5 Construction of Transport Terminals

It is recommended that two types of transport terminals be established: one a freight terminal and the other a passenger terminal.

1) Freight Terminal

The main objective of a freight terminal is to effect the transfer of goods from one transport mode to another, for example, from railway to roadway or from inter-city lorry to intra-city lorry, so as to lessen the vehicle mileage of heavy vehicles and the travel time spent on the route.

The rationale for the establishment of a freight terminal is as follows.

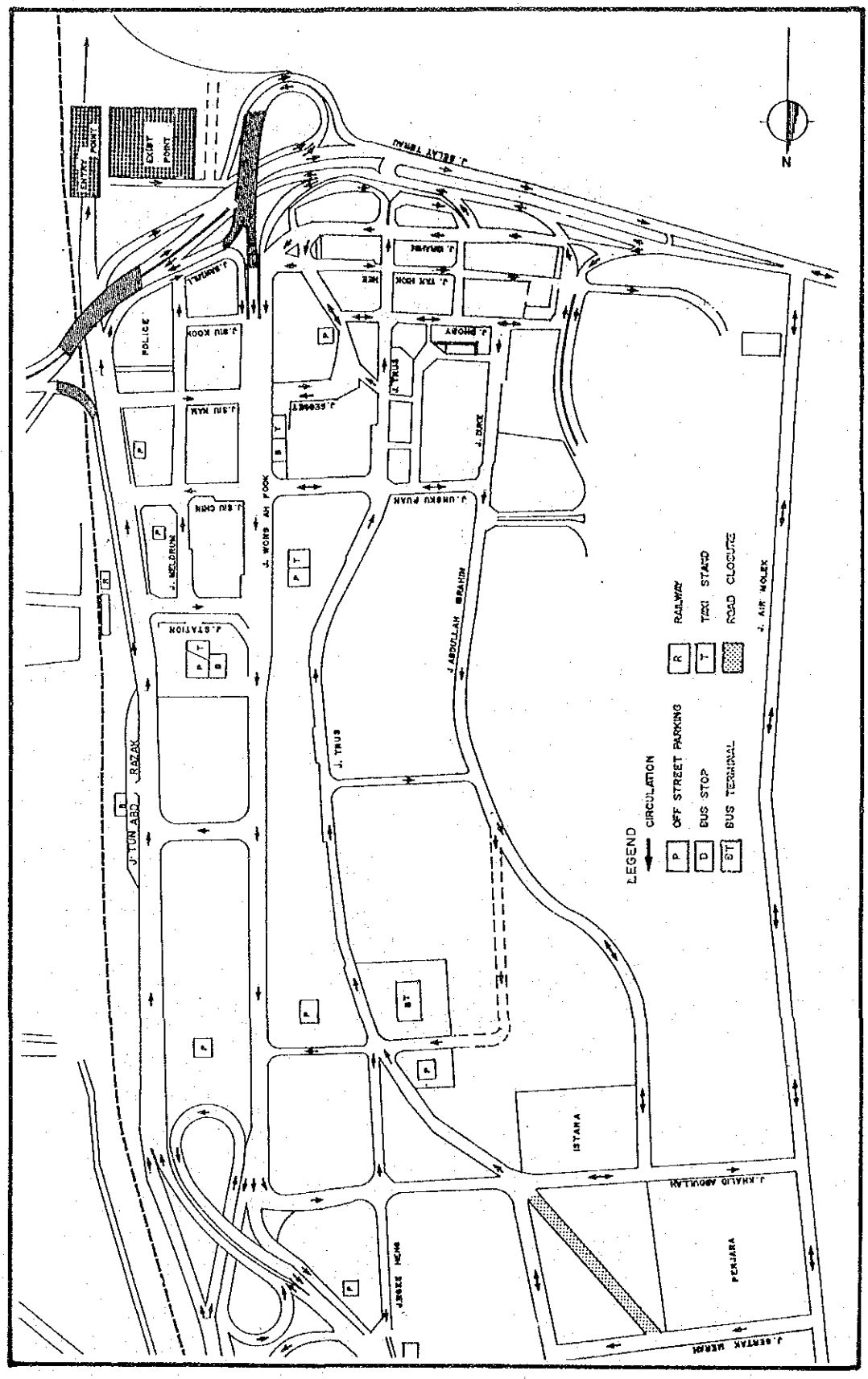
a. With increases in population and income in the future, the transport needs of consumer goods are expected to increase sharply.

b. Similarly the need to transport some producer goods will also increase.

c. In order to create a better urban environment and mitigate traffic congestion in the C.B.D., the entry of heavy lorries into the urban area may be restricted. In such a case, a shift from heavy lorries to small lorries is necessary.

d. The railway cargo is transferred to lorries at railway stations, most of it at Johor Bahru in the Study Area. Since the Johor Bahru station is located in the C.B.D., space for such transfer is limited. This will necessitate the transfering of the freight station to outside the C.B.D. in the future.

Fig. 6.9 Long Term Circulation Plan



Establishing the freight terminal at an appropriate location is expected to have the following effects.

a. Transport cost as well as transport time will be reduced by the smooth connection of different modes and the effective use of lorry capacity.

b. Unnecessary intra-city trips of heavy lorries will be reduced, and this will contribute to mitigating traffic congestion in the urban area.

c. Reducing intra-urban trips of heavy lorries will improve the urban environment by reducing public nuisance and traffic accidents.

The following two sites can be considered for the location of the freight terminal.

a. Kempas Site
b. Senai Site

They are shown on Fig. analysis of the advantages and disadvantages of the sites follows.

a. Kempas Site

Advantages

- Easy access to the Toll Expressway, the Port Access as well as the railway.
- Possibility of combining railway terminal and road-oriented lorry terminal.
- Accessibility to the C.B.D. in MPJB and Pasir Gudang.

b. Senai Site

Advantages

- Easy access to the Toll Expressway, the Federal Route 1 as well as the railway.

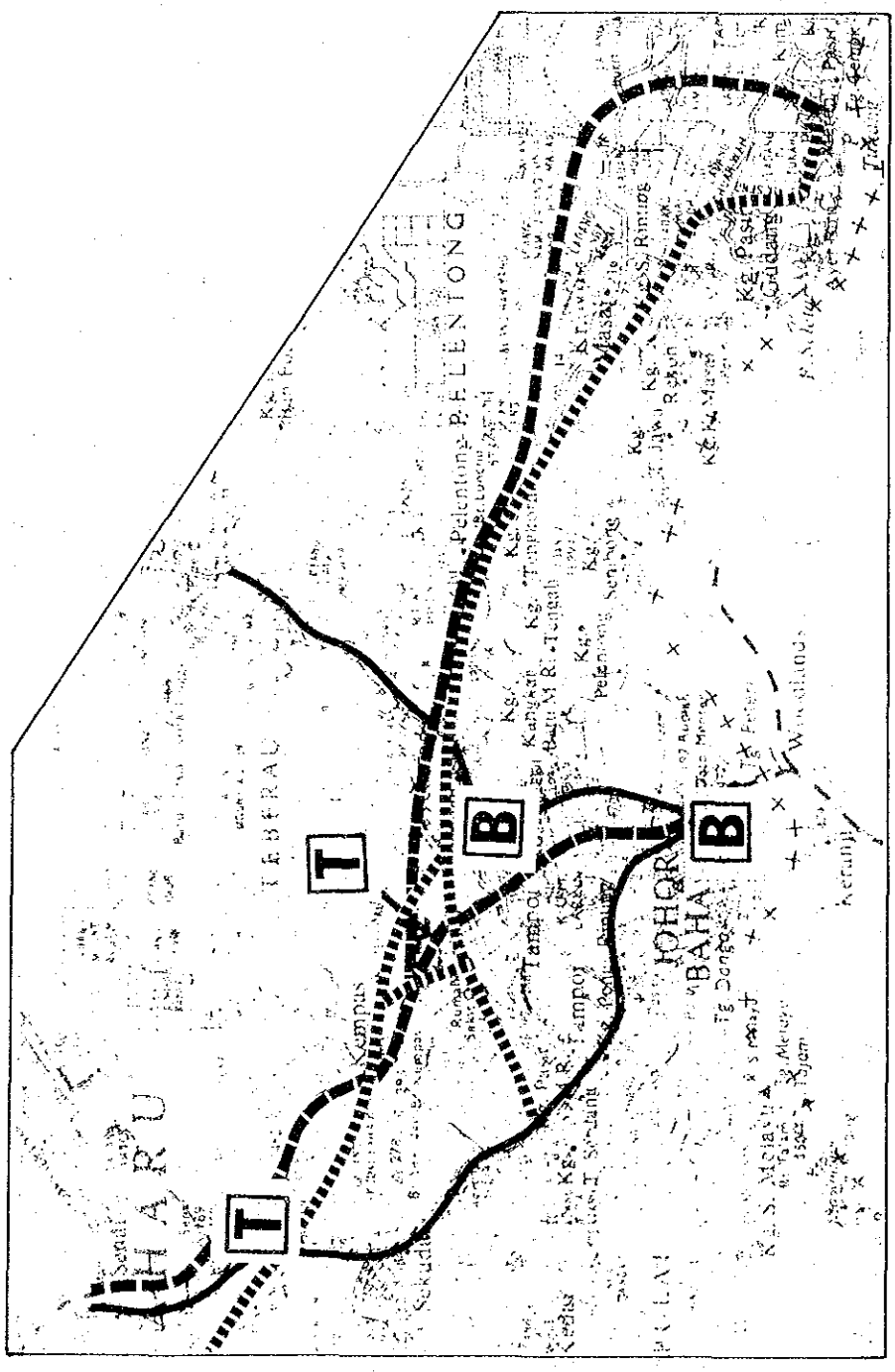


Fig. 6.10 Transport TErminal Proposals

- Possibility of combining railway terminal and road-oriented lorry terminal.

Disadvantages

- Relatively lower accessibility to the C.B.D. in MPJB and Pasir Gudang.
- Expected increase in traffic congestion on Federal Route 1 near the terminal.

To judge from these advantages and disadvantages, the Kempas Site is the better location. (See Fig, 6.11.)

The main facilities of a freight terminal are:

a. lorry berth to handle cargo;

b. platform for cargo train;

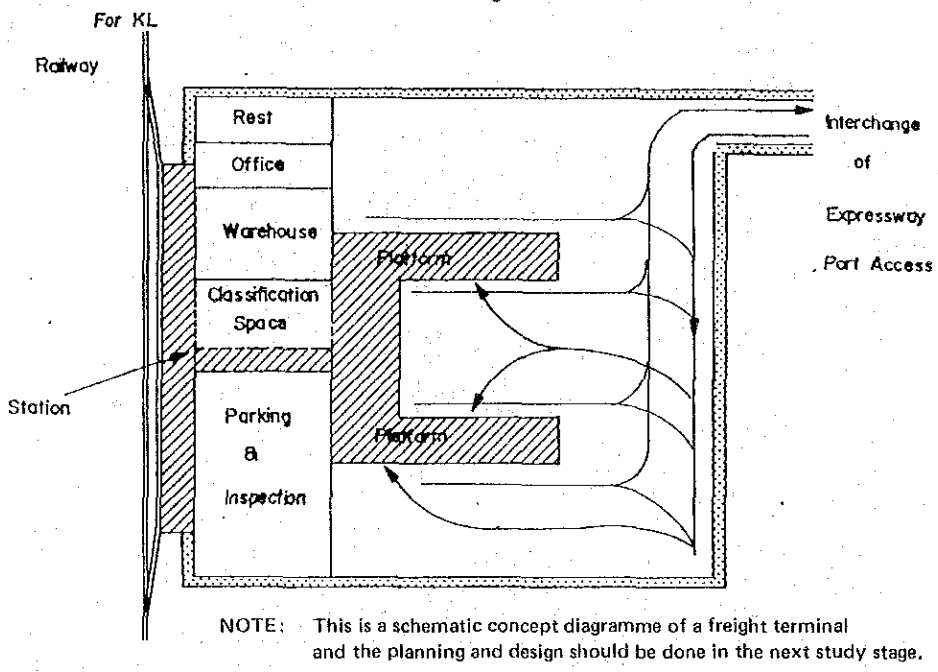
c. cargo classification space;

d. warehouse;

e. terminal office for operation;

f. lorry parking space.

Fig. 6.11 Freight Terminal



NOTE: This is a schematic concept diagramme of a freight terminal and the planning and design should be done in the next study stage.

2) Passenger Terminal

At present there is a bus terminal at Jalan Trus from which inter-city bus services are operated.

However, this terminal has the following deficiencies.

a. It is located too far from the central area of the C.B.D.

b. The transfer from bus to bus or from bus to other modes is extremely inconvenient, since there is no connecting transport system between them.

c. The approach road to the terminal is too narrow; consequently traffic congestion at the entrance will be more serious in the future.

In order to eliminate these deficiencies and to promote the development of a public transport system, the following two passenger terminal concepts should be considered.

Concept 1

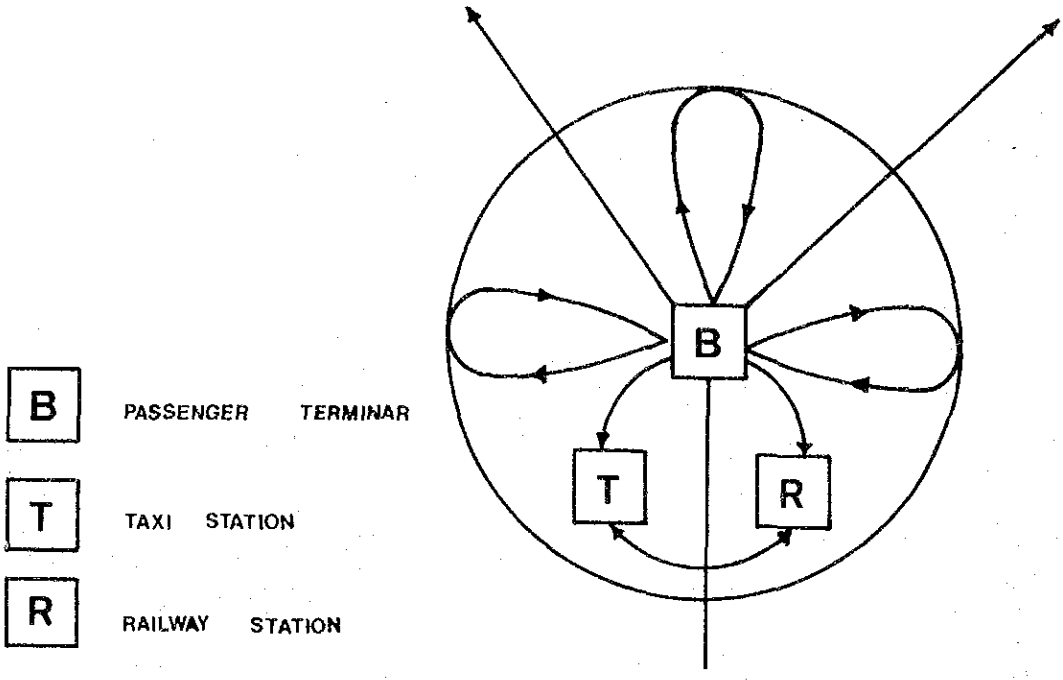
A passenger terminal located in the C.B.D. provides both inter-city and intra-city bus services.

