSTRUCTIONS : PRESS BUTTON AGAINST ROUTE NUMBER TO KNOW THE PRESENT LOCATION OF YOUR BUS

● ..... 23 OR 183	● ..... 24 OR 178
● 28	● 185
● 66	● ..... 24A OR 24C
● 176	● 34A,34D,182

BUS NUMBER	DESTINATION
23,183	TAMAN BUKIT INDAH
24,178	KAMPUNG TASIK PERMAI
24A,24C	KAMPUNG TASIK AMPANG
34A,34D,182	TAMAN LEMBAH JAYA
66	TAMAN SRI AMPANG
176	TAMAN SRI MUDA
185	TAMAN SRI WATAN
28	AMPANG JAYA
HOTLINE	XXX-XXXX

PROPOSED INFORMATION DISPLAY SYSTEM AT BUS-STOPS ALONG JALAN AMPANG

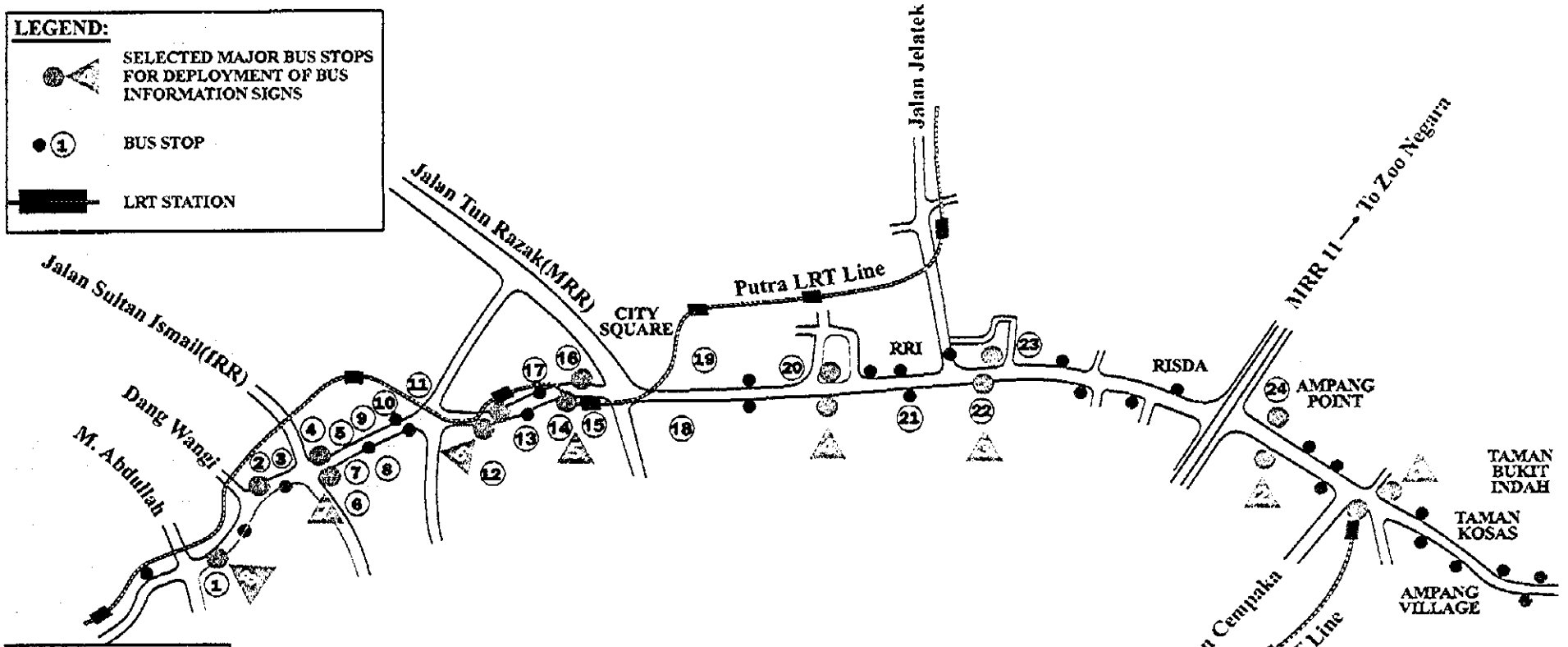
Figure no :

10.4.4

Such information signs are proposed to be deployed at major bus stops. Out of the total bus stops, 8 pairs are considered as major stops in terms of the catchment areas they serve. These major stops are located in front or the vicinity of major residential areas, shopping centres, LRT stations and other major office complexes. *Figure 10.4.5* shows the location of these major bus stops.

1.	In front of STAR LRT Ampang Station	-	Transfer point to LRT transport mode, Ampang village centre
2.	In front of Ampang Point Shopping	-	Major Shopping Centre
3.	In front of Army Barrack	-	Near Hospital and Public Institution (Red Crescent, barrack)
4.	In front of Ampang Walk	-	Shopping Centre, Schools and Embassies
5.	In front of Ampang Park	-	Transfer to LRT, major shopping centre and office complexes
6.	In front of KLCC	-	Transfer to LRT, major shopping centre and office complexes
7.	In front of MATIC	-	Close to major hotels, office complexes
8.	In front of AIA Bldg	-	Close to office complexes banks and shops

It must be noted that the above proposed bus information sign is by no means the ONLY type. Bus information of this kind can be displayed in many fashion and design. Any signs that suit the local conditions and users would be appropriate although complicated signs must be avoided. Moreover, design of such signs will also have to take into account the problem of possible vandalism and local weather conditions.



1	AIA BUILDING	9	RADISSON HOTEL	17	MBF PLAZA
2	WISMA DENMARK	10	WISMA SELANGOR DREDGING	18	BRITISH HIGH COMMISSION
3	GRAND HYATT HOTEL	11	MENARA PUBLIC BANK	19	FRENCH EMBASSY
4	RENNAISSANCE HOTEL	12	KLCC	20	AMPANG WALK
5	NEW WORLD HOTEL	13	MENARA TR	21	WISMA PEKERSO
6	CONCORD HOTEL	14	MENARA LION	22	BARRACK
7	MATIC	15	NIKKO HOTEL	23	GLEN EAGLE HOSPITAL
8	B.S.N. BUILDING	16	AMPANG PARK	24	AMPANG POINT

MAJOR BUS STOPS FOR DEPLOYMENT OF BUS INFORMATION SIGNS

Figure no :

10.4.5

10.4.7 Estimated Cost for the System

Costs for implementing the proposed system are estimated as given in Table 10.4.3 below. Cost is divided into capital expenses and operational expenses and for the two alternative options of using either the trunk radio or SMS radio systems.

