

GOVERNMENT OF MALAYSIA

JB - TRANSPLAN

FINAL REPORT



URBAN TRANSPORT MASTER PLAN STUDY FOR
THE JOHOR BAHRU CONURBATION, MALAYSIA

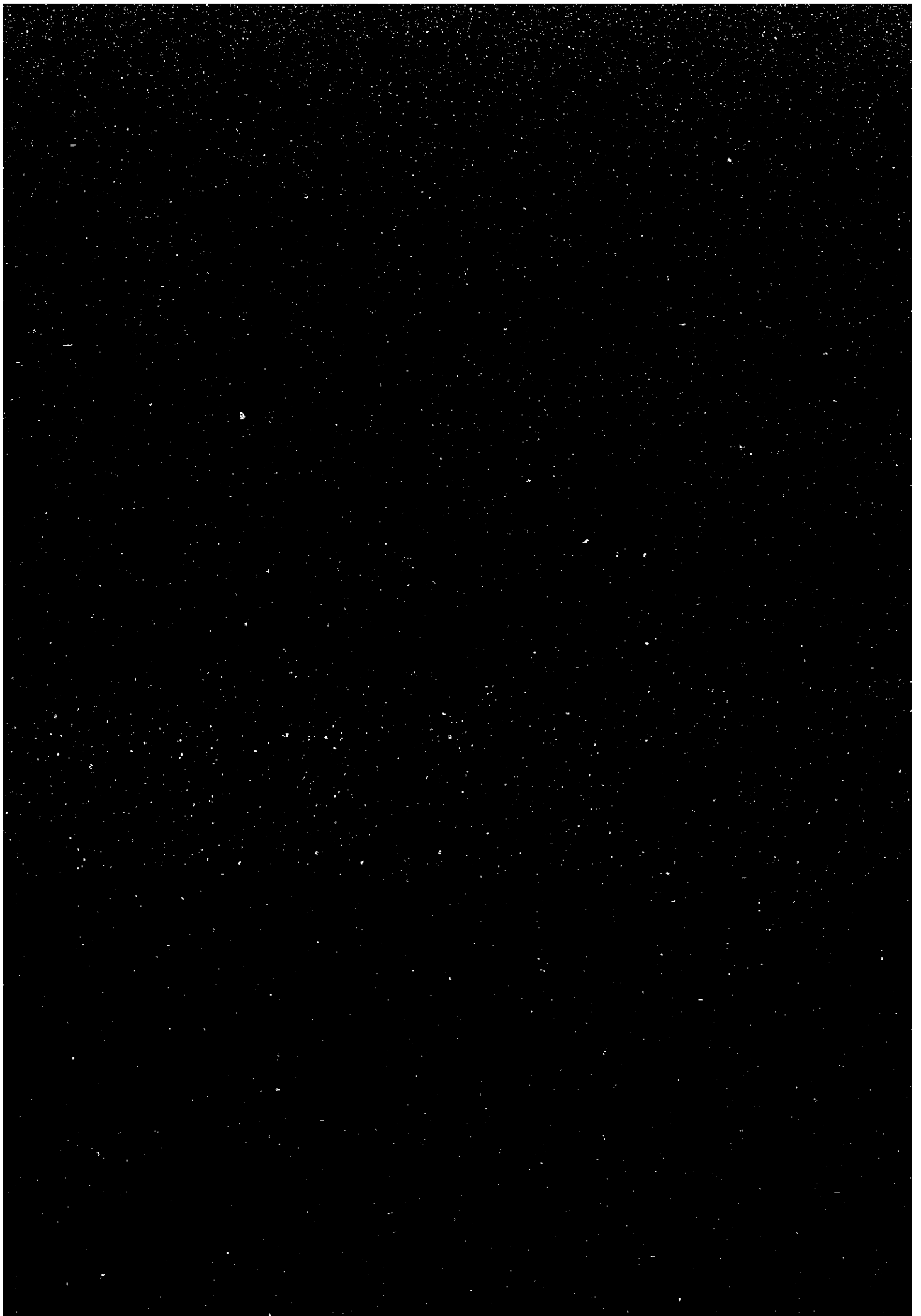
SUMMARY AND
RECOMMENDATIONS

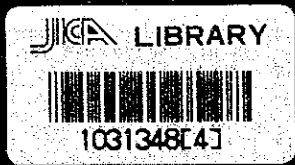
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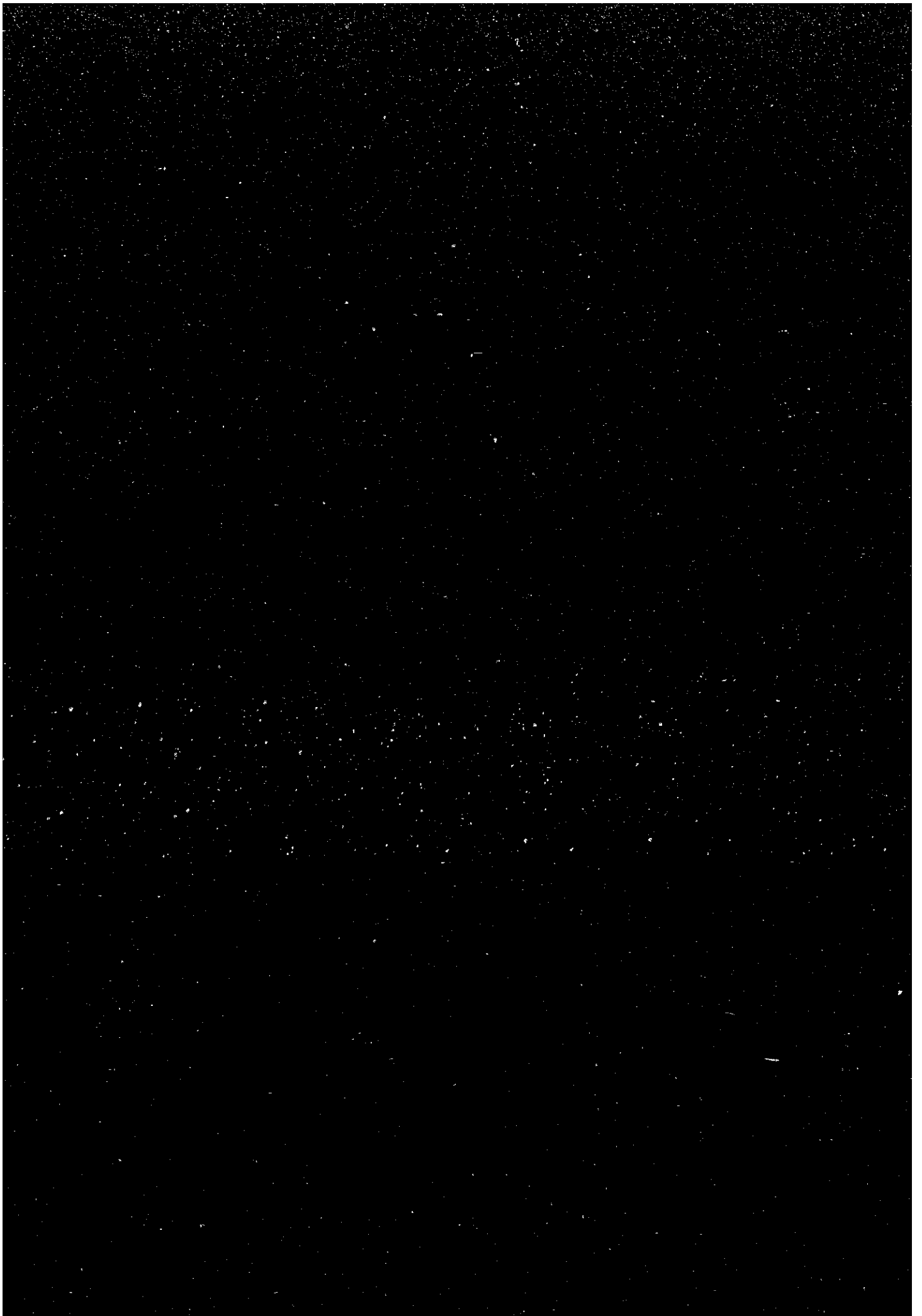
JAPAN INTERNATIONAL COOPERATION AGENCY

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GOVERNMENT OF MALAYSIA

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**URBAN TRANSPORT MASTER PLAN STUDY FOR
THE JOHOR BAHRU CONURBATION, MALAYSIA**

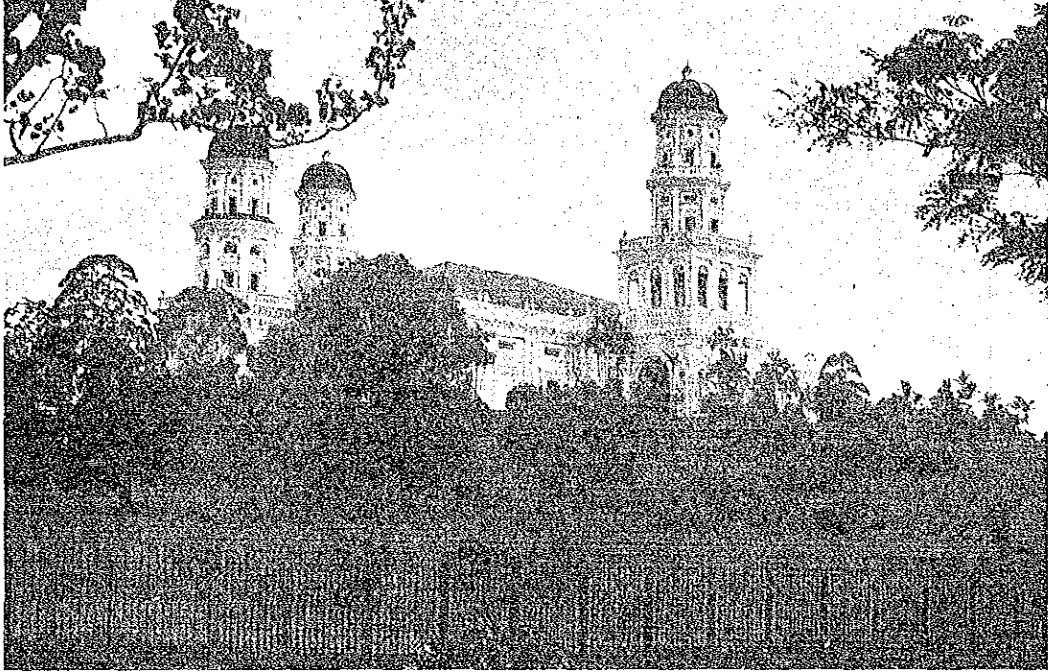
**SUMMARY AND
RECOMMENDATIONS**

OCTOBER 1982

JAPAN INTERNATIONAL COOPERATION AGENCY

No. 13904
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国際協力事業団	
受入 月日 84.9.11	113
登録No. 09704	73.7
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PREFACE

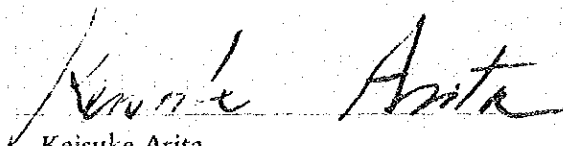
I am pleased to present to the Government of Malaysia a Report on the URBAN TRANSPORT MASTER PLAN STUDY FOR THE JOHOR BAHRU CONURBATION, MALAYSIA.

Following the request made by the Government of Malaysia to the Government of Japan, a Japanese team organized by the Japan International Cooperation Agency performed a study on the above Master Plan between May 1981 and September 1982. The study team, headed by Mr. Kokuro Hanawa, under the guidance of a supervisory committee chaired by Prof. Moriyuki Hirose, held discussions with the officials concerned of the Government of Malaysia and made a detailed field survey and data analysis. This report represents its findings and recommendations.