Two sites can be considered for the location of the terminal, namely:

a. Existing Bus Terminal at Jalan Trus

In this case, the existing bus terminal is to be improved so as to serve both inter-

Fig. 6.12 Transport Terminal Concept 1



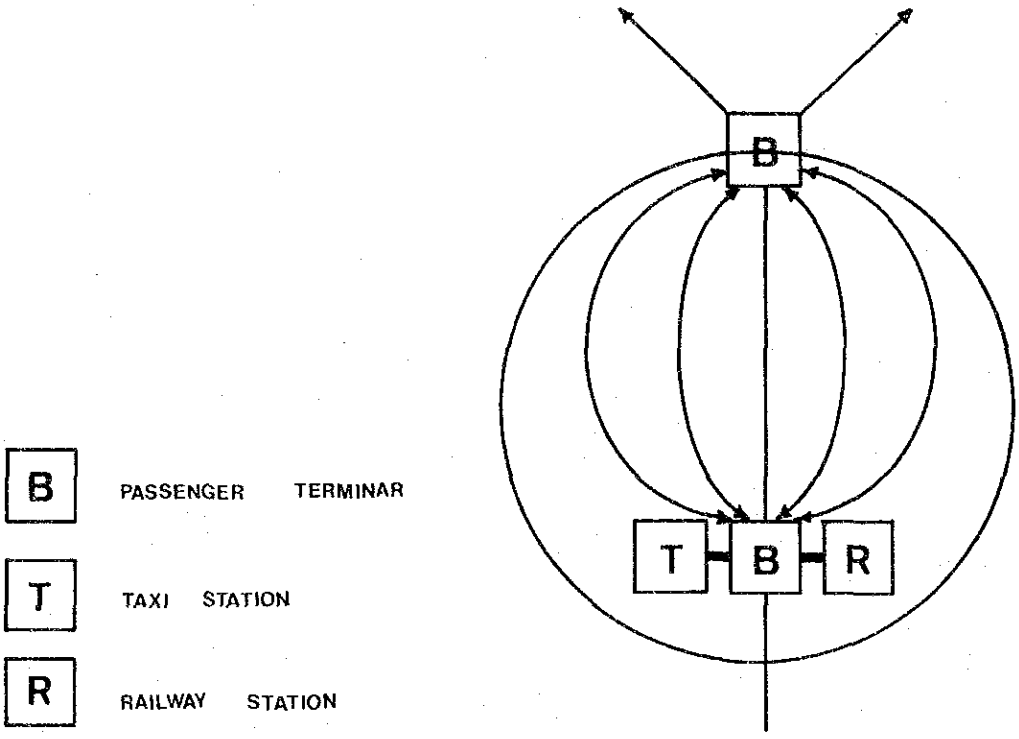
city and intra-city buses and frequent bus services to the railway station area are to be provided to facilitate the transfer from bus to other modes.

b. New Terminal at Jalan Station

The possible site for a new terminal is is the Central Market Area, preferably the former taxi stand in the C.B.D.

In this case, the terminal is to be directly connected to the inter-regional taxi station and the railway station by pedestrian bridges.

Fig. 6.13 Transport Terminal Concept 2



Concept 2

A bus terminal is to be built on the outskirts of MPJB and at the same time a passenger terminal complex is to be established in the C.B.D.

One of the most appropriate sites for the bus terminal on the outskirts of MPJB is the Tebrau site which is surrounded by Jalan Tebrau and the East Coast Bound Highway.

The passenger terminal complex in the C.B.D. is expected to be constructed in the Central Market Area as in Concept 1-B.

By this concept, the bus terminal in Tebrau serves inter-city and intra-city buses, and the terminal complex in the C.B.D. functions primarily as a collection and distribution point for intra-

urban bus users and as a transfer point for inter-modal passengers.

A comparative analysis of the advantages and disadvantages of the concepts as follows.

a) Concept 1-a

Advantages

a. Easier and less costly implementation
b. Higher availability of land than with case B

Disadvantages

a. Lower Accessibility to the central area of the C.B.D.
b. Inconvenient inter-modal transfer even with a frequent bus service
c. Too narrow an approach road

b) Concept 1-b

Advantages

a. High accessibility to the central area of the C.B.D.
b. Convenient inter-modal transfer

Disadvantages

a. Insufficient availability of land to meet future demand
b. Increase in traffic congestion in the C.B.D.

c) Concept 2

Advantages

a. High accessibility to the central area of the C.B.D.
b. Convenient inter-modal transfer
c. Lower requirement of land for the terminal complex in the C.B.D. than with Concept 1-B

Disadvantages

a. Possible reduction in the frequency of direct inter-regional bus services from other regions to the C.B.D.

To judge from these advantages and disadvantages, Concept 2 is beneficial than Concept 1-a, and 1-b.

Consequently it is proposed that a bus terminal in Tebrau and a passenger terminal complex in the C.B.D. be established simultaneously.

The passenger terminal complex may include a shopping center and recreational facilities for the passengers' convenience.

The major facilities required for the passenger terminal are:

a. Passenger Terminal Complex in the C.B.D. (Refer to Fig. 6.14)
   - Bus Bays (Stopover) - 14 berths
   - Pedestrian concourse
   - Taxi Stand (Intra-regional)
   - Shops
   - Pedestrian Bridges connecting with Railway Station and inter-regional taxi stand
   - Parking Spaces for Private Cars

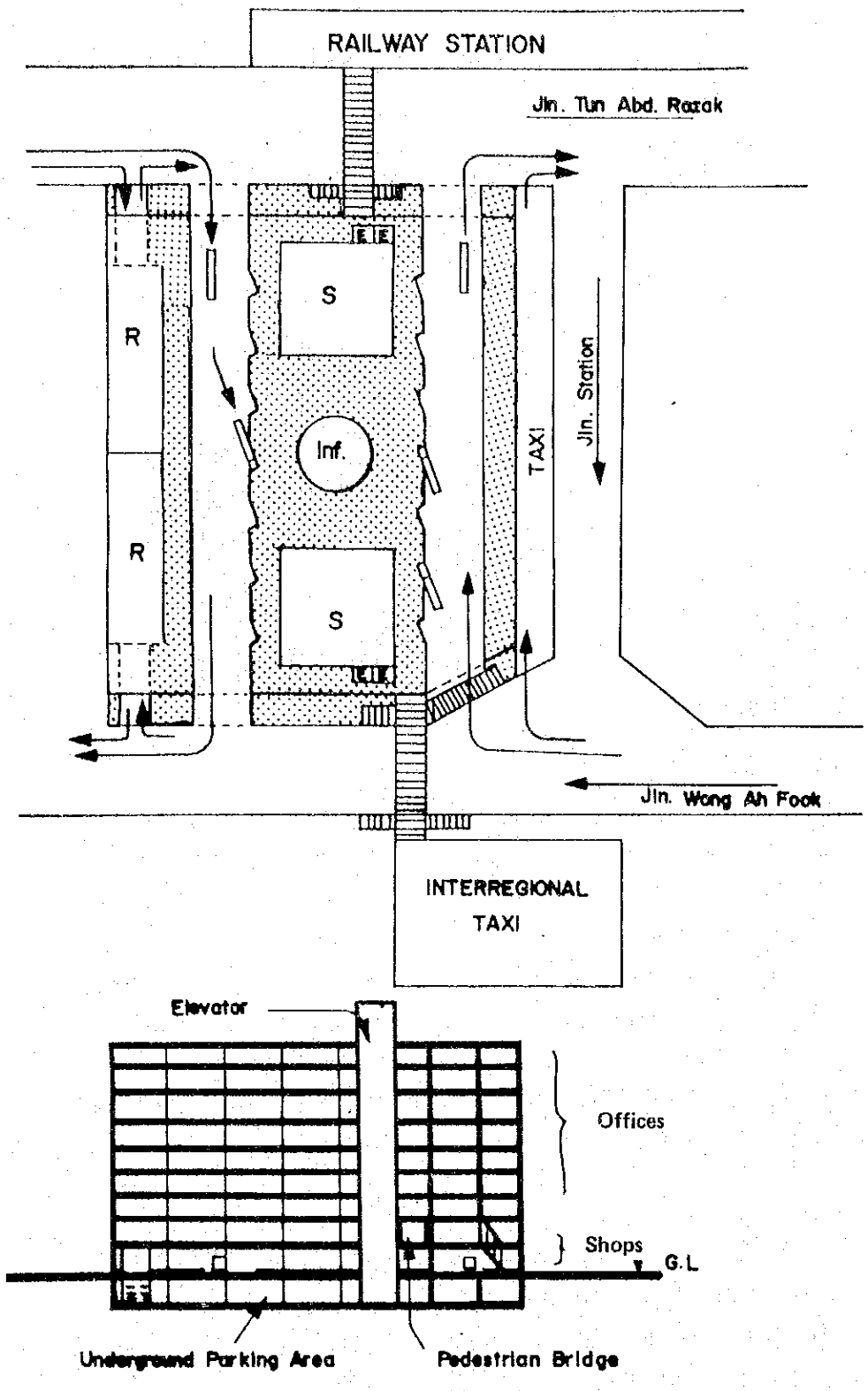
b. Bus Terminal in Tebrau (Refer to Fig. 6.15)
   - Bus Bays (Inter-city - 8 berths)
   - Taxi Stand (Intra-city - 12 berths)
   - Bus Parking Space
   - Rest Place
   - Approach Road

6 Creation of a Better Urban Environment

In implementing the transport projects, special consideration should be given to the preservation and creation of a better urban environment.

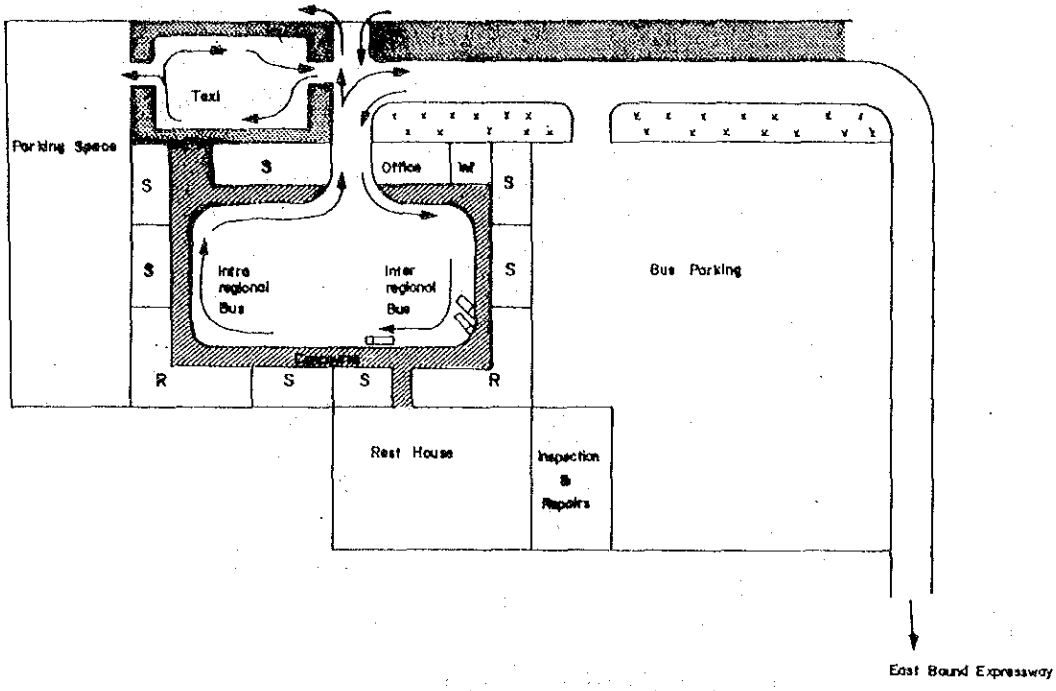
At the master plan stage, therefore, the road

Fig. 6.14 Passenger Terminal Complex in the C.B.D.



NOTE: This is a schematic comcept diagramme of the terminal complex in C.B.D., and the planning and design should be done in the next study stage.