Table 10.4.3 Estimated Costs for Bus Information System

No.	Descriptions	Capital Expenses (RM)	Operation Expenses (RM/Year)
1.	**Option 1: Trunk Radio**		
a.	Centralised Processing System	1,250,000	120,000
b.	Remote systems		
	• Mobile bus system (40 buses)	3,200,000	120,000
	• Bus stop mimic Inquiry panel (16 Panels)	2,400,000	48,000
	Total	**6,850,000**	**288,000**
2.	**Option 2: SMS method**		
a.	Centralised Processing System	1,200,000	120,000
b.	Remote systems		
	• Mobile bus system (40 buses)	4,400,000	200,000
	• Bus stop mimic Inquiry panel (16 Panels)	2,720,000	80,000
	Total	**8,320,000**	**400,000**

Note : estimate by study team, costs inclusive of necessary wiring
Assuming 40 buses to be equipped with in-vehicle units.

The capital expenses for the system will amount to an estimate of RM6.85 million for Option 1 and RM8.32 million for Option 2. This estimates is done by assuming a system with 40 buses fitted with the on-board equipment and 16 mimic panels at bus stops along the route. From the previous section, taking into account some overlapping routes, this estimate assumes 10 bus service routes each with 4 buses. 16 panels were proposed at 8 major bus stops as described in the previous section.

The system will also require an estimated yearly operational cost of between RM288,000 for Option 1 and RM400,000 for Option 2.

It should be noted that the above cost estimate is based on a trial system and if 'volume' increases, costs for the remote systems can be reduced by up to about 30%. The centralised processing system is a one time cost and it can cater to multiple sub-systems up to about 100 depending on the size of these sub-systems. The cost of this central processing system also include costs of various equipment necessary to provide information to users through the Internet as well as cabling cost to the mimic panels. It must also be noted that the costs estimated above are based on a standard design system.

The success of such a proposed bus information system will also depend on the careful examination and re-routing of the bus services by different operators on Jalan Ampang. For ease of operation, management and design, for instance, bus services on Jalan Ampang may need to be re-organised to have one major company serving on all routes along Jalan Ampang so that all the buses can be consistently fitted with the mobile units. These are but some of the other issues that have to be addressed in the detail design stage before implementation.

11

PROPOSAL FOR AN ITIS MANAGEMENT AUTHORITY

11.0 PROPOSAL FOR AN ITIS MANAGEMENT AUTHORITY

11.1 Current Traffic Information Management

11.1.1 Traffic Information Gathering

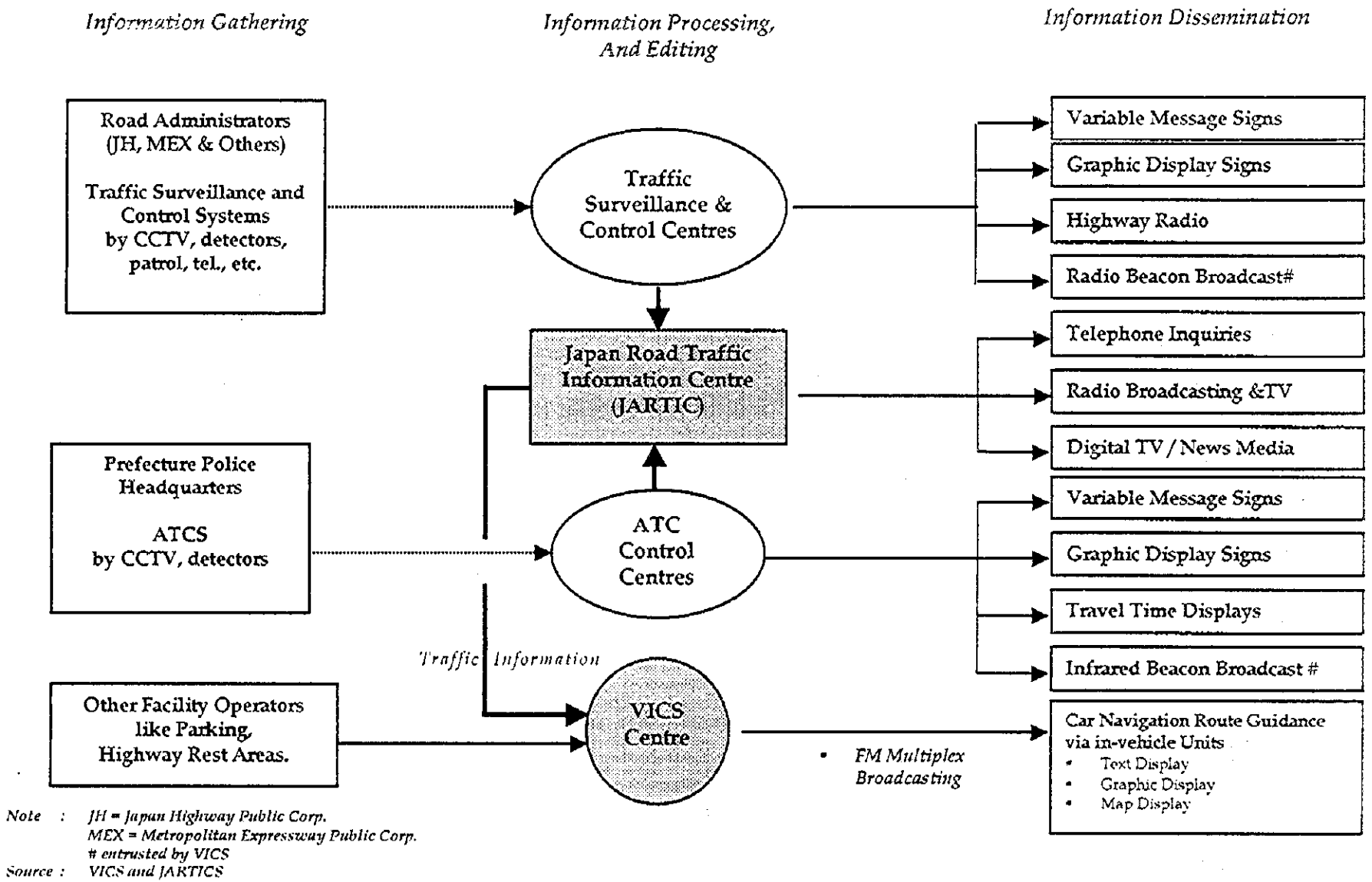
Currently, traffic information is gathered by the respective transport operators. There is therefore no single authority or body that gathers, processes and disseminates all the information in an integrated and collectively manner in the Klang Valley and MSC.

Traffic information is gathered based principally on administrative jurisdiction. Within the administrative boundary of Kuala Lumpur for instance, all traffic related matters including traffic information are gathered by DBKL. For the other areas of the Klang Valley, namely districts of Selangor, traffic information such as traffic volumes on the federal roads are gathered by the Highway Planning Unit of the Ministry of Works. Traffic accident data is compiled by the traffic division of the National Police. Analysis of accident data excluding those in Kuala Lumpur is done collectively involving the National Police, HPU and the Traffic Accident Safety Council. Traffic information on the NS Expressways and other toll highways are gathered by their respective operators namely the concessionaires. These may be done either manually by patrol units or calls from users; or automatically by detectors or sensors. By government requirements, these data are sent to the Malaysian Highway Authority on a periodic basis except those approved by DBKL or JKR. Operator for Jalan Cheras and Jalan Pahang (under Metramac) is required to forward the data to DBKL and, those for Jalan Kuching (under Kamunting) and North Klang Straits Bypass (under Shapadu) are required to forward their data to JKR.