I hope that the report will contribute to the planning of the future development and prosperity of the region and to the promotion of friendly relations between our two countries.

To those officials concerned of the Government of Malaysia, who have extended close cooperation to the study team, I would like to express my deep gratitude.

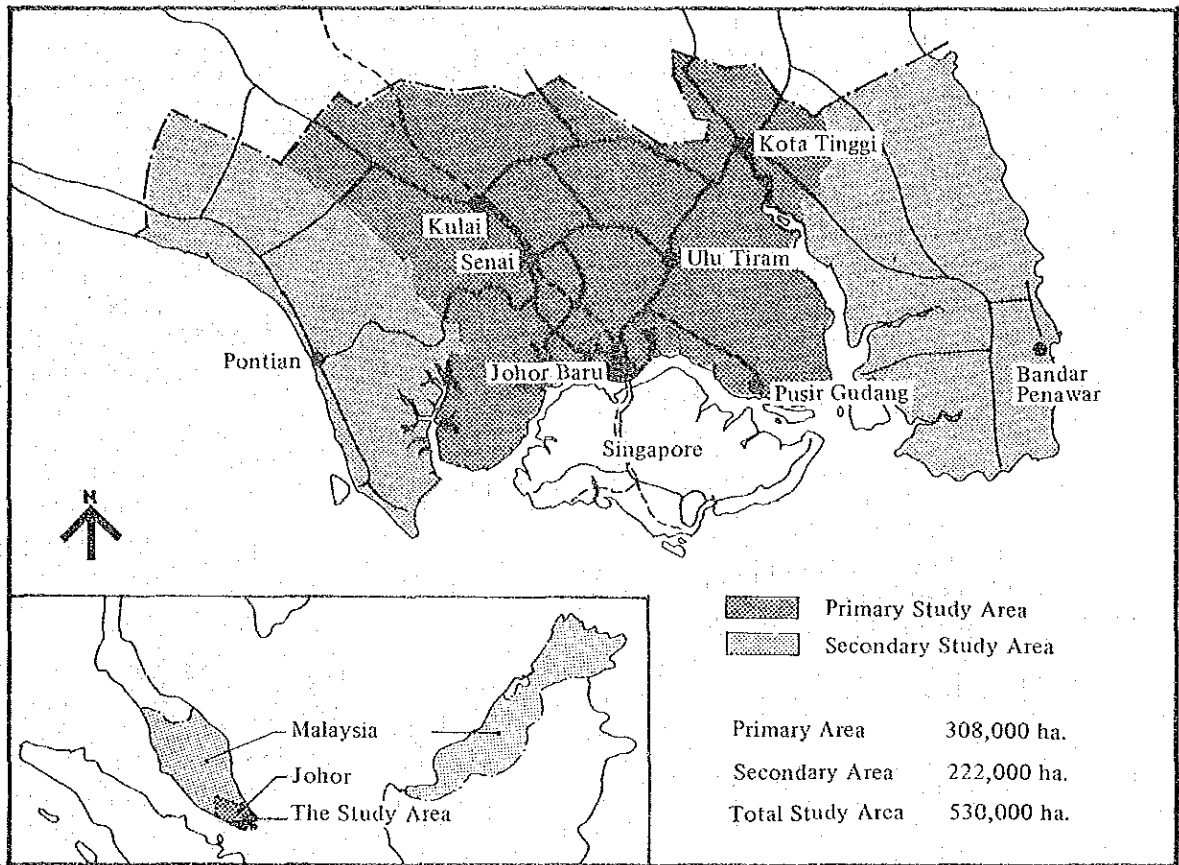
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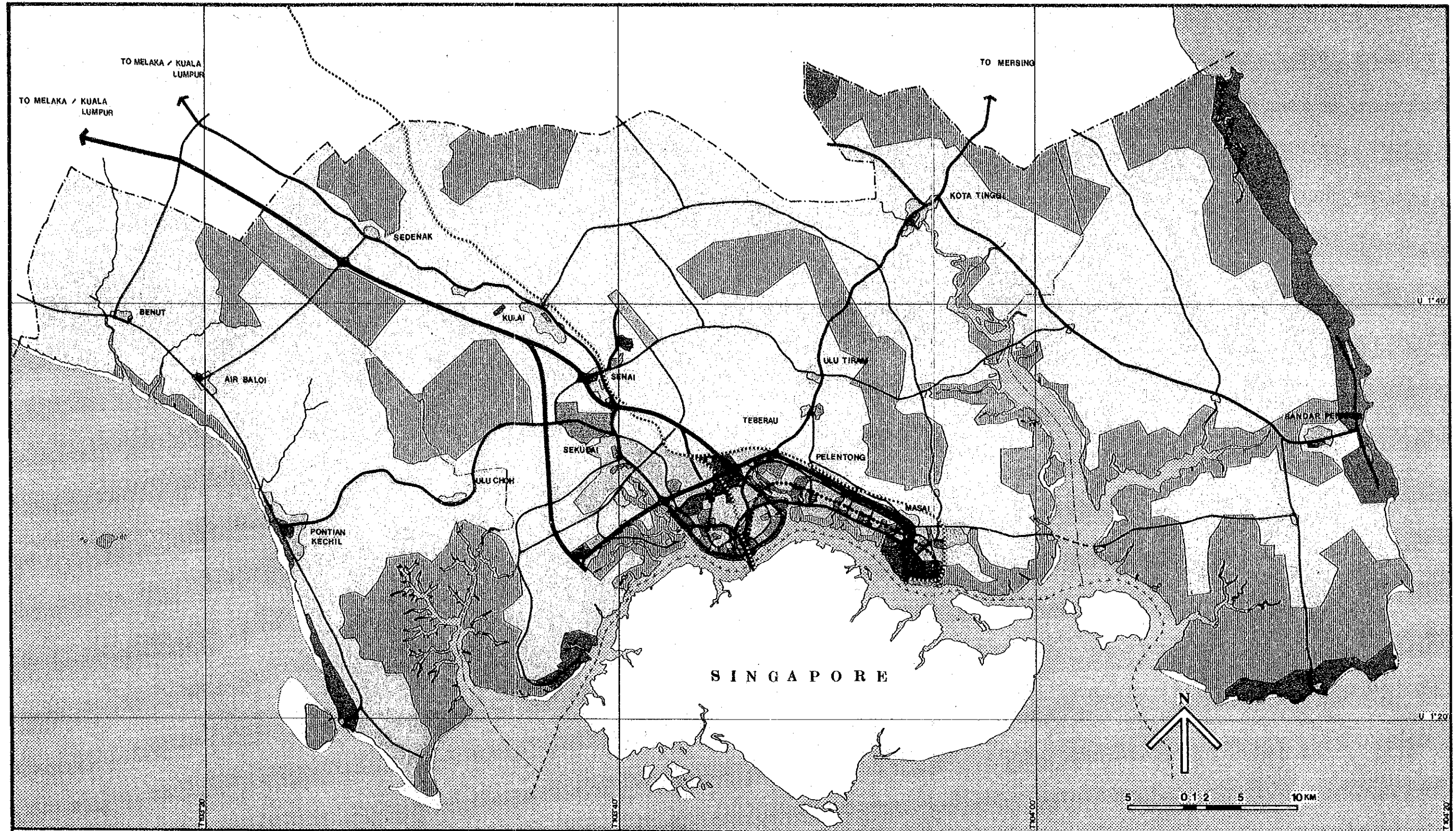
Keisuke Arita