Fig. 6.15 Bus Terminal in Tebrau

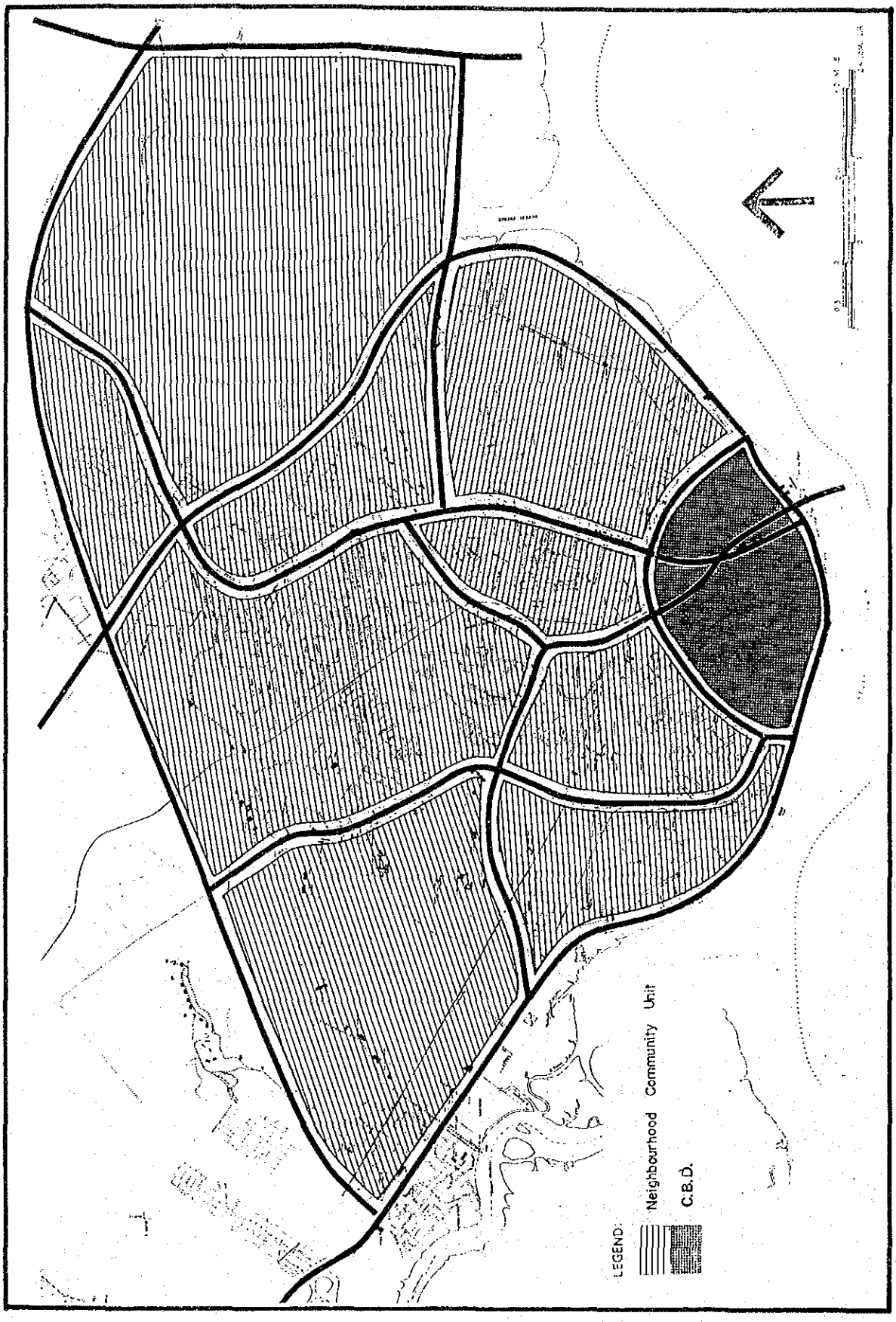


NOTE: This is a schematic concept diagramme of a bus terminal in Tebrau, and the planning and design should be done in the next stage.

network planning takes into consideration the preservation of neighbourhood community units. In order to create a safe and healthy pedestrian environment, it is strongly recommended that the pedestrian environment be improved through the provision of a shopping mall, sidewalks, pedestrian signal light and pedestrian crossings. In addition, when the primary and district distributor roads are newly implemented and constructed, a wide right-of-way should be reserved for the planting of trees. (Refer to Fig. 6.16.)

When the transport project are implemented, an environmental assessment of the corridors of the project from the natural, social and physical aspects should be made.

Fig. 6.16 Neighbourhood Community Unit



6-3 Preliminary Causeway Study

The Study TEam has been conducted a preliminary investigation on the existing condition of the causeway traffic and analysed the future scope of improvement in the transport master plan.

1 Existing Traffic Problems on the Causeway

Based on the preliminary survey conducted 1981, the Study Team identified following traffic problems on the causeway.

1) Car and Taxi Lane

The following problems of the car and taxi lane on the causeway can be pointed out:

a. The most serious problem is inadequate capacity at the customs checkpoint and is due to:

- insufficient booths for customs clearance
- different clearance time at same booth - mixed clearance time - i.e. longer declaration vehicle and shorter one
- customs procedure being not standardised.
- insufficient cashiers and the cashiers are quite a distance away from certain booths

b. Insufficient provision of service area for waiting vehicles at the immigration and customs checkpoint.

c. Inadequate channelization and delineation for access to both the immigration and customs checkpoint.

d. Not enough lane width for waiting vehicles. This does not cause the traffic queue on the causeway.

e. Inadequate location of road signs, markings and information board.

2) Bus Lane

The following problems of the bus passenger lane on the causeway can be pointed out:

a. Insufficient number of Immigration booths to Singaporean-Malaysian and foreigners.

b. Not enough booths for customs clearance.

c. Inadequate access facilities from bus-stops to immigration and to customs checkpoint.

d. Inadequate access facilities (pedestrian way) to town.

3) Lorry Lane

Since the counter measures were implemented, there are no problems at present.

4) Roads Related to the Causeway in MPJB

The following problems of the roads in relation to the causeway in MPJB can also be pointed out:

a. No provision of information boards on the major roads in the C.B.D. of MPJB.

b. Inadequate circulation systems in front of the causeway.

c. No provision of pedestrian facilities for bus passengers coming from the causeway, such as sidewalk and pedestrian crossing.

d. Inadequate lorry route coming to and going out of the customs complex.

2 Future Traffic Volumes on the Causeway

According to the traffic projection made, the peak-hour traffic volume is expected to be as follows:

Table 6.5 Future Traffic Volume in 2000 and Causeway Capacity

Singapore to Johor Bahru

	Number of Vehicles (A)	Passenger Car Unit (B)	Capacity (C)	(C)/(B)
Cars and Taxis	1,970	1,970	2,000	0.99
Lorries	640	1,370	1,400	0.98
Buses	450	1,350	1,800	1.07
Motorcycles	770	580		

Johor Bahru to Singapore

Cars and Taxis	1,600	1,600	2,000	0.80
Lorries	850	1,820	1,400	1.30
Buses	560	1,680	1,800	1.49
Motorcycles	1,340	1,010		

The congestion rate of each lane on the causeway is near or over 1.0.

The following improvement plan is necessary.

a. From the boundary of Malaysia with Singapore, it is necessary to widen the road from three (3) lanes to four (4) lanes.

b. The car and taxi lane with motorcycle and bus lane should be widened from two (2) lanes to three (3) lanes.

c. The lorry lane should also be widened from a single carriageway to a dual carriageway.

3 Possible Strategy for Causeway Improvement

The Government of Malaysia has been conducting a study on the renovation of the customs and immigration checkpoint on the causeway on a short-term basis.

Taking into account the renovation plans, the Study Team conducted the preliminary causeway study on a long-term basis. For expanding and utilizing the

existing causeway, there are two (2) options that can be considered:

a. to expand the existing causeway horizontally by reclamation;

b. to construct a second deck onto the existing causeway.

As the result of a preliminary study from the point of view of traffic and transport, engineering, environment and economy, it was concluded that the plan for a horizontal expansion of the existing causeway was clearly better than the plan for a second deck.

Because water quality in the Johor Straits may be lowered because of the separation by the causeway, it is suggested that the median segment of the existing causeway be reconstructed as a bridge.

The other option is to construct a second linkage between Johor Bahru and Singapore at another point.

When a second linkage is constructed, about forty (40) per cent of the projected traffic demands between Johor Bahru and Singapore and most of the lorry traffic can be diverted to it.

The findings and recommendations on the second linkage were based on traffic and transport engineering, environment and transport economic studies, so that the further investigation on socio-economic, political and environmented aspects be carried out to determine the feasibility of the second linkage.

Chapter 7 SHORT TERM TRANSPORT IMPROVEMENT PROPOSALS

7–1 Traffic Engineering and Management

1 General Policies

The main concern of the traffic engineering and management study is the provision of short-term actions to utilize the existing road infrastructure and the related facilities more smoothly, effectively and safely with or without the implementation of the committed projects. This is because the traffic problems which now exist will be much alleviated if the existing road space and the related facilities can be made to provide for optimal traffic capacity and orderly usage; most of the problems are caused by an overall deficiency of roads and off-street parking space provision, which will be treated as a long-term issue.

It is understood that the traffic engineering and management measures which are essential for improving the existing conditions will present a basis for long-term planning of the transport system.

In this connection, the following general policies can be adopted.

a. To improve the existing road and traffic conditions and operational system so as to make possible the most effective road usage.

b. To provide a better transport environment.

c. To provide and to secure a more pleasant and safer environment for pedestrians as well as vehicular traffic.

2 Present Problems from the Aspect of Traffic Engineering and Management

Such surveys as those for traffic engineering and road-management inventory, traffic control devices inventory, parking, turning movement counting at major intersections and special traffic performance, which

will be summarized in separate volumes as technical reports, were conducted. Problems have been identified through the study and analysis of the data obtained from the above-mentioned surveys together with the results published in reports undertaken by other institutions.

The problems which have been identified up to now can be summarized as follows:

1) Congestions in the C.B.D. of Johor Bahru

   a. Heavy congestion which results in long queues along Jalan Ibrahim occurs at the roundabout where the traffic from Jalan Lumba Kuda and Jalan Ibrahim merge, particularly during the morning and evening peak hours.

   b. Long queues of cars waiting for immigration clearance are extended into Jalan Tun Abdul Razak and severely disturb traffic on the street.

   c. Heavy congestion and conflicts of traffic occur along Jalan Wong Ah Fook in the evening peak hour even though three oneway lanes are allocated for the passage of the vehicles.

2) Inefficient traffic flow on roads and at intersections in the peripheral area as well as in the C.B.D.

   Inefficiency of traffic flow is mainly due to an overall dificiency in road network provision. Nevertheless, some broblems could be alleviated with the application of traffic engineering methods, control and technology as elaborated below:

   a. The circulating flow pattern now existing within the C.B.D. is poor because some roads are too crowded with parking or loading vehicles, hawkers and pedestrians, while other roads are still under-utilized.

b. The channelization design of some intersections are not adequate to meet turning demands.

c. Traffic regulations.

- One-way system

  One-way designations are not sufficiently applied so as to reduce the burden of traffic at critical intersections in the C.B.D.

- Parking

  Illegal parking or loading is usually seen along Jalan Wong Ah Fook, Jalan Segget and Jalan Station, although there are sufficient parking spaces as a whole in the C.B.D. Parking control will need to be strengthened so as to facilitate circulation flow.

- Signs

  Some signs do not comply with the revised rules, and others are so or dilapidated as to be useless.

- Marking

  Most of the markings are poorly visible and reflective although they are properly installed.

- Signals

  - The visibility of signal faces is not adequate.
  - The pedestrian signal displays are quite limited.
  - More signal controls are needed to expedite traffic flow.
  - The timings of signal indication are not adequate to meet the demand on some approaches.

- Fixed time signal controls are not adequate at the intersections in the peripheral area.

3) Adverse pedestrian environment

- There are insufficient footpaths and pedestrian malls especially in the C.B.D.
- Pedestrian crossings are not clearly visible to drivers or pedestrians.

4) Insufficient Institutional activities

a. Enforcement should be strengthened especially against illegal parking, reckless driving and illegal pedestrian movement.

b. A manual on uniform traffic control devices is urgently needed.

c. The compilation of traffic accidents and their analysis is urgently needed.

3 Proposed Traffic Engineering and Management System

1) Proposed Policies and Procedure

a. Functional classification of Road Network

The streets, especially in the C.B.D. serve many urban activities such as vehicular traffic movement, pedestrian traffic, loading and unloading of merchandise, short-term parking, delivery services, bus services, taxi stands and emergency services, and they are subject to changes of function from hour to hour and day to day. However, those functions that are not directly related to traffic movement should in principle be assigned to off-street areas. This is especially the case during the traffic peak hour, and many usually permitted roadway functions should be banned in order to increase the capacity for traffic

movement.

From the viewpoint of functional use of street networks, it is suggested that streets in the C.B.D. be classified into the following 3 categories.

b. Primary Distributor

This element of the system serves as the major traffic artery throughout the day. On-street loading, unloading, parking and other functions not related to traffic movement should be strongly discouraged with strict enforcement.

c. Local Distributor

Although these roadways are used for traffic movements through the C.B.D., they are generally not used for through traffic but rather for circulating from point to point within the area and for access to parking.

When necessary, this street system can be used to fulfill the needs of the community for short-term parking, loading and unloading of merchandise and other similar services that cannot be conducted of the street.

d. Access Road

This minor street system is seldom used for traffic movements through the C.B.D. Its major function is to provide access to adjacent properties, and includes back alleys and narrow streets not suitable for heavy traffic movements. Occasionally this system may be suitable for loading and parking purposes if they do not interfere with its main function.

2) Traffic Circulation Plan

The main purpose of the traffic circulation plan in the C.B.D. is to form the main traffic flow line within the C.B.D. and to avoid the introduction of through traffic into minor roads. To this end, it is proposed that some local distributors be made into one-way streets resulting in a higher capacity, thereby easing traffic at critical intersections although this will force drivers to make longer trips.

3) Traffic Regulations

The main concern of traffic regulations in the C.B.D. of Johor Bahru is one-way streets. It is recommended that as many local distributors and access roads in busy
one-way streets to provide parking spaces or pedestrian facilities and to facilitate circulation.

Traffic regulations should be applied as called for by circumstances on roads and traffic situations. Emphasis should be placed on efficient circulation within the C.B.D. on the roads designated as circulating roads.

The Municipal Council needs to prepare a traffic control guideline, such as a manual on uniform traffic control devices.

Traffic regulations such as one-way designations and parking prohibitions have socio-economic effects on the roads and on the use of buses. Thus, this requires be discreet consideration, and the Municipal Council ought to initiate a campaign in order to get a consensus from the people.

4) Traffic Signals

To improve the visibility of traffic signals, the existing old models should be replaced by new

signal bulbs and lens. It is also proposed that mast arms and horizontal overhead displays be installed at busy and large intersections.

If traffic signal control is deemed necessary for isolated intersections in Johor Bahru, traffic-actuated signal control is proposed as the most suitable for achieving higher capacity on these roads.