11.1.2 Traffic Information Dissemination

As discussed in sections of previous chapters, the present main media of real time traffic information dissemination is by FM radio broadcasting. Traffic information from DBKL and some of the highway operators are either sent to the broadcasting stations by telephone or fax twice a day (morning and evening) on weekdays to enable the broadcasting of general traffic situations on the highways and city streets of Kuala Lumpur, PJ and others. Some operators have established telephone hot lines which users or the public can call in to find out any traffic situations.

Although some of the current highway operators are equipped with sophisticated traffic information gathering equipment like vehicle sensors for automatic incident detection and VMS for information dissemination, they are not fully utilised to provide information either on the highways themselves or the city streets. The latter is due to the very fact that there is no information integration or exchange system established so far in the Klang Valley area. To date, there is also no operator that has set up wayside radio broadcasting system in giving continuous traffic information to the road users. Graphic signs are also not used in any of the existing toll roads or city streets for providing traffic information to users.



Note : *JH = Japan Highway Public Corp.*
MEX = Metropolitan Expressway Public Corp.
 # entrusted by VICS
Source : *VICS and JARTICS*

Figure 11.3.2 Relationship of Road Administrators, JARTIC and VICS in Japan

11.1.3 Present Traffic Information Management Features

In summary, the present traffic information management in the Study Area or in Malaysia can be said to possess the following features:

- No Uniform Traffic Information Management System

Each highway operator chooses the type of traffic control and management system it wants, as there is no specific standard specifications required by the Government. System specification therefore varies from one operator to another. Data gathered by different operators therefore are in different format and this definitely will hinder data exchanges.

- No Integration or Sharing of Information

There is little or no integration or exchange of information so far between various highway operators or road administrators in the Study Area. The scope of information given to users is therefore very limited. They are only pertaining to situation within the boundary of one operator only. Traffic information on adjoining streets or areas are not available to users before they exit the system. They may therefore unknowingly exit a certain highway via a very congested exit route than a much less congested one at the next exit point if only such information was given.

- Little Information Dissemination to the Public

Due to the limitation of information integration and exchange between operators, traffic information given by any one operator is therefore limited. The potential of VMS is not fully utilised in many of the existing toll highway systems. Information given on the VMS is constrained to those for the particular toll road only or advisory in nature.

11.2 Public Agencies Involved in Traffic Management and ITS in Malaysia

11.2.1 Present Traffic Management Organisations

There are several government agencies responsible for gathering and managing traffic information in the Study Area. They are therefore involved in ITIS development in Malaysia in one way or another. They are:

a) Malaysian Highway Authority under the Ministry of Works,
b) Highway Planning Unit under the Ministry of Works
c) Kuala Lumpur City Hall.

Their functions are briefly described below.

a. The Malaysian Highway Authority

The Malaysian Highway Authority (MHA) is a quasi government body established under the Ministry of Works, and vested with the legal authority as stipulated in the Malaysia Law Act 231 "Highway Authority Malaysia (Incorporation) Act 1980" to 'supervise and execute the design, construction and maintenance of highways as determined by the Government.' The Act also allows the MHA to enter into contracts, collect toll, set up a MHA Fund and regulate the use of the highways under its care. It is also authorised to set rules on the use of property of the Authority, types of vehicles allowed on the highway, control of traffic and everything for the betterment and proper use of the highways and facilities.

With the privatisation program of the Government, MHA is also responsible to provide advice on the operations of all privatised toll roads in the country except those, which may have been approved by other agencies. MHA basically advises the Government on various technical issues regarding the construction, operation and management of any toll road project in the country. Management of toll roads approved by the Federal Government is required by law to provide traffic data gathered to MHA on a regular basis. These would include traffic volume data, traffic accident and others.

In this sense, although MHA has a considerable amount of traffic information, it has not established any system to enable it to disseminate these information directly to the public. Traffic information received from the various operators is compiled into specific reports by MHA annually for its own operational use only.

b. Highway Planning Unit

The Highway Planning Unit under the Ministry of Works undertakes the planning of federal roads found in the Study Area. It carries out annual traffic counts at various stations on the federal roads and publishes such information in the 'Road Traffic Volume Malaysia' yearbooks.

HPU also analyses the accident records on federal roads gathered by the Traffic Police Agency together with the National Traffic Safety Council. HPU does not directly disseminate any traffic information to the public.

c. Dewan Bandaraya Kuala Lumpur

DBKL manages all traffic information within the city of Kuala Lumpur. The main source of information is from its SCATS ATC system and the recently installed ITACA system. Some information on traffic volume at three tolled road sections namely Jalan Kuching, Jalan Pahang and Jalan Cheras are also gathered.

Traffic information is disseminated to the public via the commercial FM radio broadcasting. Information on traffic flow and congestion for example are given by the traffic control centre in DBKL via telephone or fax twice a day to the radio stations for broadcasting. Information is also given to the public via telephone hotlines manned by DBKL.

DBKL is in the process of establishing an internet homepage to provide a wide range of information to the public including traffic information, public transport information and information on traffic management measures like detours, one-way diversion and others.

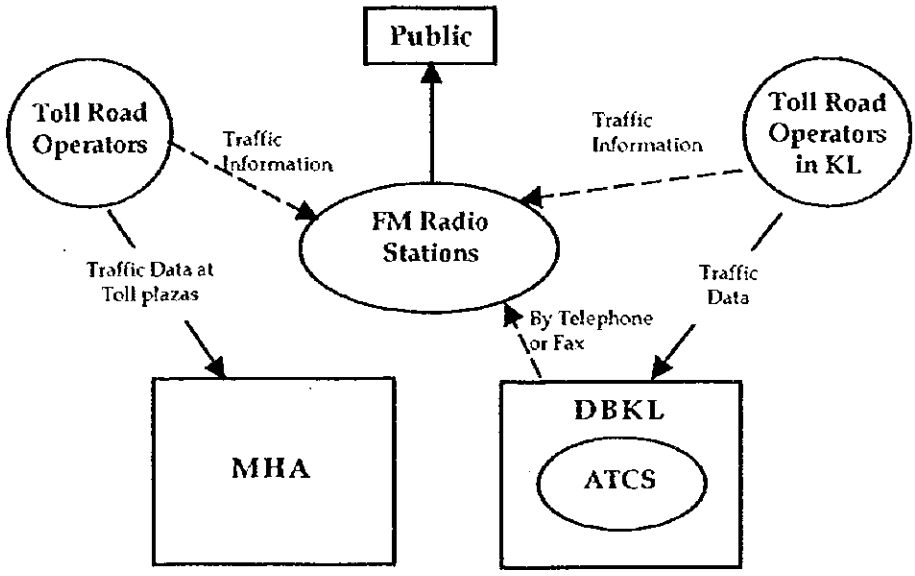


Figure 11.2.1 Present Traffic Information Management Flow in Study Area

11.2.2 Other ITS Related Agencies

The other agencies that would have jurisdiction over the implementation or development of ITIS in the Klang Valley and MSC are:

a) Ministry of Energy, Communication and Multi-media,
b) Ministry of Transport
c) Ministry of Science, Technology and Environment,
d) Ministry of Entrepreneur Development,
e) Multimedia Development Corporation (MDC).
f) Others

The roles of these agencies in terms of implementation of ITS in Malaysia are briefly described below.

a. Ministry of Energy, Communication and Multi-media

The MoECM is responsible for regulating the telecommunication, broadcasting and computing industries in Malaysia. Therefore, the standardisation of communication system to be used in ITS in future would require the active involvement of this Ministry.