President

Japan International Cooperation Agency



STUDY AREA



LEGEND :			
	RESIDENTIAL		NATURAL & RESERVED
	COMMERCIAL		PRIMARY DISTRIBUTOR ROAD (INTER-REGION)
	INSTITUTIONAL		PRIMARY DISTRIBUTOR ROAD (INTRA-URBAN)
	INDUSTRIAL		DISTRICT DISTRIBUTOR
	TRANSPORTATIONAL		RAILWAY
	RECREATION & BUFFER GREEN		NEW TRANSIT SYSTEM
	AGRICULTURAL		FERRY ROUTE
			BOUNDARY OF STUDY AREA
			BOUNDARY OF PRIMARY AREA
			INTERNATIONAL BOUNDARY

TITLE:
FUTURE LAND USE AND TRANSPORT NETWORK PLAN - 2000

JB - TRANSPLAN : URBAN TRANSPORT MASTER PLAN STUDY FOR THE JOHOR BAHRU CONURBATION ,MALAYSIA

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INTRODUCTION

Due to intensive economic development in Johor State, Johor Bahru and its conurbation are already encountering various urban transport problems, and these problems are expected to further increase in the near future. Moreover, the Toll Expressway connecting Alor Star with Johor Bahru is expected to promote the redevelopment and further development of the present transport system.

In the light of these foreseeable changes, it is imperative that the improvement of the transport system in the area involved be carried out expeditiously.

The objectives of the study therefore are to formulate a master plan for the urban transport system in Johor Bahru and its conurbation, to recommend major transport policies and to suggest the order of priority for undertaking and realizing projects.

As possible solutions to the numerous transport and transport-related problems facing Johor Bahru and its conurbation the study proposes two (2) sets of recommendations, namely:

- a. a short-term action programme;
- b. a longer-term plan and programme for transport development.

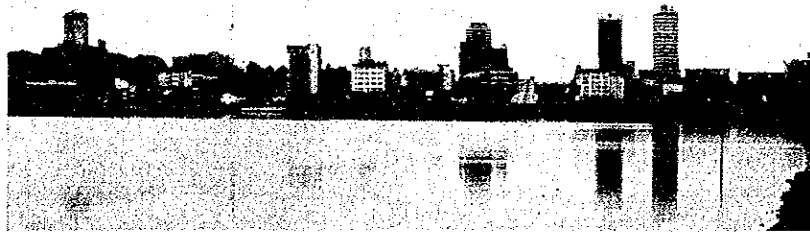


Fig. i A VIEW OF JOHOR BAHRU FROM THE CAUSEWAY (1981)

STUDY ORGANIZATION

Study Organization

The project is being carried out jointly by the Government of Malaysia and JICA in coordination with other agencies. The organizations involved in the project are shown in the chart below:—

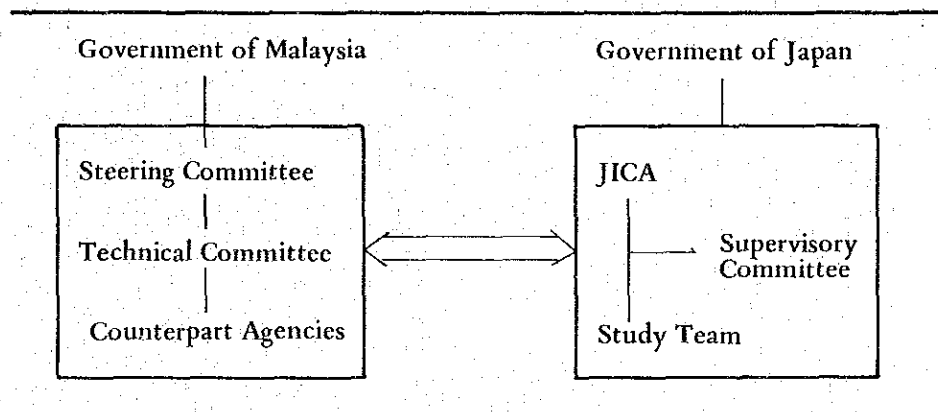


Fig. ii STUDY ORGANIZATION CHART

Malaysian Steering Committee

Chairman	Y.B. Tan Sri Ishak bin Pateh Akhir	Economic Planning Unit, Prime Minister's Department
Chairman	Mr. Ali Abdul Hassan	Economic Planning Unit, Prime Minister's Department
	Mr. Ismail bin Mohamed	Economic Planning Unit, Prime Minister's Department
Secretary	Mr. Annuar bin Khabar	Economic Planning Unit, Prime Minister's Department
	Mrs. Faridah Mohd. Ali	Economic Planning Unit, Prime Minister's Department
	Mr. Elaguppillai Balasubramaniam	Highway Planning Unit, Ministry of Works and Utilities
	Mr. Ghazali bin Bujang	Highway Planning Unit, Ministry of Works and Utilities
	Mr. Shigeru Komae (Colombo Plan Expert)	Highway Planning Unit, Ministry of Works and Utilities