However, fixed time signal control is recommended in the C.B.D. and on some arterial roads along the developed area. Fixed time signals can usually be modified to function as a coordinated traffic signal control system. In the future, many of the traffic signals within the C.B.D. and on the heavily trafficked arteries along the developed area are expected to be controlled by a co-ordinated traffic signal control system when traffic signals are closely installed as to warrant this system.

5) Traffic Safety

Traffic safety still remains a major world-wide concern, and every effort is being made to achieve it, especially from the aspects of engineering, the human factor, educational enforcement and the environment. Johor Bahru is no exception to this.

Accident records are kept in the traffic section of the Polic Department. However, accident statistics and analytical reports are not always available to the traffic engineers, highway engineers, educational institutions and other agencies concerned with traffic safety, although they are important requirement to any on-going programme for traffic operational improvement. Therefore, a uniform and standardized system of data processing, to be established at the initial stage is proposed.

6) Parking and Loading

A policy should be adopted which focuses enforcement activities on the parking of vehicles and loading of trucks which obstruct footpaths and severely hamper the passage of vehicles. These practices are common in the highly developed commercial and congested areas, such as along Jalan Wong Ah Fook, Jalan Segget and Jalan Station.

In any case, the control of on-street parking and loading has to be strengthened on circulating roads since traffic volume will increase.

Therefore, a strategy of where and how to impose the control in the C.B.D. has to be prepared at this stage.

7) Pedestrian

Concerned effort by means of a wide variety of measures is required to improve the facilities provided for pedestrians. As a basic measure, laws and ordinances which clearly define the duties and responsibilities of vehicle drivers and pedestrians have to be developed. Also, effort should be concentrated primarily on constructing side-walks or safe walking spaces for pedestrians so that they can move about safely and without obstruction.

4 Proposed Traffic Engineering and Management Plans

1) Interim Traffic Dispersal Plan in the C.B.D.

The grade-separated interchange design, including the improvement of the immigration complex, was proposed in Chapter 6 as a longer-term project. Here, the traffic improvement plans with minimal modifications of road infrastructure are proposed for immediate action.

At this stage, two alternatives are proposed.

2) Traffic Dispersal Plan A ... refer to Fig. 7.1

The following modifications of the existing system are suggested.

a. Jalan Tan Hiok Nee is to be made continuously eastbound one-way from Jalan Dato Onn by improving the channelization at the intersection of Jalan Dato Onn and Jalan Bukit Timbalan.

b. The construction of a direct connection between Jalan Tan Hiok Nee and Jalan Wong Ah Fook.

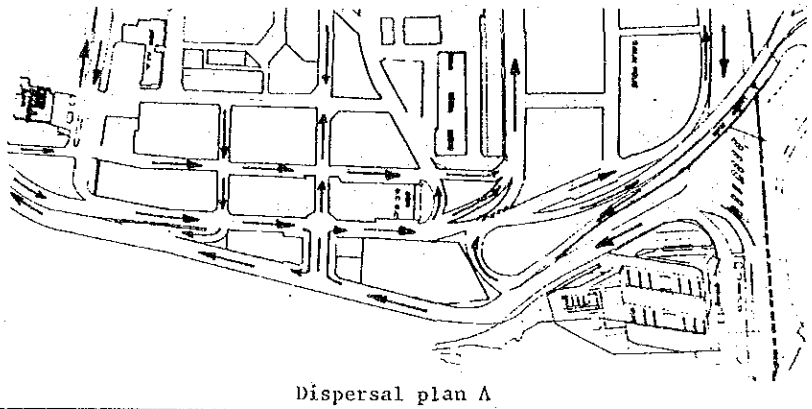
c. Two blocks of the southern end of Jalan Trus are to be changed to northbound one-way so that the burden on the traffic at the intersection of Jalan Ibrahim with Jalan Trus can be reduced. The southbound traffic on Jalan Trus will be forced to detour.

d. Construction of a means of channelization just south of Jalan Ibrahim with Jalan Pahang so that the traffic on Jalan Pahang can flow into Jalan Selat Tebrau after crossing Jalan Ibrahim. The results of comparing these modifications with the existing conditions are as follows:

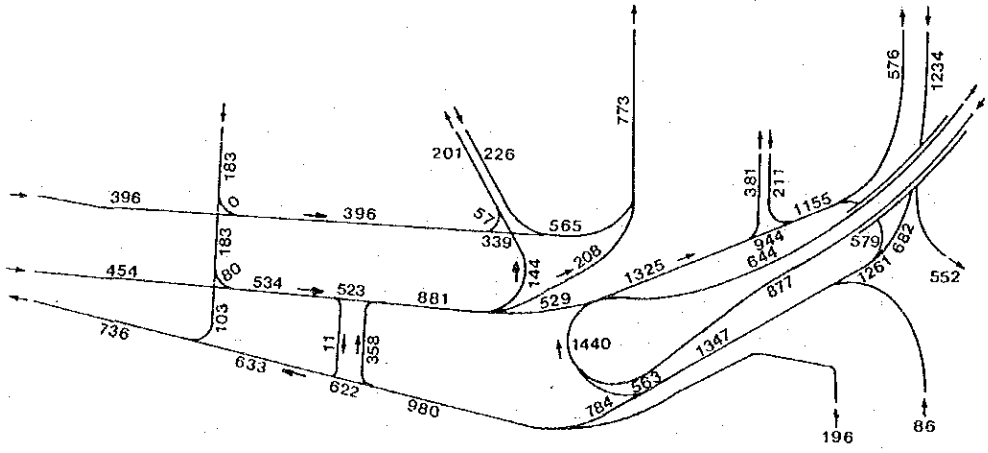
Advantages

The traffic load on Jalan Ibrahim will decrease drastically.

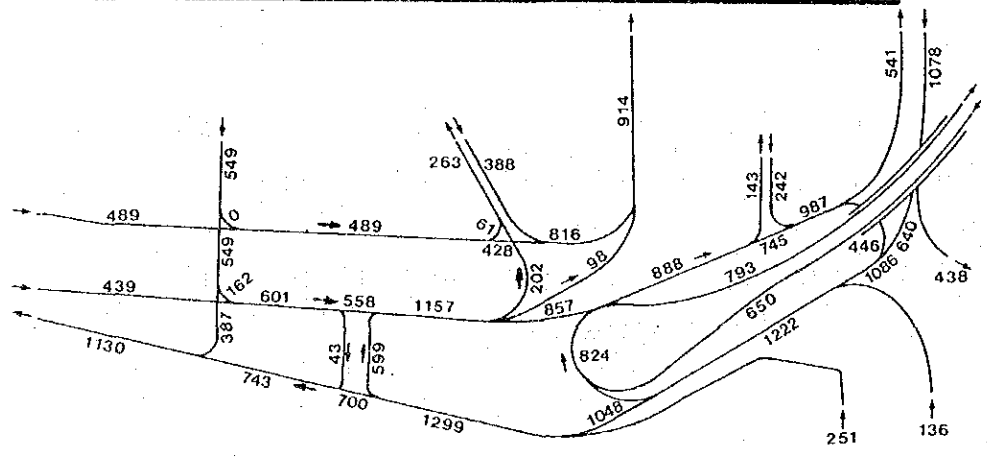
Fig. 7.1 Alternative Disperal Plan–A and Peak Hour Traffics Estimated



Dispersal plan A



Morning peak hour traffic (8.00 ~ 9.00)
(Estimated)



Evening peak hour traffic (16.00 - 17.00)
(Estimated)

Disadvantages

The traffic load at the merging point, which is a bottleneck, is not relieved, although some improvement of traffic on the approaches will be attained due to the reduced volume of traffic on Jalan Ibrahim.

3) Traffic Dispersal Plan B ... refer to Fig. 7.2

The following modification is made from the traffic dispersal plan A.

The westbound roadway of Jalan Lumba Kuda is diverted from the circle by a branch roadway which merges into Jalan Selat Tebrau. This will result in the banning of traffic entering Jalan Lumba Kuda from Jalan Selat Tabrau.

The advantages and disadvantages of dispersal plan B compared to dispersal plan A, are as follows:

Advantages

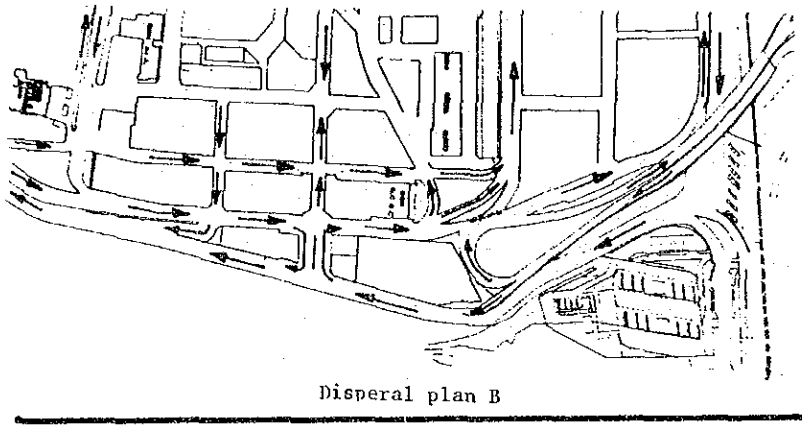
a. Traffic burden at the merging point of Jalan Lumba Kuda circle and Jalan Ibrahim which is a critical bottleneck is drastically reduced. This contributes much to the improvement of overall capacity of the interchange.

b. The traffic volume on the eastern side of the circle comprising Jalan Sawmill and Jalan Selat Tebrau is reduced.

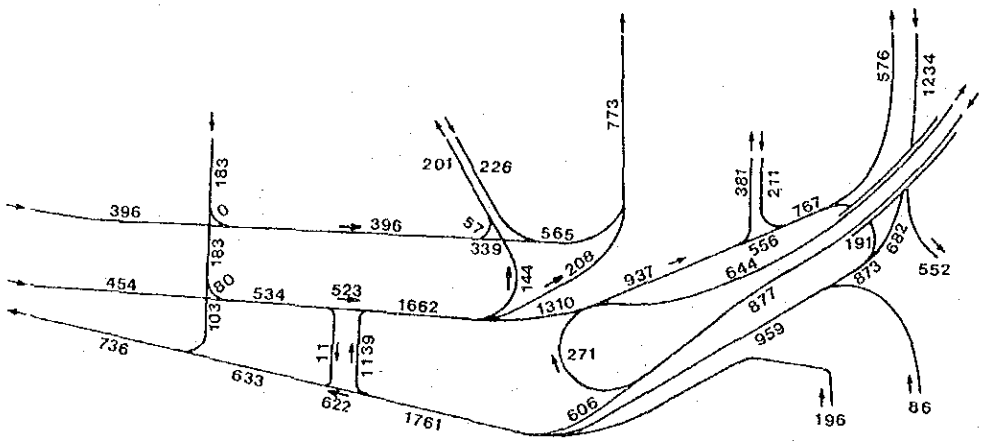
Disadvantages

a. The traffic circulating on Jalan Selat Tebrau, Jalan Tangga Duke and Jalan Ibrahim is expected to increase especially during the morning peak hour, with an increase of unladen trucks and buses from the custom office and U-turn buses from Jalan Tun Abdul

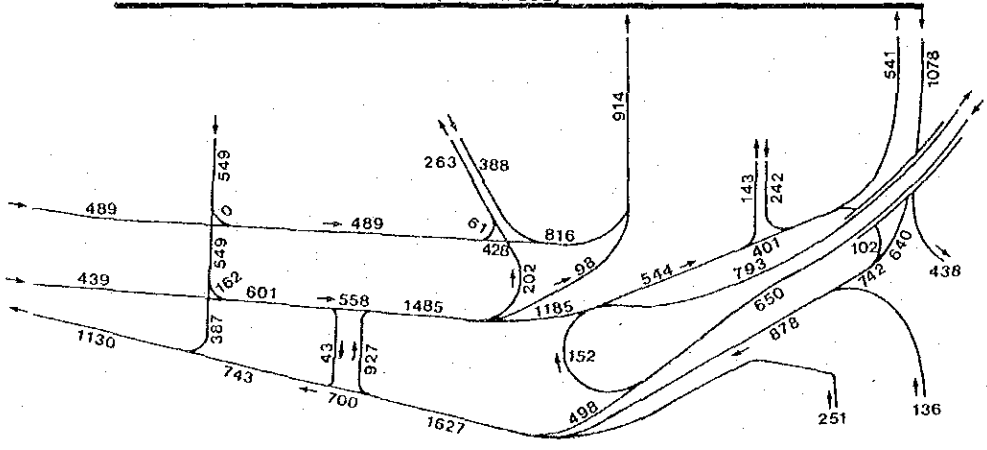
Fig. 7.2 Alternative Dispersal Plan-B and Peak Hour Traffics Estimated



Disperal plan B



Morning peak hour traffic (8.00 - 9.00)
(Estimated)



Evening peak hour traffic (16.00 - 17.00)
(Estimated)

Razak, most of which currently make use of the circle at Jalan Lumba Kuda.

b. The section of Jalan Selat Tebrau of this circulating route will be a weaving section, which is considered as a simple weaving section, 115 m long. This section handles a total demand volume (morning peak hour volume) estimated at 1761 cars, including a weaving volume of 969 cars. A quality of flow of type IV is estimated. This is the lowest allowable level on the street.