There is also a Multi-media Development Commission (CMC) under this Ministry that oversees the application and development of IT projects in the MSC. Any proposal on ITIS may also come under the perusal of The National Information Technology Council (NITC) which is the authority on IT development at the national level.

b. Ministry of Transport

The Ministry of Transport enforces the Road Transport Ordinance for road traffic. It sets the various national level transport policies and is responsible for the registration of vehicles through the JPJ (Road Transport Department).

c. Ministry of Science, Technology and Environment

The Ministry of Science, Technology and Environment is responsible among other things to set the various environment quality standards. The implementation of Air Pollution Monitoring System in future for instance would require the active participation of this ministry.

d. Ministry of Entrepreneur Development

The Ministry of Entrepreneur Development is responsible for regulating the operation of commercial vehicles including trucks and buses. The implementation of commercial vehicle management system and public transport, specifically the bus information systems for example, would involve the participation of this ministry.

e. Multimedia Development Corporation (MDC)

The MDC is the corporate body directly in charge of developing the MSC. It is thus authorised to plan and develop the corridor. Although the approval of projects has to be given by the relevant local authorities, MDC provides advice on various private projects within the MSC. MDC is responsible for the implementation of the ITS project currently being planned for Cyberjaya.

f. Others

There are also other organisations that would be involved in ITIS implementation in the country. These include the various Municipalities (Majlis Perbandaran) and District Councils under the Ministry of Housing and Local Government, who manage many of the distributor roads. In the Klang Valley and MSC, these would include:

1. MPPJ (Municipality of Petaling Jaya)
2. MPSJ (Municipality of Subang Jaya)
3. MPSA (Municipality of Shah Alam)
4. MPK (Municipality of Klang)
5. MPKJ (Municipality of Kajang)
6. MPS (Municipality of Selayang)
7. District Council of Sepang
8. District Council of Hulu Langat

11.2.3 ITS Projects in Cyberjaya and Putrajaya

There are two specific ITS projects currently being planned and at varying degree of progress within the Study Area. These are the ITS projects in Putrajaya and Cyberjaya.

A. ITS Project in Cyberjaya

The ITS project is directly under the jurisdiction of MDC. MDC has commissioned a private firm to plan and implement the project with the setting up of a City Command Centre (CCC). The conceived system plan for Cyberjaya's MEGAJAYA CCC PLAN includes 4 major monitoring functions covering such areas as:

a) Advanced Traffic Management,
b) Integrated Utilities Management,
c) Interactive Community Services and
d) Municipal and Public Amenities.

Under the Advanced Traffic Management function is the setting up of an area wide traffic surveillance system to monitor and manage traffic movement including public transport, parking and provide residents with such information. The PLAN also envisaged the introduction of vehicle tracking systems for public transport vehicles and trucks using GPS technology. This system however is still in its very initial development stage and there is no concrete engineering design plan being prepared yet.

B. ITS Project in Putrajaya

Putrajaya project is being developed by the Putrajaya Corporation (PJC), a corporate company formed to plan, develop the National Administrative Centre of Putrajaya. The ITS project in Putrajaya is similar to that for Cyberjaya with a set up of a City Control Centre (CCC). The centre is to oversee three main systems namely the Intelligent Transport System, Facilities Management System and Public Information & Emergency System. Each of these systems will have their respective sub-systems.

1. Intelligent Transport System	-	Advanced Traffic Management System
	-	Advanced Traveller Information System
2. Facilities Management System	-	Road Infrastructure Management System
	-	Park & Environment Management System
	-	Asset Maintenance & Contract Mgmt.

3. Public Information & Emerg. Sys.
   - City Wide CCTV Surveillance System
   - Emergency Management System
   - Public Information System

This project is also in its very initial development stage.

11.3 The Case of JARTIC and VICS in Japan

As a reference to how the administrative framework can be developed in Malaysia for the implementation of ITIS Project, the study team attempted to review any available examples in other countries.

Although many countries in Europe, America, and Asia have been actively involved in the research and deployment of ITS in the last few years, Japan stands out as the only country that has any specific administrative set-up for the collective management of traffic information. The necessity became even more apparent when Japan embarked on its car navigation system for which it is now the forerunner in the world. Traffic information system within a specific toll highway or urban area in most developed countries is individually managed by the respective system operators who bear the cost of putting up the various traffic surveillance systems and managing them. Car navigation systems with dynamic route guidance functions have yet to be implemented on a wide scale in most of these countries. Even in the US, car navigation system used in some states has only static guidance function only.

The advancement of ITS industry in Japan is by no means a coincidence. As early as the 70's, Japan has embarked on the research of various traffic management systems and the need to collectively manage the vast amount of traffic information gathered by the various transport related agencies.