Mr. Yoon Shee Leng	Public Works Department
Mr. Shamsuddin bin Che Mat	Ministry of Transport
Mr. Megat Amir Nordin	Road Transport Department
Mrs. Teh Zawahir	Town and Country Planning, (Federal)
Dr. Shahir bin Nasir	State Planning Unit (Johor State)
Mr. Zainuddin bin Mohamad	Town and Country Planning (Johor State)

Technical Committee, Government of Malaysia

Chairman	Y.B. Dato Sulaiman bin Mohd Noh	State Secretary, (Johor State)
Chairman	Dr. Shahir bin Nasir	Deputy State Secretary, (Johor State)
Secretary	Mr. Hamsan bin Saringat	State Planning Unit, (Johor State)
Secretary	Mrs. Zainee bte Abdul Jalil	State Planning Unit, (Johor State)
	Y.B. Dato Hj. Abd. Kadir bin Hj. Samon	State Land and Mines, (Johor State)
	Y.B. Dato Haji Nasir bin Mohd. Diah	Police Department, MPJB
	Y.B. Dato Abdul Razak bin Abdullah	Town Council; MPJB
	Mr. Anuar bin Khabar	Economic Planning Unit, Kuala Lumpur
	Mr. Edward Cheah Bian Siaw	Public Works Department, (Johor State)
	Mr. Yoon Shee Leng	Public Works Department, (Federal)
	Mr. Zainuddin bin Mohamad	Town and Country Planning, (Johor State)
	Mr. Ghazali bin Bujang	Highway Planning Unit
	Mr. Hiroshi Nakajima (Colombo Plan Expert)	Ministry of Works and Utilities
	Mr. Ghazali bin Hj. Rasid	Highway Planning Unit
	Mr. Harun bin Baba	Ministry of Works and Utilities
		Road Transport Department, (Johor State)
		Development Office, (Johor State)

Supervisory Committee, Government of Japan

Professor	Professor Moriyuki Hirose	Meisei University
	Mr. Takashi Shiina	Ministry of Construction
	Mr. Hiroshi Yamano	Urban Development Public Corporation
	Mr. Yasutake Inoue	Ministry of Construction
	Mr. Taro Kaji	Ministry of Construction

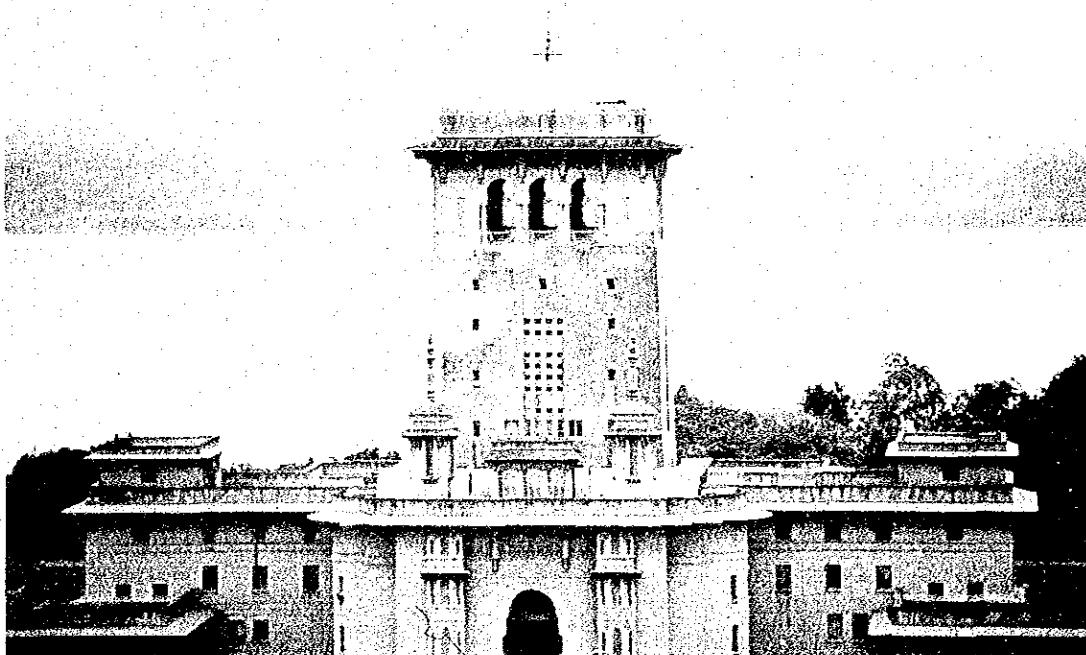
Study Term

Japanese Expert

Team Leader	Mr. Kokuro Hanawa	Traffic Engineering and Management
Project Coordinator	Mr. Toshio Kimura	Transport Economy
	Mr. Hideaki Hoshina	Land Use Planning
	Mr. Toshisada Katsurada	Transport Planning
	Mr. Koji Saito	Road Planning
	Mr. Hiroitsu Yamakawa	Public Transport Planning
	Mr. Seichiro Yamazaki	System Analysis
	Mr. Susumu Nigo	Traffic Engineering
	Mr. Tadashi Heida	Commodity Flow
	Mr. Masato Ohno	Environmental Analysis