4) Conclusion and Recommendation

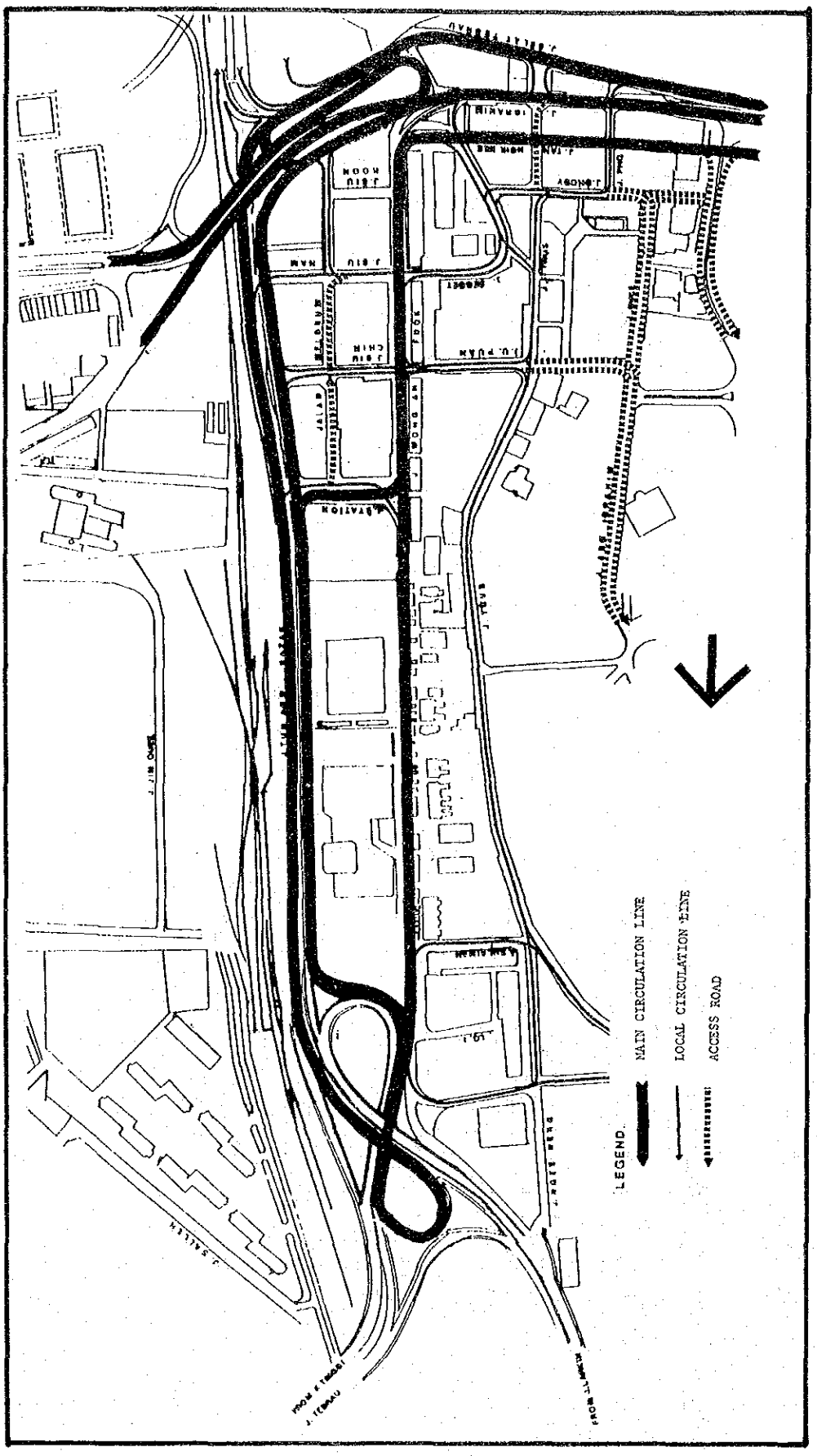
The study team concludes that traffic dispersal plan B is the most suitable measure for the relief of the existing congestion, because the improvement of the capacity at the merging point of the circle contributes directly to the improvement of the overall capacity of the interchange even though this will cause a weaving problem. The study team recommends, at this stage, the adoption of traffic dispersal plan B.

5) Proposed Circulation Plan in the C.B.D.

The proposed circulation plan in the C.B.D. is illustrated in Fig. 7.3. The thick lines which are mainly primary distributors, show the main circulation lines which carry traffic coming into or going out of the C.B.D. and major circulating traffic within the C.B.D. The thin lines, which are local distributors, show local circulation lines which carry the circulating traffic within the C.B.D. The dotted lines shown local access roads, even if they are wider and made one-way. Other roads with no marks are also access

roads. This differs from the existing system in that the eastbound one-way of Jalan Tan Hiok Nee is now westbound one-way access road, the northbound one-way blocks of the southern end of Jalan Trus is now southbound one-way, and the circulating roads of Jalan Siu Chin and Jalan Ungku Puan are now functionally access roads.

Fig. 7.3 The Circulation Plan in the C.B.D., MPJB



6) Traffic Regulations Proposal

The proposed one-way system has already been discussed in the preceding sections.

It is proposed that stop signs be installed on the approaches of local distributors at their intersections with primary distributors if traffic signals are not installed, and stop signs be also installed on the approaches of the access roads at their intersections with local distributors and primary distributors to facilitate the smooth and safer flow of traffic.

Lane markings should be clearly marked and installed so that cars and motorcycles can easily follow the road space allocated for them thereby avoiding confusion with bicycles and pedestrians that are instructed to use the road space outside of lane marking.

Hawkers should be prohibited from dispensing their wares on the carriage-ways of local distributors as well as primary distributors as much as possible. One of the major concerns is parking regulations. This will be discussed in item 5.

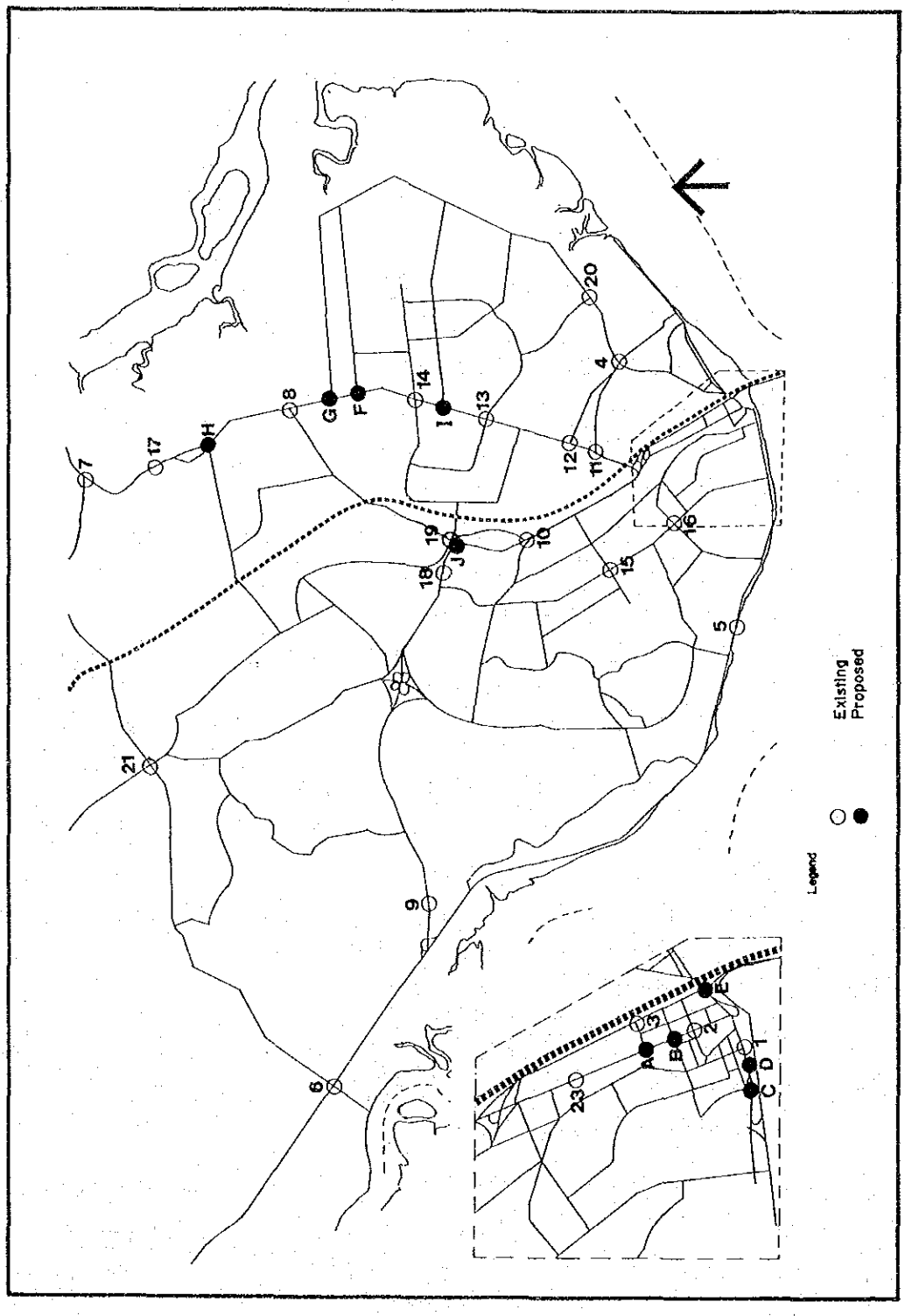
7) Traffic Signals

The traffic signal installation sites, existing or proposed, are illustrated in Fig. 7.4. At this moment four signal installations are proposed, three of which are located within the C.B.D. and one at the intersection of Federal Route No. 1 with Jalan Kebun Teh. It is proposed that this intersection be improved in geometric design a plan, which will be discussed in the intersection improvement plan. Signal control will then be applied.

The traffic signal control proposed within

the C.B.D. should be coordinated with other signal controls, existing or proposed. It follows from this that the existing signal controllers must be replaced with new ones capable of coordination.

Fig. 7.4 Existing and Proposed Signal Installation



8) Parking Control Proposal

It is proposed that in the future there be no parking on primary distributors and busy streets that are categorized as local distributors, since parking and loading obstruct pedestrian movement and severely hamper vehicular traffic. However, first, steps should be taken to strengthen control to ensure that parking is prohibited within 30 meters of intersections, next, on one side of the street and finally along whole sections of streets. Another step would be first, prohibition of parking only during peak hours which can later be extended to the whole day. The public should be informed in advance of any new programme of parking control so that those affected can arrange for alternative parking.

9) Pedestrian Facilities Proposal

The existing and proposed pedestrian facilities in the C.B.D. are illustrated in Fig. 7.5. Five-foot ways should be cleared of obstacles such as wares displayed and goods unloaded on them so as to facilitate the smooth and continuous passage of pedestrians.

The links without five-foot ways or the links with five-foot ways which are not sufficient in width to accomodate heavy pedestrian demand in busy areas should be provided with pedestrian space to be separated from parking lots by clearly visible markings or by curbs.

The problem sites or links which should be improved for pedestrian safety are identified and shown in Fig. 7.5.

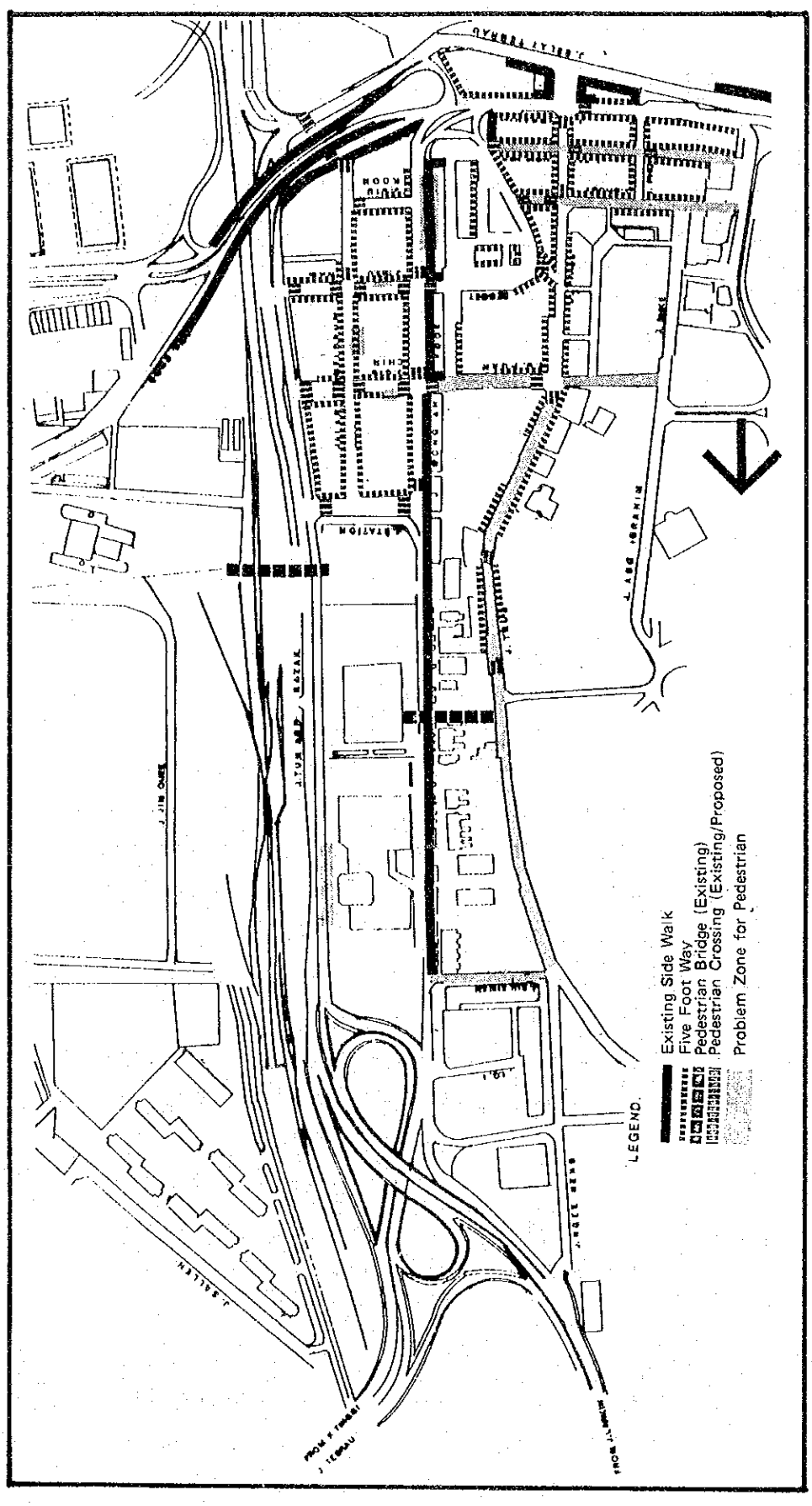
It is proposed that clearly marked zebra crossings be installed at the existing and proposed intersections or sites marked in the Fig. 7.5.

And an increased use of pedestrian signals in conjunction with traffic signals is also proposed.