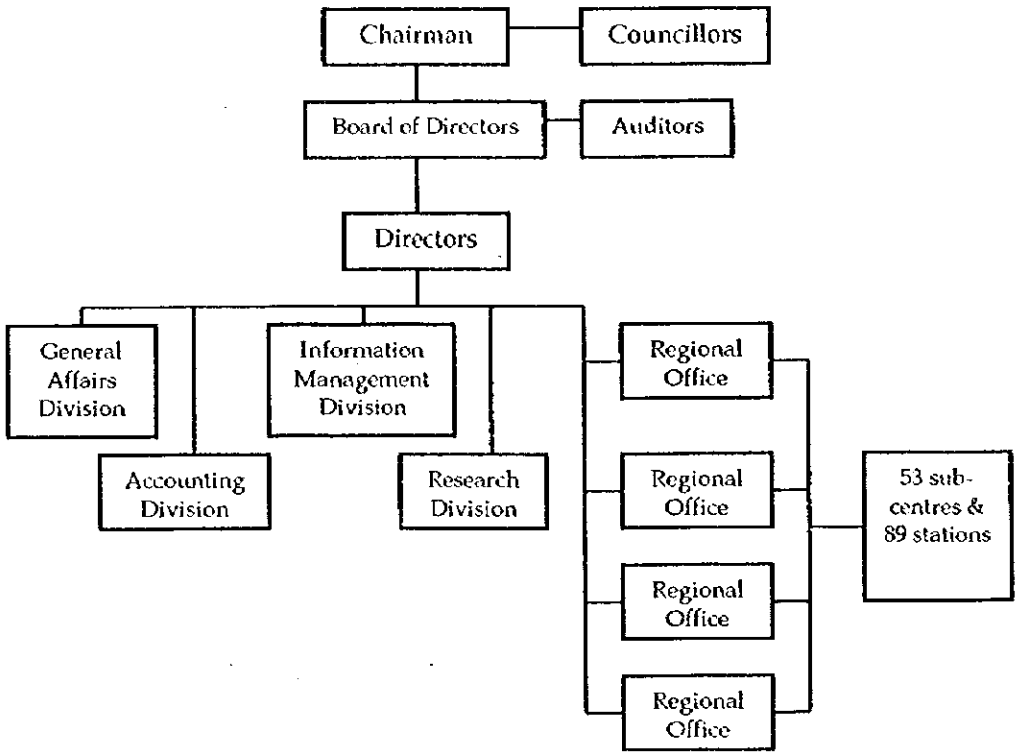
In Japan, road traffic information are gathered mostly by the National Police Agency as well as road administrators such as the Japan Highway Public Corporation (JH), Metropolitan Expressway Public Corporation (MEX) and others. In Japan, the National Police Agency at the prefecture levels operates most of the Area Traffic Control Systems (ATCS) for all the urban areas. JH operates and manage the nationwide interurban expressways while others like MEX manages urban expressways in the major metropolitans like Tokyo.

With the rapid growth in traffic demand and consequently traffic accidents during the economic boom years of the 70s, it was felt that all these information must be integrated and centralised to reap more benefits. It was with this aim that the Japan Road Traffic Information Centre (JARTIC) was formed in January 1970.

The organisation was set up as a non-profit foundation with the support of the Ministry of Construction and the National Police Agency of Japan.

To standardise and ensure the timely collection of the vast amount of traffic information, JARTIC dispatches personnel to be attached with the various road administrators and operators. With its HQ in Tokyo, it is organised into 4 regional offices (Tokyo, Nagoya, Osaka and Fukuoka) which together operate 53 sub-centres and 89 stations throughout Japan. See *Figure 11.3.1.*

These sub-centres are attached to the Prefecture Police Agency particularly the Traffic Control Centres. Stations are mostly the civil engineering department of the prefecture government offices.



Source : JARTIC

Figure 11.3.1 Organisation Structure of JARTIC

Traffic information gathered from the various sub-centres and stations are compiled, edited and integrated at the regional offices and which disseminate them to the users via various means, among which are telephones, facsimile, commercial radio and TV stations, digital TV, newspapers and others. Real time traffic information (updated every 5min) was given to areas within a radius of 50km in the Tokyo Metropolitan Area) via the digital TV broadcasting. In Year 1996, there were more than 12 million telephone inquiries on traffic situations. This works out to be about more than 32,000 calls a day.

The information provided by JARTIC is not confined to just traffic but also traffic management measures, detours, weather alerts (snow storm, typhoon, etc).

It also facilitates the exchange of traffic information between the various road administrators and users. Traffic information on city streets is therefore made available to urban expressway operators who then incorporate such information into their information dissemination system via VMS or wayside broadcasting. *Figure 11.3.2* shows the flow of traffic information from the various road administrators and prefecture police headquarters to JARTIC.

JARTIC also plays an important role in vehicle navigation system in Japan. As it gathers all the available real time road traffic information, it is in the best position to provide them on a real time basis to navigational units installed in individual private vehicles. In Japan, this is done via another centre called VICS, which further processes and edits the information in the required format before giving to the users. Like JARTIC, VICS is also a foundation with support from the Government of Japan.

VICS (Vehicle Information and Communication System) Centre therefore further compliments the functions of JARTIC. Besides road traffic information from the JARTIC, it also gathers information on parking for example directly from parking operators and from service & rest areas on expressways. Estimated journey times are processed and provided by VICS. Real time traffic information is then given to drivers via 3 means, wayside radio wave beacon broadcasting, infrared beacons and FM multiplex broadcasting. Real time traffic information broadcasting using roadside radio wave beacon is entrusted by VICS centre to the road administrators while those by infrared beacon is entrusted to the traffic management bodies.

Figure 11.3.2 shows the relationship of JARTIC, VICS and road users. Traffic information signals beamed at road users are displayed on the in-vehicle units (IVU) in three different levels. At level 1, it is a simple text display that says " xxx section congested, divert to xxx". In a level 2, a graphic display that shows simple road junction with congested section in colours is given while a map display which shows congested road sections are superimposed on maps is shown at level 3.

Traffic information is given on certain expressway sections in Japan via the highway radio broadcasting system. Of course road users are given other information via VMS and graphic display signs by the expressway administrator on the expressway as well as at approaches to or egresses from these highways.

Traffic information given via the car navigation system is more spatially restricted. In Japan, traffic information (VICS information) to car navigation users are limited to the three major metropolitan areas of Tokyo, Osaka and Nagoya areas with a coverage of about 50km radius each. There are now over 1 million users of VICS in Japan who is regarded as the forerunner in this particular niche of ITS.

In the case of Japan, the traffic management and surveillance system costs were borne by the various toll road operators when they were put in place. Likewise, cost of the ATC and its surveillance system is borne by the Prefecture Police. JARTIC does not implement any specific system but it collates and disseminates information it gets from other organisations.

The initial cost of establishing JARTIC and VICS as well as the operation and maintenance costs of these two foundations are harnessed from contributions mainly from private organisations. The list of private sector contributors to VICS for example includes not just automobile manufacturers and communication related companies, but also banks, major manufacturing companies, insurance and power supply companies.

Information from JARTIC is given to road users free of charge. Information given by the toll road operators is considered as a service by these operators and no additional charge is levied on the highway users. Likewise, traffic information given by the ATC system is free.

For the car navigation system, however, the users of such service have to purchase the in-vehicle units and the necessary software in the form of a CD-ROM or DVD. Thus, the charge for such information is indirectly collected from users via sale of such gadgets and road map database. Users need only pay a small one-time initial subscription fee to use the car navigation service. Information transmission via FM carrier is done by the NHK (Japan National Broadcasting Corporation) and since it is a government agency; no additional charge is levied on users

11.4 Proposal for A Malaysia Traffic Information Authority (MTIA)

From the discussions above, it is clear that the implementation and operation of a successful ITIS involves many key industries notably the transport sector, telecommunication, broadcasting and so on. It also requires the active roles from both the public and private sectors. The key considerations in proposing a suitable administrative set-up for the implementation of ITIS in Malaysia shall therefore have to bear the following points in mind:

i. The proposed ITIS will generate a large amount of social benefits that are difficult to quantify and would also be difficult to collect payments from the users. The Project should therefore be viewed as an important social infrastructure investment by the Government of Malaysia and thus should be implemented by the Government. It is not appropriate to be privatised as these information are of national security interests to the government and social in nature;

ii. Many government agencies will be involved in regulating the various aspects of the ITS industry and an advisory committee or council make up of representatives from these various ministries or agencies to oversee the implementation should be formed to ensure consensus and compliance of various sectoral requirements or regulations,

iii. There are various existing systems operated by different organisations both public and private, that need to be integrated into the ITIS,

iv. There is a need to have a single authority to facilitate the standardisation and integration of all traffic information gathering, processing and dissemination practice and procedure in the study area.

v. With the ITS industry still in its infant development stage in most of the countries in the region, there is great opportunity for Malaysia, through the implementation of the ITIS Project to encourage home-grown ITS related industries that may see its technology being exported to neighbouring countries in the near future.