Malaysian Counterpart

Mrs. Aishah bte Othman	Transport Planning, Highway Planning Unit
Mr. Noharuddin bin Nordin	Transport Planning, Road Transport Department



STUDY METHODOLOGY

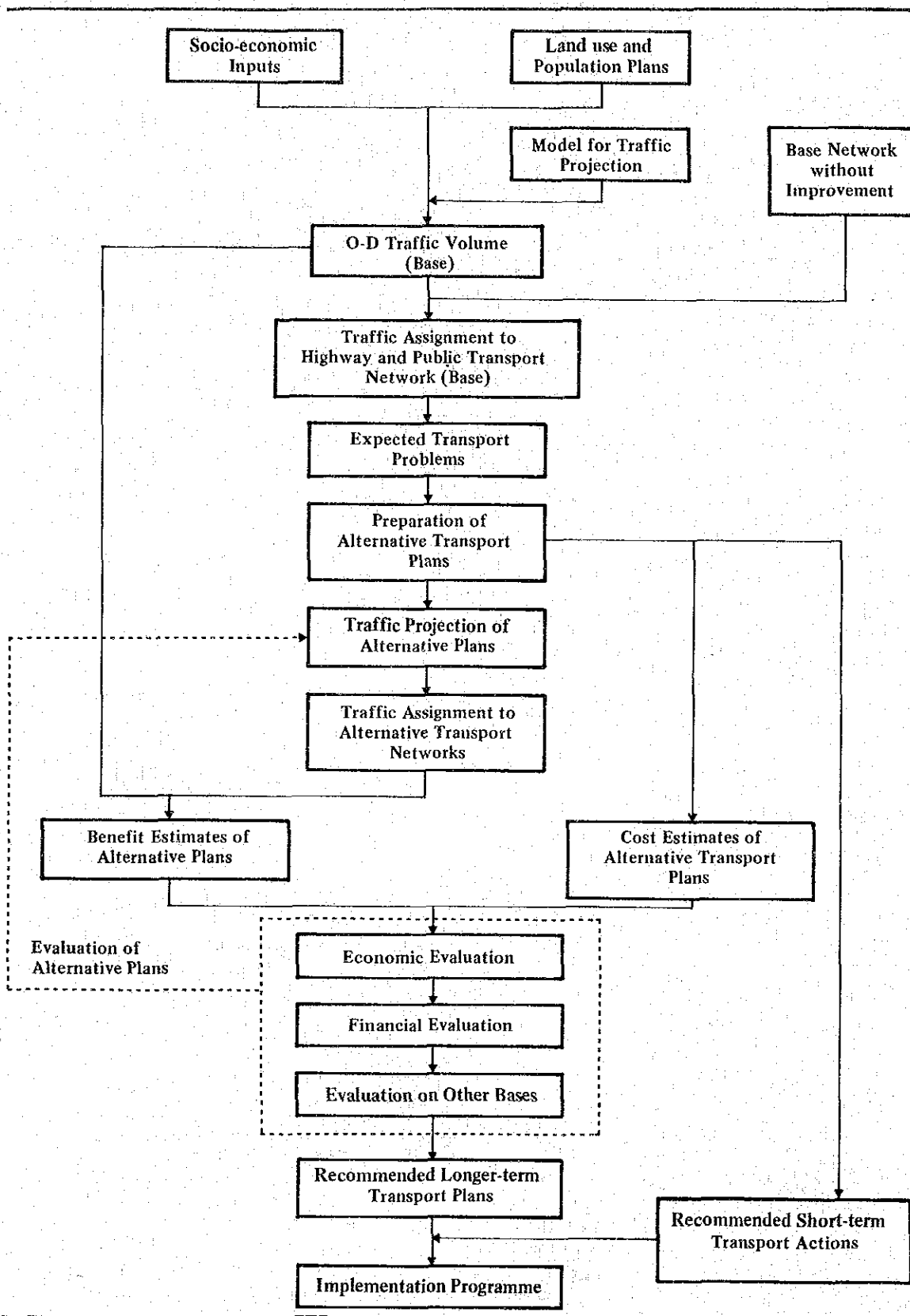


Fig. iii STUDY METHODOLOGY

MAJOR FINDINGS AND RECOMMENDATIONS



1 PRESENT CONDITIONS AND FUTURE PROSPECTS

1-1 SOCIO-ECONOMIC FRAMEWORK

The socio-economic framework for the Study Area as well as for Johor State assumed for the purposes of this study is based on the expectation that Johor Bahru and its conurbation will be the most developed community center and nucleus of growth in southern peninsular Malaysia.

1. In the 1990's Johor Bahru with its conurbation is expected to become the second largest metropolis in the whole of Malaysia. In the year 2000, the size of the population in the Johor Bahru region will almost equal that of Kuala Lumpur in 1980.

Within the Study Area, the projected annual population growth rate is 4.0 per cent from 1980 to the year 2000 which means that the population is expected to increase from 0.62 million in 1980 to 1.35 million in the year 2000. (See Table 1/Fig. 1)

TABLE 1 POPULATION; PRESENT AND PROJECTED

AREA	YEAR	1980 ⁽¹⁾ (x 1000)	1990 (x 1000)	2000 (x 1000)
	JOHOR BAHRU	417	655	1,000 ⁽²⁾
	KOTA TINGGI	42	53	67
PRIMARY AREA - TOTAL		459	708	1,067
SECONDARY AREA		161	221	283
STUDY AREA - TOTAL		620	929	1,350