10) Intersection Improvement Plan

Intersection improvements together with the installation of traffic signals are proposed for some intersections such as Jalan Skudai - Jalan Tampoi, Jalan Larkin - Jalan Kebun Teh and Jalan Larkin - Jalan Ayer Molek.

Fig. 7.5 Existing and Proposed Pedestrian Facilities in the C.B.D., MPJB



7–2 Construction and Improvement of Roads

The short-term plan seeks to ensure the effective use of the existing transport spaces in order to release an existing bottleneck of the road system and to form an adequate road system for the year 2000. This is to be accomplished by the following:

a. upgrading of strategic and busy roads;

b. widening of existing roads,

c. construction of sections of the road network that are missing. Examination shows that the following road constructions and improvements should be undertaken.

1) Widening of Jalan Tebrau to a dual carriageway, as a step toward a future expansion to six (6)-lanes.

2) In order to support the development of regional growth nucle, the two (2) federal roads should be upgraded in their alignment.

   a. East Coast Federal Road from the Toll Expressway to Kota Tinggi Town.

   b. Skudai - Pontian Road

3) In order to relieve busy roads, the following roads should be upgraded in their roadway width and intersections:

   a. West Access to Toll Expressway

   b. Jalan Langkasuka

   c. Jalan Stulang Baru

   d. Jalan Serampang

   e. Jalan Pasir Pelangi

   f. Road Improvement in Taman Century

   g. Road Improvement in the New Developed Area

4) In order to improve accessibility to Senai Airport from the northeastern part of the Study Area, it is recommended that the Senai - Ulu Tiram road be constructed or upgraded as a two (2)-lane road.

In order to implement the next phase projects, an engineering study including a feasibility Study should be conducted on the following road projects:

- Toll Expressway Access and East Coastal Roads;
- Johor Bahru - Pasir Gudang Coastal Road;
- Widening and Extension of Jalan Kebun Teh;
- Inner Ring Road including Lorry Route.

7-3 Public Transport -- Scheduled Bus

1 General

The longer-term policies and strategies are indicated in Chapter 6. The longer-term plan envisages the increased attractiveness of bus use vis-a-vis private car ownership. This is to be achieved by improvements in:

a. the public transport service level,
b. the public transport facilities;
c. the fare strategy;
d. the streets for public transport;
e. the public transport operations;
f. the public transport system;
g. the institutional system.

The short-term action plan is proposed as an immediate step in the eventual achievement of the long-range plan and thus merges with the larger package of the long-term plan. The general components of the short-term plan are as shown in Table 7.1 below.

Table 7.1 Short-Term Components of Public Transport Plan

Specific Strategy	Short-Term	Medium and Long-Term
Improvements of Public Transport Services	*	*
Improvements of Bus Transport Facility/Fleet	*	
Fare Policy	*	*
Improvement of Street for Public Transport Route	*	*
Improvement of Management and Operations	*	
Application of Innovations in Buses		*
Public Transport System		
Improvement of Institutional System	*	*

Note: * Applicable

2 Present Problems and Required Solutions

1) User Problems (Service Problems)

a. Bus Routes

Certain areas are not covered, viz. Taman Pelangi, Taman Seri Tebrau, Taman Sentosa, Taman Tasek.

Routes are radial, therefore bus users who want to travel circumferentially have to change buses in town. This also unnecessarily increases bus-trip demands. The frequency of transfers is exceptionally high as shown in Table 7.2.

Table 7.2 Frequency of Transfer

Respondents interviewed at:	% Frequency of one or more transfers
Town Centre	52
Town Periphery	65
Kolam Air Area	32
Housing Estate	30
Industrial	48
Ulu Tiram	6
Pontian, Kulai, Kota Tinggi	40

Source: Urban Transport Study, Johor Bahru, 1981

b. Bus-stop Coverage

Bus-stop coverage is inadequate resulting in longer than preferred walking distances (Fig. 7.1).

c. Long waiting Time at Bus-stop (Fig. 7.2).

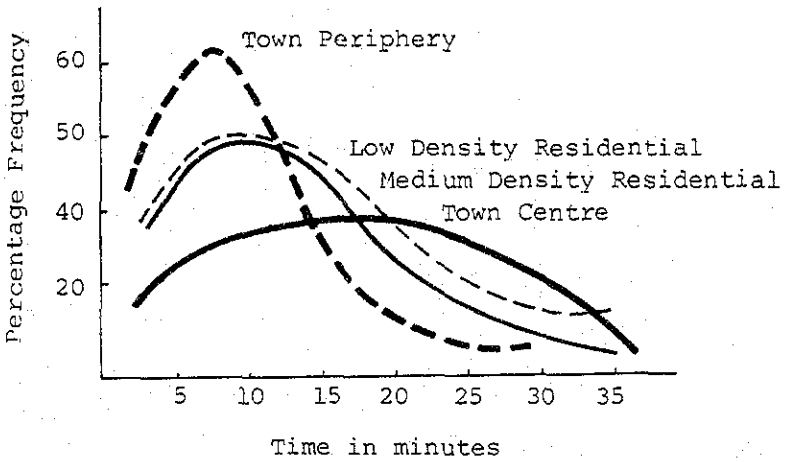
Commuters have to wait for a long time at the bus-stops because of infrequent bus runs or because buses are unable to follow schedules due to breakdowns and traffic congestion.

d. Poor Bus-Shelters

The present design does not provide adequate protection against sun and rain, especially in the town centre, where more space is required.

e. Rushing for Buses

Because they are afraid they will not get a seat or be able to board a bus, passengers rush instead of lining up for orderly boarding. This creates disorder and confusion; alighting passengers have difficulty getting off the bus, and in most cases buses have only one door.



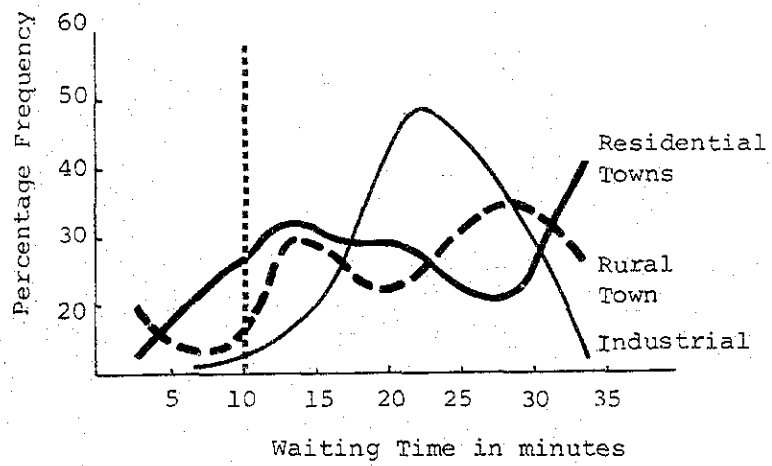
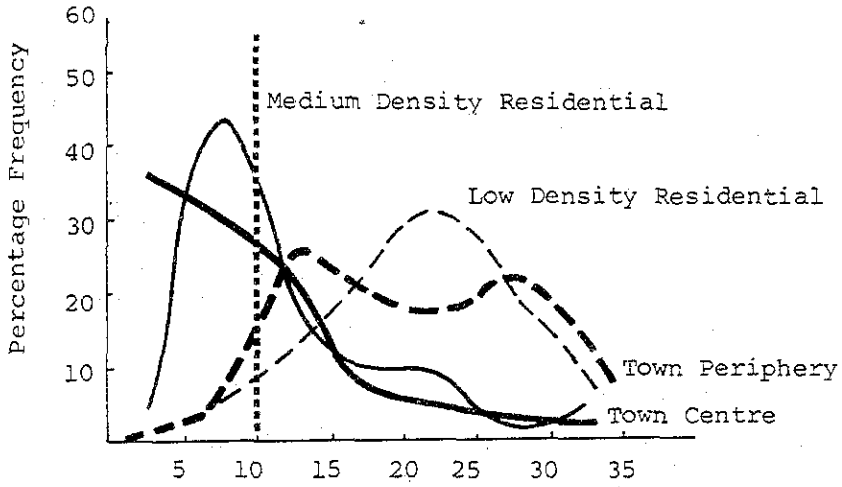


Fig. 7.6 Distribution of House to Bus-Stop Walking Hour



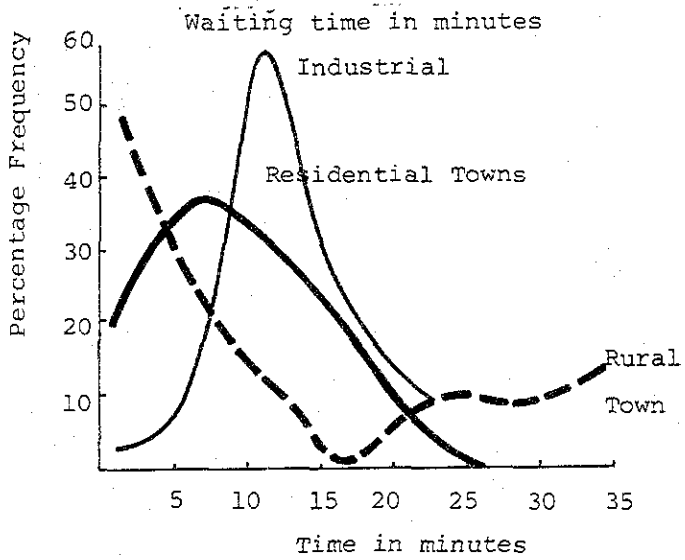


Fig. 7.7 Waiting Time Distribution of Bus Users

f. No place to sit in the bus

Passengers complain they do not have places to sit, sometimes even on long journeys. This and Item (5) above are caused by a lack of capacity during peak hours.

g. Information display

While most passengers appear to be familiar with their usual routes, there are complaints when commuters want to use different routes. Lack of information on schedules and detailed information on bus routes also deter potential users.

2) Bus Company Problems (Management and Operation Problems).

a. Lack of flexibility in expansion

The process of applying for new routes is slow. There are two departments (the Public Transport Licensing Board in the Ministry of Public Enterprises and the Registrar and Inspectorate of Motor Vehicles) which administer public transport affairs. A third government body, the Economic Planning Unit is involved in policy making.

In part, the absence of new routes since the last study in 1973 is due to this factor.

b. Inefficient Cost Management

The operating cost per bus mile appears vary. Companies A and C are 12% less efficient than B in unit operating cost. In terms of maintenance, A is 72% less efficient than B although their fleets are nearly the same age. Company C is 43% less efficient than B although its fleet is newer. In wages, A and C are 20% and 8% less efficient than B. In fuel, oil and

tyres, A is 15% less efficient than B, and C is about the same as B. (Table 7.3). It is apparent that there is a need to replace old buses to reduce maintenance costs.

Table 7.3 Operating Cost Per Mile

Company	Total Cost per mile (cents) in 1980	Maintenance Cents per mile	Wages Cents per mile	Fuel, oil, tyres Cents per mile
A	126.8	30.7	48.7	26.8
B	112.1	17.8	40.7	23.3
C	124.6	25.4	44.1	23.6

Source: The Bus Company Study 1981.

c. Unsound Financial Management

Company C has been operating at a loss. In 1980, it paid out interest equivalent to 97% of its paid-up capital.

d. Controlled Fare

Bus fares are controlled by the Public Transport Licensing Board.

e. Encroachment by pirate taxis and school and factory buses

Illegal operations by pirate taxis and the use of school and factory buses cut into the revenue of bus companies.

f. Traffic Congestion along Bus Routes

Congestion occurs at the following places:

- turning from Jalan Ah Fook to Jalan Station;
- Jalan Tun Abdul Razak near Immigration Complex;
- turning from Jalan Selat Tebrau into Jalan Ibrahim;

- Jalan Tebrau from Police Depot to Taman Sri Tebrau.

Because of congestion, buses cannot complete trips according to schedule. Thus, they are off schedule and the actual frequency is lower than scheduled.

q. Flooding along Bus Route

Flooding frequently occurs at:

a. $3\frac{1}{2}$ m/s Jalan Scudai;
b. 5 m/s Jalan Kota Tinggi.

3) Facilities Problems

a. Bus Terminal

The major problem is that there is no permanent structure.

Because the existing station is not located along bus-routes, buses infrequently call at the bus-terminal. There is thus no connection between town bus routes and inter-regional routes which collect passengers at the bus-terminal.

The existing terminal appears to be poorly planned with no separation of different modes. The major problem is vehicular/pedestrian conflict. The structures are temporary and inconvenient to users as there are no proper toilets, places to sit and wait or protection against sun and rain. Cleanliness in the terminal needs to be improved.

There is no route map schedule or information on fares. This is inconvenient to new users and users who are not frequent users of particular routes.

b. Town Bus-stands

During the morning peak hour, there are 78 bus movements at the bus-stands in the town centre, Jalan Ah Fook and Jalan Tun Abdul Razak. The survey revealed a maximum of 70 bus movements per hour during the peak hour. Travel time survey indicated stop time of more than one minute. There thus appear a need for at least a two-channel station in the town centre as there are about 1.75 bus movements per minute.

The bus-stands in town do not provide adequate space. At Jalan Ah Fook, there are 1300 passenger movements per hour. The space provided by the bus-stands is inadequate. The design does not offer protection against sun and rain.

The bus-stands are without lay-bys. On the heavily trafficked Jalan Tun Abdul Razak this interrupts other modes of transport. At Jalan Ah Fook, this problem is minor since traffic from the round-about is now prohibited from turning directly into Jalan Ah Fook. Vehicle volume near the Ah Fook bus-stand is thus low and the buses do not hold up other traffic.

As with the terminal, there is no bus route map or a schedule of fare information.

c. Suburban Bus-stops

There is inadequate coverage of bus-stops, as explained in user problem (b) above.

The designs do not meet requirements. Most stops are without shelters or a place to sit. There is no route, schedule or fare information either.

d. Roads

Congestion and flooding are already mentioned.

In addition, there are problems posed by on-street parking and construction works such as the digging up of roads.

4) Institutional Problems

Under the existing government organization for public transport, there appears to be no planning and little coordination. The EPU, the PTLB and the RTD are not involved in anticipating problems or in planning expansion. The in current concerns appear to be the determination of fares, approval or disapproval of route applications and enforcement. It is however promising that the RTD is now beginning to study these problems.