With these considerations in mind, an independent quasi-government agency, similar to agencies like the MHA, and tentatively called the Malaysia Traffic Information Authority (MTIA) should be formed to implement the ITIS Project, and to operate and manage the ITIS centres.

Compared to the case of Japan, however, MTIA shall be a single agency that implements, manages and operates the ITIS and will eventually implement and manage the future car navigation system as well. A tentative administrative set-up is suggested below.

The MTIA may be headed by a Director General to be appointed by the Government and who shall work closely with a council or steering committee. The council or steering committee shall make up of representatives from:

a) Ministry of Works (Malaysian Highway Authority and HPU),
b) Ministry of Transport (Land Transport)
c) Ministry of Energy, Communication and Multi-media,
d) Ministry of Entrepreneur Development
e) Ministry of Science, Technology and Environment
f) DBKL
g) National Police Agency
h) MDC and PJC
i) Department of Broadcasting
j) Department of Mapping and Survey
k) All relevant Municipalities and District Councils.

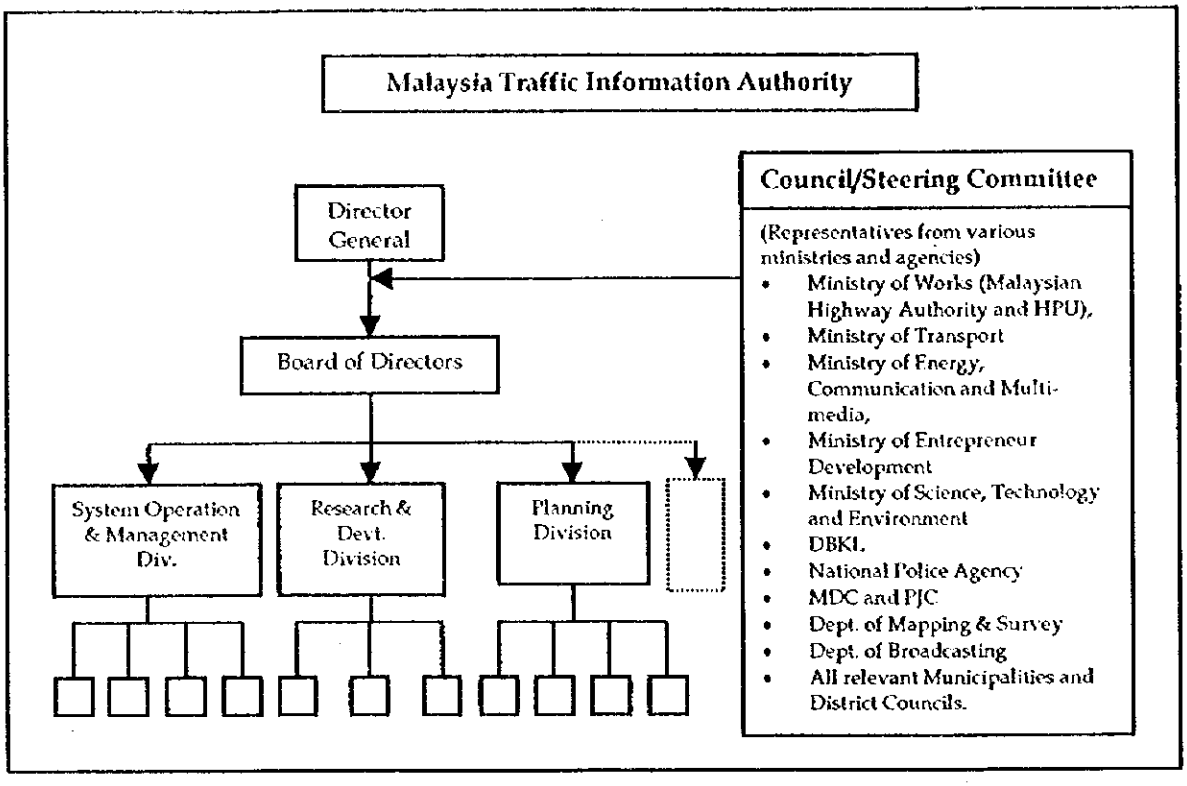


Figure 11.4.1 A Proposed Administrative Set-up for MTIA

Under the top management will be several divisions headed by technical directors. These may include Operation & Management (system operation and ITIS centre), Planning, Research & Development and System Integration Divisions.

To further strengthen the administration of MTIA, it could include the direct participation of other quasi government bodies like MHA, MIMOS and the MDC which are experienced traffic or IT related entities. Therefore, the board of directors may include top management personnel seconded from MHA, DBKL, MIMOS and MDC. MHA and DBKL are two organisations that have accumulated substantial knowledge in traffic management and traffic information handling. Both organisations could help in facilitating information exchanges with the existing systems and ensure good co-ordinations. MIMOS is the authority in research on IT related fields while MDC could provide strong marketing supports. Through MIMOS and MDC, home grown industries on ITS could be promoted and realised in Malaysia and later marketed to other countries in the region.

The specific roles and functions of MTIA shall therefore include:

i. to implement the ITIS Project in the Klang Valley and MSC and expand the system to other regions of the country,

ii. to operate, maintain and manage the ITIS system,

iii. to gather traffic information via various means as proposed in the ITIS Plan in a standardised manner and procedure,

iv. to integrate and utilise other information that are available from existing system with those gathered by the ITIS Project,

v. to process, compile and consolidate all these traffic information at the ITIS centre,

vi. to disseminate these processed information to road users and public via various means as proposed in the ITIS Plan,

vii. to facilitate the exchange of information between ITIS centre with those of the existing systems,

viii. to promote the research and development of ITS related industries in the country.

REAM is currently in the process of preparing the ITS Masterplan. This masterplan when completed would provide the overall policy and legal framework including the administrative organisation for the implementation of ITS in this country. The above suggestion shall be further examined in line with these frameworks in the masterplan when it is completed and endorsed by the Government of Malaysia.

The MTIA should also set up regional centres in the northern and southern regions of Peninsular Malaysia to facilitate information gathering and dissemination on a nation wide scale. A regional centre could be established in Penang and another in Johor Bahru. The East Coast could have a regional centre in Kuantan. *Figure 11.4.2* below shows the proposed operational set-up of ITIS centre and sub-centres as well as the possible linkages with other existing systems.