Source: Study Team Estimates

(1) 1980 Population Census

(2) Target Population made in the Structure Plans Study

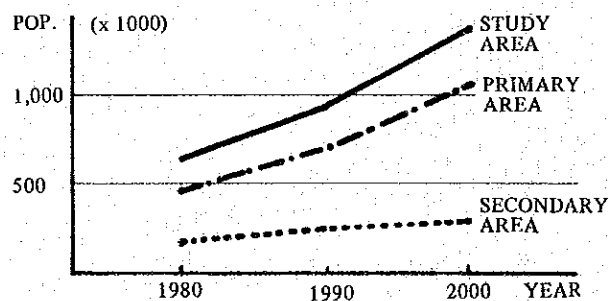


FIG. 1 POPULATION PROJECTION BY 2000

2. The Gross Regional Product in Johor State is expected to grow at an annual rate of 8.0 per cent from 1980 to the year 2000. In terms of value, it is estimated that the Gross Regional Product will thereby expand from M\$2,941 million in 1980 to M\$6,460 million in 1990 and M\$13,697 million in the year 2000. (See Fig. 2)
3. The annual growth rate of employment in the Study Area is projected at 4.6 per cent from 1980 to the year 2000, with employment expected to increase from 219,000 to 533,000 in that interval. (See Fig. 3)

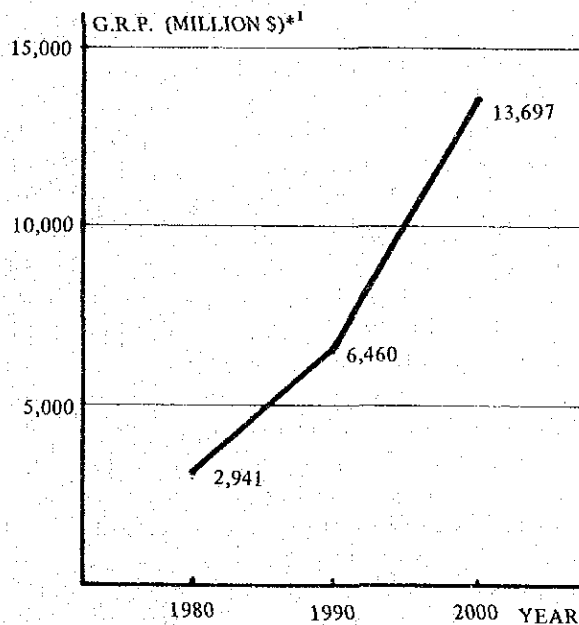


FIG. 2 GROSS REGIONAL PRODUCT
IN JOHOR STATE

NOTE : *1 Prices in 1970
Source: Study Team Estimate (1981)

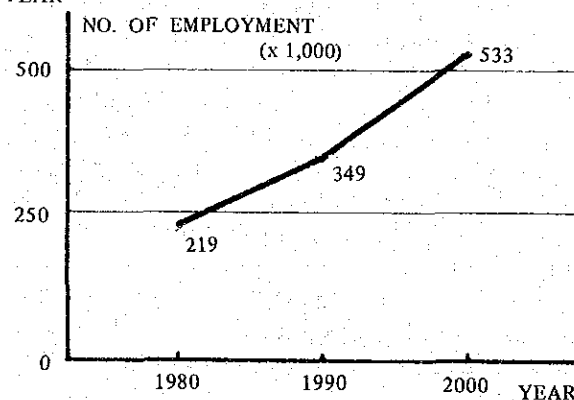


FIG. 3 EMPLOYMENT NEEDS
IN THE STUDY AREA
Source: Study Team Estimate (1981)

4. The average monthly household income in Johor State is expected to increase from M\$766 in 1980 to M\$1,876 in the year 2000, and hence, based on 1981 prices, the average annual growth rate of real income will be 4.6 per cent. (See Fig. 4)
5. Based on a projection of household income, the number of vehicles in the primary area is expected to increase from 88,000 in 1980 to 273,000 in the year 2000. (See Fig. 5)