3 Short-Term Action Plan

1) Improvement in Bus Services

a. The expansion of bus services into the following areas:

Pasir Pelangi, Taman Maju Jaya, Taman Sentosa, Taman Seri Tebrau and Taman Tasek.

b. Improvement in routing

Re-routing in C.B.D.; to be proposed after improvement of traffic management.

Sub-centre and suburban routes.

Rural routes.

c. Shortened Interval

(frequency of each route to be planned after O-D data).

d. Improved Reliability

To ensure that buses are on schedule, the schedule should be realistically timed and the number of buses allocated accordingly.

Breakdowns should be minimised by regular servicing and maintenance; replacement of old buses should also help to reduce breakdowns.

Delays caused by congestion should also be minimised through the measures in 2 (c). There should be a set of contingency detours in the event of congestion, flooding or construction works. Signs should be put up at the affected bus-stops.

2) Improvement in Public Transport Facilities

a. Improved Bus-Stand Design

Every bus-stop should have the following:

a. shelter from rain or sun;
b. adequate seating;
c. bus-route map;
d. waste disposal;
e. bus-lay-by;
f. expansion of Jalan Ah Fook Bus-stop.

b. Improved Access ot Bus-Stand

There should be a short-term target to establish a bus-stand at every 300 meter interval.

c. Street Improvement

To increase bus speed, improvements should be made in streets used by buses through traffic control and management measures.

d. Improved Information System

All bus-stands should be provided with route maps, and information on schedules and

Fig. 7.8 Proposed Bus Routes Outside MPJB

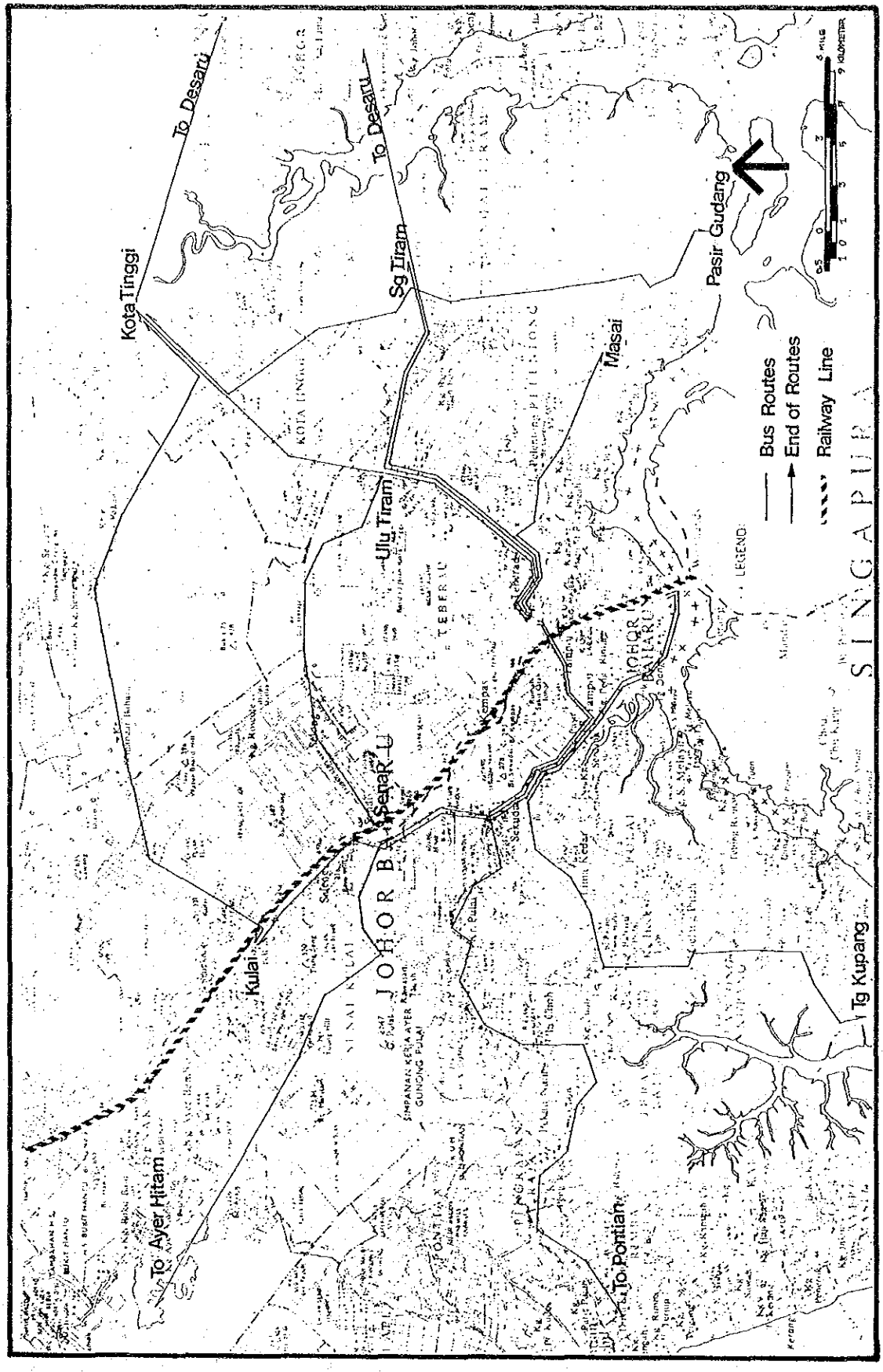


Fig. 7.9 Proposed Bus Routes in MPJB

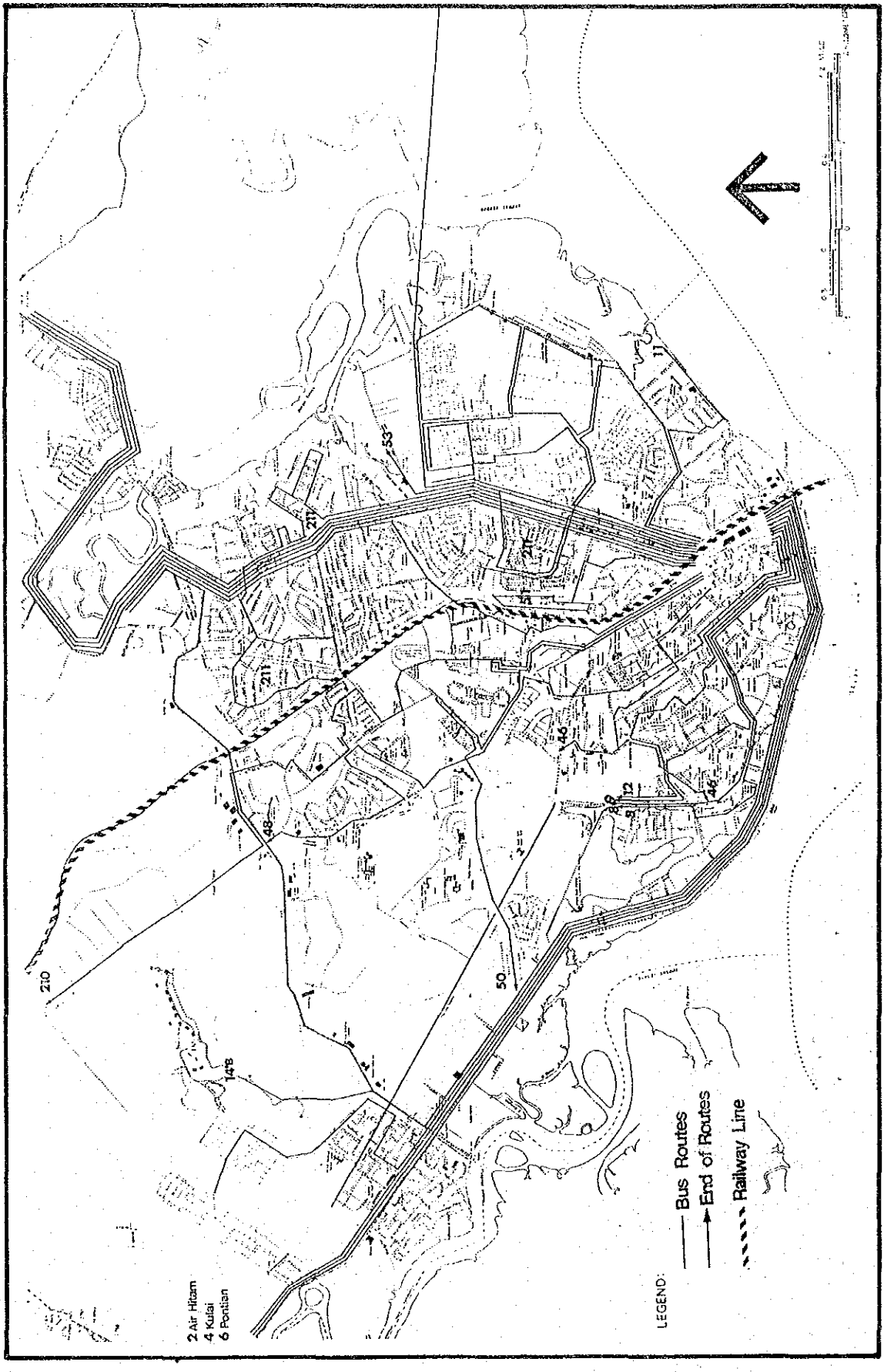


Table 7.4 Short-Term Route Frequency Plan (Charges only)

Old Route Number	Changes	Additional (km)	Peak Hours			Non-Peak		
			Loop or Line	Trip Purpose	Interval	Loop or Line	Purpose	Interval
New Route	Tampoi-Jalan Kempas - T. Johor Jalan Scudai - Tampoi (Subscription)	+	Loop		Subscription	Loop	OOthers	30 - 60 (small Bus)
14A and 44	44 cut into Melodies Garden, Taman Mejidi	nil +	Loop	Work	7.5	Loop	Others	10
50	Extend to Bandar Baru Tampoi	+	Line	Work others	30 min	Line	Others	10
211 and 54	Link via J. Goroda, J. Dewata	1.6 +	Loop	Work	7.5	Loop	Others	15
9	Extension to J. Larkin Century Gardens, Pelangi (Mini)	11.2	Loop	School Work	5	Loop	Others	10
49	Extension to Century Gardens, Pelangi (Mini)	9.6	Loop	School Work	5	Loop	Others	15
10	Extension to T. Sentosa (Mini)	3.2	Loop	Work	5	Loop	Others	7.5
New Route	T. Tun Aminah, T. Scudai Senai		Line	Work	10	Loop	Others	15
4	Plus to Senai Airport	1.5	Line/ Loop	Work	15	Line/ Loop	Others	30
48	Extension from J. Datin Halimah to J. Janika - J. Senggama - J. Kukoh (Mini)		Loop	School/ Work	5	Loop	School/ Work	10
46	Detour to J. Abu Samad - J. Tasek Utara - J. Kolam Air (Mini)		Loop	School/ Work	5	Loop	School/ Others	10

the fare system. The route map should also be shown inside the bus.

3) Fleet Improvement

a. Bus-Types

There should be a systematic replacement of old buses. This will reduce maintenance costs and minimise breakdowns. The new buses should be:

- equipped with two wider doors;
- low to facilitate boarding and deboarding especially for the handicapped and aged, and to improve safety;
  standee on short routes.

- The capacity of the buses should be related to demand. When demand density is low, smaller capacity buses should be used. For short-distance inter-town services, the buses used should have a seating capacity of less than 20. Where demand density is high, there should be large capacity buses. If routes are short, standee buses should be provided.

b. Incentives for Replacement of Buses

Incentives in the form of accelerated depreciation allowance should be provided by the Ministry of Finance to encourage replacement of buses.

Import duties on buses should be minimised.

4) Improvement in Fare and Princing Policy

a. Equity Consideration

The handicapped and elderly should be provided with a discount system as a social equity policy.

b. Fare-Prepayment Scheme

Fare prepayment:

- reduces expense and inconvenience at each boarding (ticketing, handling change);
- increases ridership and revenues;
- improves cash flow for the operator;
- shortens boarding time;
- heightens public awareness of public transport.

In principle, there should be a discount on prepaid fares. While a uniform card system would be convenient, the differences in trip purpose should be taken into account.

Since work and school trips demand tends to have low price elasticity compared with demand for other trips, it is proposed that there be two categories of cards.

Peak hour cards priced at 20 round-trips per month and with unlimited mileage on fixed sectors on town bus services. For those working 5 to 6 days this is a discount of 10 to 33% even when transfers are not considered. The use of the card for other trips will enhance the discount without increasing the operator's cost as non-peak hour occupancies are currently low.

Non-peak hour cards for unlimited mileage during non-peak hours on town services. This category of trips, being more elastic, will have to be priced more carefully.

In both cases, it would be advisable to determine amount of discount through market research or through pilot schemes. There should be extensive promotion to accompany such a scheme.

For the fare prepayment scheme to succeed, the coordination between bus companies should be improved. The scheme should be operated in a unified manner even though the companies may be separate.

c) Premium Service-Premium Fare Scheme

Studies have shown that only a few services a day, particularly those few trips during the peak hours, are capable of paying for the cost from the fares collected if premium fares are charged. It is proposed that fares for peak hour commuting may be increased to perhaps 20 to 25 cents for the first mile with a concomitant increased bus speed through express services, skip-stopping; increased frequency: guaranteed schedule. At the same time, the current type of service, while being improved, should still be kept in service as an alternative to this premium-fare-premium service-scheme. This competition will ensure that the level of service is maintained at a level superior to the non-premium service to deserve the premium fare.

5) Improvement in Management and Operations

a. Improved Efficiency

With the introduction of new buses, the rate of repairs and breakdown will be lowered. However, there will still be a need to service and maintain these new vehicles in addition to the ones in service that are yet to be replaced.

The operating costs of bus companies should be controlled with a statuatory declaration suggested in Chapter 5. Comparison with

other bus companies in and outside the region will give an indication of the level of cost efficiency. The control of fares based on reasonably efficient cost levels will deter bus companies from inefficiency.

b. Employee Training

There should be enhanced training in the planning of routes, frequency, bus-type required and contingency scheduling. Tax incentives or credits should be given for such costs incurred. In-service training to enhance safe driving should be given to bus drivers.