The proposed ITIS Plan should be implemented by the Government using its development budget or with external soft loans. The project, at this stage, should not be privatised for various reasons. One of which is that it has far-reaching social impacts and the other is that information gathered has great implication on national security interests.

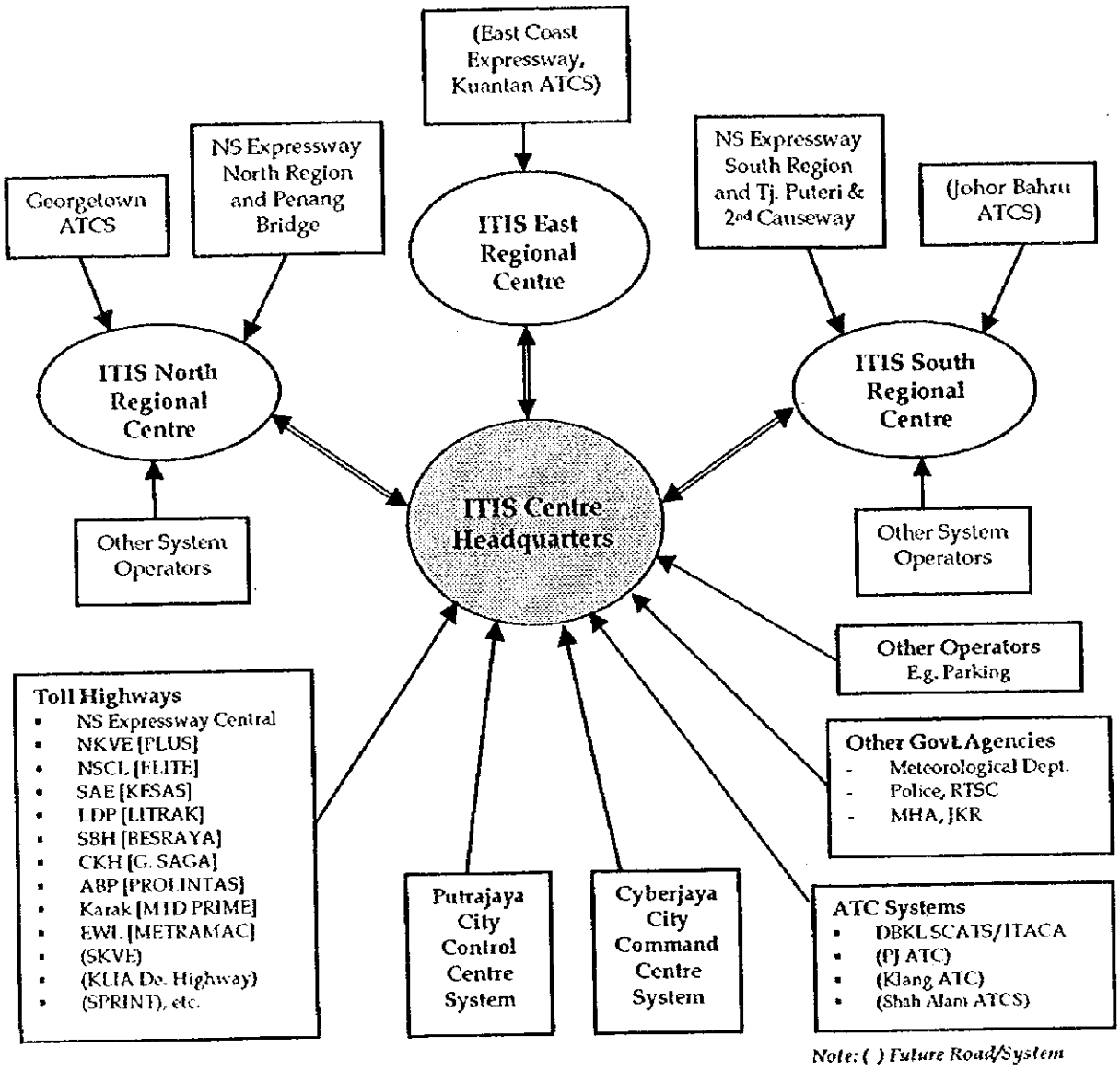


Figure 11.4.2 A Suggested ITIS Centres Set-up by MTIA

APPENDIX

(A) **OPINION SURVEY QUESTIONNAIRE FOR PRIVATE VEHICLE USERS**

Surveyor: _____ Date: _____
Location: _____ Time of Survey: _____

1. Show pictures on use of Integrated Transport Information System.

2. What is your main purpose in travelling using a car?
   - ☐ Commuting to office
   - ☐ Commuting to school/ college/ university
   - ☐ Leisure/ shopping/ social purpose
   - ☐ Business purpose

3. How frequently do you drive?
   - ☐ Everyday/ Almost everyday
   - ☐ Everyday during weekdays
   - ☐ 2-3 days on weekdays
   - ☐ Every weekend

4. Average driving time in a day
   - ☐ Less than 30 minutes
   - ☐ 31minutes to 1 hour
   - ☐ 1 - 1.5 hours
   - ☐ 1.5 - 2 hours
   - ☐ 2 - 3 hours
   - ☐ 3 - 5 hours
   - ☐ More than 5 hours

5. On days with no congestion (during festival periods), what is your average driving time
   - ☐ Less than 30 minutes
   - ☐ 31minutes to 1 hour
   - ☐ 1 - 1.5 hours
   - ☐ 1.5 - 2 hours
   - ☐ 2 - 3 hours
   - ☐ 3 - 5 hours
   - ☐ More than 5 hours

6. How is your driving route
   - ☐ Fixed
   - ☐ Almost fixed
   - ☐ Varies each time

7. To your knowledge what are the currently available sources of traffic information
   - ☐ Radio
   - ☐ Electronic Display Board
   - ☐ Others (please specify) _____

8. How many times in a day do you pass a toll gate?

- [ ] 0
- [ ] 1 to 2
- [ ] 3 to 4
- [ ] 5 to 6
- [ ] 7 to 8
- [ ] More than 8 times

9. How do you pay your toll?

- [ ] Cash
- [ ] Touch & Go
- [ ] Smart Tag
- [ ] Fastrak
- [ ] Others (please specify) _____

9a. If cash user, why don't you use the other systems that are available?

- [ ] Infrequent user
- [ ] Too difficult to obtain these cards
- [ ] Deposit requirement of card
- [ ] Not all toll booths have similar facilities
- [ ] Others _____

9b. If user of card system, how do you rank the use of these systems?

- [ ] Very good
- [ ] Good
- [ ] Average
- [ ] Not very good

10. For cash user, How much time do you think the card user saves at the toll gate?
For card user, How much time do you save at the toll gate by using the card compared to people who pay by cash?

- [ ] 0 to 5 minutes
- [ ] 6 to 10 minutes
- [ ] 11 to 15 minutes
- [ ] More than 15 minutes

11. Your comments to improve this system

_____

_____

_____

THIS SECTION IS TO BE COMPLETED BY THE INTERVIEW RESPONDENT

Please rank the following system from your point of view and perspective

	Type of Information	Importance Ranking
12	Seriousness of congestion (heavy, medium, light or no congestion) - (length of queue)	
13	Cause of congestion (accident, construction work, flood and etc.)	
14	Estimated travel time to reach the destination (in minutes)	
15	Route guidance (info on alternative route or fastest route available)	
16	Parking location in a certain area	
17	Availability of parking	

Importance Ranking
1: Very Important
2: Important
3: Average
4: Not Important

THIS SECTION IS TO BE COMPLETED BY THE INTERVIEW RESPONDENT

Please rank the following based on your view and perspective

How do you rank the current information that is available on traffic

	Type of Information	Very Satisfied	Satisfied	Not Satisfied
18	How congested a road is (heavy, medium, light or no traffic jam on the road)	1	2	3
19	Cause of congestion (accident, construction, vehicle breakdown,flood etc)	1	2	3
20	How long it will take for you to reach a destination (in minutes)	1	2	3
21	Advise you on the route that you should take (information on which is the fastest route)	1	2	3
22	Provide you information on the parking areas in an area (where you can park in an area)	1	2	3
23	Information on which parking areas still have spaces available and which are already full	1	2	3

How much are you willing to pay if the following traffic information can be provided. Payments are for each information provided.

	Type of Information	Amount willing to be paid
24	How congested a road is (heavy, medium, light or no traffic jam on the road)	_____ cents
25	Cause of congestion (accident, construction, vehicle breakdown,flood etc)	_____ cents
26	How long it will take for you to reach a destination (in minutes)	_____ cents
27	Advise you on the route that you should take (information on which is the fastest route)	_____ cents
28	Provide you information on the parking areas in an area (where you can park in an area)	_____ cents
29	Information on which parking areas still have spaces available and which are already full	_____ cents

Traffic information can be provided to you using various devices.
(Please refer to pictures or ask the interviewer if you need clarification on any of the following)

Before you start your trip (for example at your house before you start driving) which device do you prefer to supply you with traffic information:

	Type of Device	High Preference	Average Preference	Low Preference
30	Radio broadcasting	1	2	3
31	Telephone inquiry where you can call and obtain traffic information	1	2	3
32	Fax service where you can request for latest traffic info using fax	1	2	3
33	Internet facilities where you have a website providing latest traffic information	1	2	3

While you are driving you can be provided with traffic information using the following devices. Please rank which device you prefer to supply you with the traffic information.

	Type of Device	High Preference	Average Preference	Low Preference
34	Message sign placed along the road which continuously provides latest traffic information	1	2	3
35	An electronic board which shows the whole road network	1	2	3
36	A navigation system placed inside your car	1	2	3
37	Radio broadcasting	1	2	3
38	Roadside broadcasting (a particular frequency on the radio providing traffic information as you travel along a road)	1	2	3
39	Telephone inquiry where you can call and obtain traffic information	1	2	3

40 How do you choose which route to take

- [ ] Minimum travel time
- [ ] Minimum travel distance
- [ ] Minimum out of pocket cost (such as toll)

41 If the road you are travelling on is congested, and the ITIS system can provide you an alternative route, are you willing to use the alternative route?

- [ ] Yes, I am willing if there is no additional cost
- [ ] Yes, I am willing even if there is an additional cost
- [ ] No, I am not willing if there is an additional cost
- [ ] No, I am not willing even if there is no additional cost

(B) OPINION SURVEY QUESTIONNAIRE FOR PUBLIC TRANSPORT USERS

Surveyor: _____ Date: _____
Location: _____ Time of Survey: _____

1 Show pictures on use of Integrated Transport Information System.

2 What is your main purpose of travelling using public transport?
- [ ] Commuting to office
- [ ] Commuting to school/ college/ university
- [ ] Leisure/ shopping/ social purpose
- [ ] Business purpose

3 How frequently do you use the public transport?
- [ ] Everyday/ Almost everyday
- [ ] Everyday during weekdays
- [ ] 2-3 days on weekdays
- [ ] Every weekend

4 Average time spent commuting in public transport in a day
- [ ] Less than 30 minutes
- [ ] 31minutes to 1 hour
- [ ] 1 - 1.5 hours
- [ ] 1.5 - 2 hours
- [ ] 2 - 3 hours
- [ ] 3 - 5 hours
- [ ] More than 5 hours

5 On days with no congestion (during festival periods), what is the average time spent in a day commuting in public transport
- [ ] Less than 30 minutes
- [ ] 31minutes to 1 hour
- [ ] 1 - 1.5 hours
- [ ] 1.5 - 2 hours
- [ ] 2 - 3 hours
- [ ] 3 - 5 hours
- [ ] More than 5 hours

6 Which public transport do you use regularly?
- [ ] Bus
- [ ] Taxi
- [ ] LRT
- [ ] KTM8 Komuter

(can answer more than one answer)

THIS SECTION IS TO BE COMPLETED BY THE INTERVIEW RESPONDENT

Please rank the following system from your point of view and perspective

These following information on public transport can be supplied, please rank the importance of these information (Please circle your selection)

	Type of Information	Very Important	Important	Average	Not Important
7	Route information at bus -stops	1	2	3	4
8	Route information at terminals	1	2	3	4
9	Information on arrival times of buses and waiting times at bus-stops	1	2	3	4
10	Information on arrival times of buses and waiting times at bus terminals	1	2	3	4
11	Integration of the operations between various modes of public transport	1	2	3	4
12	Integration in the ticketing system on all public transport	1	2	3	4

How do you rank the current information that is available on public transport

	Type of Information	Very Satisfied	Satisfied	Not Satisfied
13	Route information at bus -stops	1	2	3
14	Route information at terminals	1	2	3
15	Information on arrival times of buses and waiting times at bus-stops	1	2	3
16	Information on arrival times of buses and waiting times at bus terminals	1	2	3
17	Integration of the operations between various modes of public transport	1	2	3
18	Integration in the ticketing system on all public transport	1	2	3

19 How much are you willing to pay in additional fare for the above information?

_____ cents

Public transport information can be supplied to you at your home by way of various facilities. How do you prefer to receive the public transport information:

	Type of Device	High Preference	Average Preference	Low Preference
20	Radio broadcasting	1	2	3
21	Telephone inquiry where you can call and obtain traffic information	1	2	3
22	Fax service where you can request for latest traffic info using fax	1	2	3
23	Internet facilities where you have a website providing latest traffic information	1	2	3

You can also be provided with the latest traffic information using the following devices. Please rank which device you prefer to supply you with the traffic information.

	Type of Device	High Preference	Average Preference	Low Preference
24	Changeable message sign at the terminal			
25	Electronic board display at bus-stops			
26	Exclusive traffic information station (Roadside broadcasting)			
27	Internet facilities			
28	Automatic telephone inquiry			
29	Fax services			