6) Institutional Improvement

a. There should be a public transport consultative committee consisting of government officials, bus companies, planners, and laymen including bus-users.

The bodies involved should be:

- State Economic Planning Unit (Chairman);
- State Public Works Department;
- State Traffic Police;
- State Road Transport Department;
- Regional Public Transport Licensing Board;
- State Town and Country Planning Department;
- Municipal Authority;
- bus company representatives;
- transport planners;
- concerned citizens and bus users;
- developers (by invitation).

b. There should be improved coordination between the PTLB and the RTD. The possibility of uniting these two bodies should be considered in the light of advantages for public transport services.

c) The RTD should be active in the checking of service levels, particularly in terms of reliability of schedule.

d) The public should be encouraged to queue up and to board the buses in an orderly manner. This will promote safety as well as ensure a shorter boarding time.

7-4 Factory Bus and School Bus

1 Factory Bus

The number of factory buses is small now, so there are few problems.

It is possible to suggest the need for a more systematic organization in order to avoid overlapping of their routes and congestion around industrial estates (which are predicted in the near future).

An organised association or cooperative should control the service level for the protection of users and to help individual operators in getting loans and solving administrative problems.

2 School Bus

The school buses provide a good service, i.e. they assure the safety of school children and provide the convenience of a door-to-door service. It is possible to suggest the need for a more systematic organization as with factory buses.

An organized association or cooperative should protect the interest of school children and help operators in getting loans and solving administrative and technical problems.

7-5 Taxi

Taxis are more efficient where demand density is

low and provide flexible routes and door-to-door service.

The number of taxis is not a problem because the ratio of town taxis to the population in Johor Bahru district is much higher than Singapore and Penang.

(Johor Bahru 1.6 vehicle/thousand)
(Singapore 0.7 vehicle/thousand)
(Penang 0.5 vehicle/thousand)

In order to promote the use of taxis, it is necessary to ensure that taxi operators charge fairly - i.e. that they use taxi meters - and to eliminate pirate taxis.

To ensure a more even spread of taxi service, mini-taxi stations should be set up in residential areas preferably in the commercial centre.

Chapter 8 IMPLEMENTATION PROGRAMME

8--1 Introduction

The main purpose of this chapter is to examine whether the implementation of the transport plan as recommended is financially viable, and to formulate the implementation programme if it is financially viable.

The main steps in this analysis are as follows:

a. forecast of transport funds;
b. investment requirements of transport projects;
c. comparative analysis of transport funds and investment requirements;
d. implementation programme.

8--2 Examination of Government Financial Position

The amount of transport expenditure is largely dependent upon the national revenue. The national revenue is proportionate to the Gross Domestic Product (GDP). Therefore, in this forecast, it is assumed that the road and bridge fund in the Johor State will increase proportionally with the GDP.

As a result, the road fund in Johor State is expected to increase from $77.1 million during 1976 - 1980 to $104.3 million in 1981 - 1985, $190.7 million in 1986 - 1990 and $692.8 million in 1991 - 2000 in case that 5.5 percent of the total fund is allocated to the Johor State. (See Table 8.6).

Table 8.1 Gross Domestic Product, Malaysia 1970–1980

(M$ in 1970 prices)

Year	Gross Domestic Product (GDP) (	Average Annual Growth Rate (%)	
1970	12,308	*	
1971	13,016	5.7	
1972	14,238	9.4	
1973	15,904	11.7	7.1%
1974	17,227	8.3	
1975	17,365	0.8	
1976	19,288	11.1	
1977	20,753	7.6	
1978	22,284	7.4	8.5%
1979	24,346	9.3	
1980	26,188	7.6	

Sources: (1) Economic Planning Unit (EPU).
(2) Fourth Malaysia Plan.

Table 8.2 Gross Domestic Product, Malaysia 1981–2000

(M$)

	Gross Domestic Product (1970 prices)	Gross Domestic Product (1981 prices)
1976 - 1990	112,859	182,568
1981 - 1985	164,050	305,133
1986 - 1990	243,056	452,084
1991 - 1995	358,579	666,957
1996 - 2000	524,424	975,429

Source: Economic Planning Unit (EPU).

Table 8.3 Economic Development Allocations and Gross Domestic Product

(M$ in 1981 prices)

	Economic Development Allocation	GDP	Percent Share to GDP (%)
1976 - 1980[1]	13,570.79 (18,480.55)[3]	182,568	7.4 (10.1)
1981 - 1985[2]	22,764.50	305,133	7.5
1986 - 1990	33,906	452,084	7.5
1991 - 1995	50,020	666,957	7.5
1996 - 2000	73,157	975,429	7.5

Source: (1), (2) Fourth Malaysia Plan
(3) Mid-Term Review's Figure

Table 8.4 Allocation to Transport Sector

(M$ in 1981 prices)

	Allocation to Transport Sector	Economic Development Allocation	Percent Share to Economic Development (%)
1976 - 1980[1]	2,842.75	13,570.79	20.9
1981 - 1985[2]	4,116.07	22,764.50	18.1
1986 - 1990	6,159	33,906	18.1
1991 - 1995	9,098.6	50,020	18.1
1996 - 2000	13,289	73,157	18.1

Source: (1), (2) Fourth Malaysia Plan.

Table 8.5 Allocation to Roads and Bridges

(M$ in 1981 prices)

	Roads and Bridges	Allocation to Transport Sector	Percent Share to Transport Sector (%)
1966 - 1980	1,765.46	2,842.75	62.1
1981 - 1985	2,318.07	4,116.07	56.3
1986 - 1990	3,468	6,159	56.3
1991 - 1995	5,115	9,086	56.3
1996 - 2000	7,482	13,289	56.3

Table 8.6 Allocation to Roads and Bridges in Johor State

(M$ in 1981 prices)

	Roads and Bridges	Allocation of Johor State		
		4.5%	5.5%	6.5%
1981 - 1985	2,318.07	104.3	127.5	150.7
1986 - 1990	3,468.0	156.1	190.7	225.4
1991 - 1995	5,115.0	230.2	281.3	332.5
1996 - 2000	7,482	336.7	411.5	486.3
Total	-	827.3	987.8	1,148.5

Source: Both Federal and State Funds are included.

8-3 Phasing Plan for Recommended Plans and Projects

1 General

As a result of an evaluation of the alternatives, the following combination of the road network plan and the demand control plan has been arrived at:

Table 8.7 Recommended Transport Plan

	1990	2000
Road Network Plan	Existing + Committed Projects + Proposed Roads	Option 1
Demand Control	Parking Control	Parking Control + Area Pricing
Public Transport Improvement	Exclusive Bus Lane	Exclusive Bus Lane

The following measures are also recommended on the basis of the recommended transport plans. The implementation programme is prepared in accordance with the recommended plans and action plans of the projects.

2 Phasing Plan

The implementation programme is prepared according to the following phases.

Phase 1	1983 - 1985	Short-Term Projects
Phase 2	1986 - 1990	Medium-Term Projects
Phase 3	1991 - 2000	Long-Term Projects

The short-term actions, whose aim is to cope with the improvements of the present transport conditions, should be implemented in the Phase 1 period.

The actual programme for the medium and long-term projects will be formulated through engineering studies which will include their feasibility and/or their justification so that future conditions can be expected.

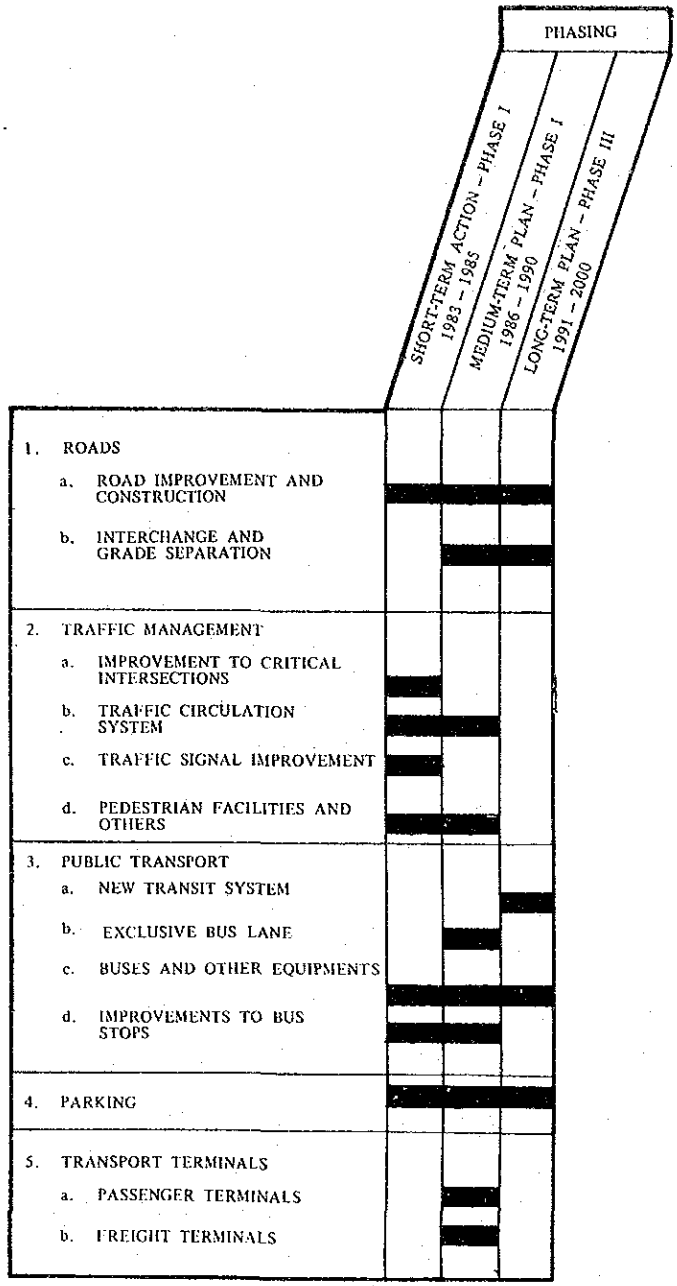
3 Implementation Programme of the Projects

1) Roads

a. Construction and Improvement of Roads

Table 8.9 shows the implementation programme of the roads. A major policy in the

Table 8.8 Recommended Phasing Plan



formulation of the programme was to solve the existing problems on the roads and to restructure the road network configuration.

b. Interchanges and Grade-Separations

Of the interchanges and grade-separation development, it is recommended that sixteen (16) in the MPJB - Pasir Gudang corridor and three (3) in the outer area be constructed.

The Phasing Plan for construction of the interchanges and grade-separations is shown in Table 8.9.

Table 8.9 Number of Interchanges to be Constructed

	Phase		
	1	2	3
Interchanges and Grade-Separation	0	15	4
MPJB - Pasir Gudang corridor	0	12	4
Outer Area	0	3	0

2) Public Transport System

a. Bus Fleet

The following number of new buses should be introduced by phase:

Table 8.10 Number of Bus Fleets to be Replaced and Added

	Phase		
	1	2	3
Number of New Buses	63	90	322

It is assumed that the life span of a bus fleet is 10 years.

b. Bus Stands

It is proposed that one hundred and fifty-five (155) bus stands be improved since these bus stands will be used in future stages. It is recommended that this be done in Phase 1.

c. Exclusive Bus Lane

An exclusive bus lane should be provided after the complete widening of Jalan Tebrau to six (6) lanes. And the Johor Bahru - Pasir Gudang southern linkage should also be given an exclusive bus lane. This will be accomplished in Phase 2.

d. New Transit System

According to the most likely plan presented in Chapter 6, the new transit system should be introduced in Phase 3.

3) Traffic Engineering and Management

a. Traffic Dispersal and Circulation Plan in C.B.D.

Since the traffic situation in front of the causeway is very bad and the dispersal of the causeway traffic is to be one of the important means of ensuring an effective traffic flow, a traffic dispersal and circulation plan in the C.B.D. is recommended.

As a short-term action, the interim circulation plan is recommended for implementation; the ultimate traffic dispersal and circulation plan should be implemented simultaneously with the causeway improvement plan as a medium-term plan.

b. Traffic Regulatory Measures

In order to improve the present disorderly

traffic situation, the traffic regulatory measures should be implemented in Phase 1.

c. Traffic Signal Improvement

Improvement of existing signals and installation of new signals in MPJB should be carried out at an early time. A line control system and/or an actuated signal system will be introduced in Phase 2.

d. Pedestrian Facilities

- Sidewalk

Since the present condition of sidewalks is quite poor and a safe traffic environment is considered to be one of the most important aspects of transport planning, it is recommended that sidewalks be improved as both a short-term and a medium-term action.

Priority for improvement of sidewalks should be given to the C.B.D. of MPJB where the concentration of commercial and public activities attracts many pedestrians. The second priority area is the newly developed areas, e.g. Taman Century and Taman Pelangi, where the concentration of shopping activities also attracts many pedestrians.

- Pedestrian Crossings and Pedestrian Signal Lights

The provision of pedestrian crossings is recommended as both a short-term and a medium-term action, simultaneous with the sidewalk improvement. And it is recommended that pedestrian signals be provided at the pedestrian crossings at key intersections.

· Pedestrian Mall

It is recommended that Jalan Meldrum be opened exclusively to pedestrians as a pedestrian mall in the medium-term plan.

e. Intersection Improvement

The improvement of the bottleneck intersections in the traffic flow should be implemented as a short-term action.

4) Parking Control Programme

a. On-Street Parking Control.

In order to achieve a smooth traffic flow and provide spaces for sidewalks and bus-stands, on-street parking should be prohibited and this prohibition should be enforced effectively; otherwise the private sector would be discouraged from developing off-street parking. The procedure for parking control is as follows:

Table 8.11 On-Street Parking Prohibition

Phase 1	* Within 100 feet from busy intersections
	* Primary Distributors in the C.B.D.
	* District Distributors in the C.B.D. as well as newly developed areas.
Phase 2	* Jalan Meldrum
	* Local Distributors identified as busy commercial streets

b. Development of off-street parking

Development of off-street parking depends mainly on the private sector which can meet the parking demand more efficiently than the public sector. However, the public sector should develop off-street parking in areas where the private sector is unlikely to do so,