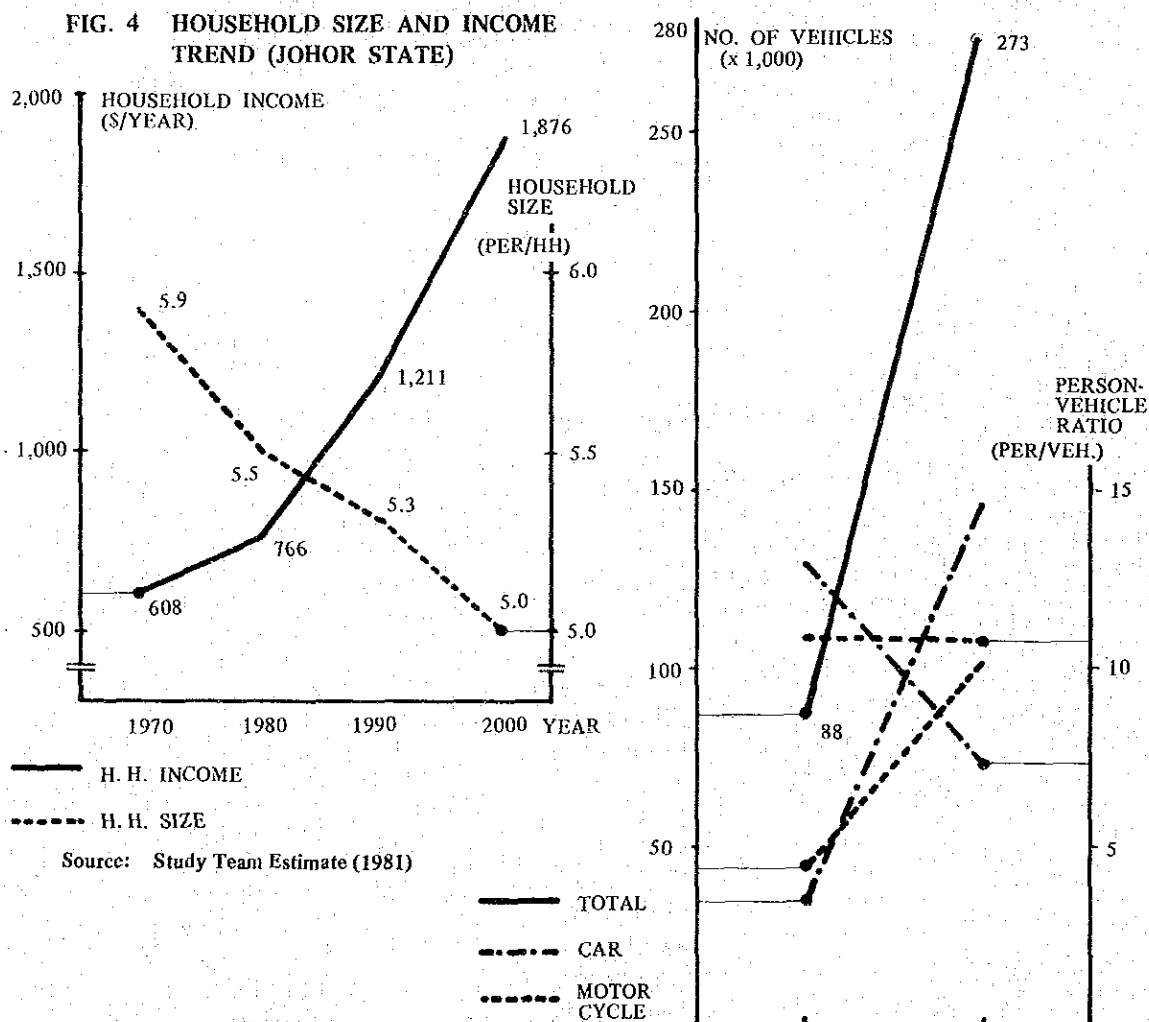


FIG. 5 PROJECTED NUMBER OF CARS AND MOTORCYCLES (PRIMARY AREA)

Source: Study Team Estimate (1981)

1-2 REGIONAL DEVELOPMENT PATTERN

A. EXISTING REGIONAL LAND USE PATTERN

At present the Study Area is predominantly agricultural. Agriculture accounted for nearly 60% of the Study Area's land use in 1980, and rubber and oil palm are the two most widely cultivated crops. The Study Area also has extensive forest and marsh land, comprising more than 20% of the total area. The Government has been promoting a comprehensive rural development plan which will turn this forest land into farmland.

The urban area accounts for approximately 3% of the total area, and most of it is concentrated in Johor Bahru and its suburbs. Fig. 6 shows basic pattern of existing land use adopted from "Present Land Use of Peninsular Malaysia" by I.F.T. WONG. 1979.

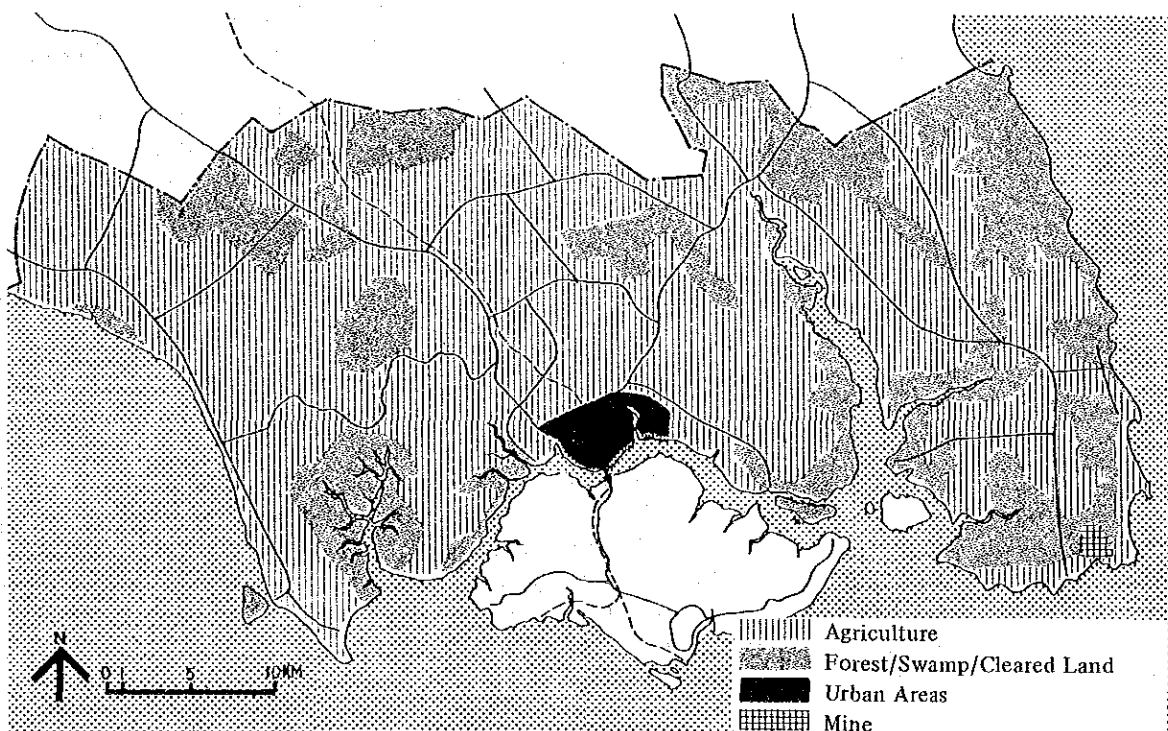


FIG. 6 EXISTING REGIONAL LAND-USE PATTERN

Source: Adopted from "Present Land Use of Peninsular Malaysia" (1979)



FIG. 7 A BIRD-EYE VIEW OF THE NORTH OF CBD, MPJB (1981)

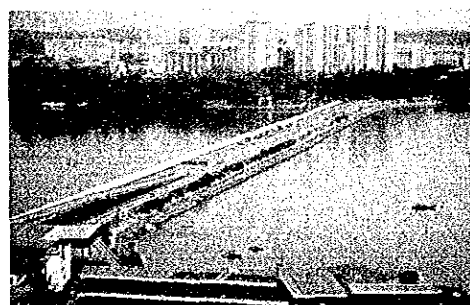
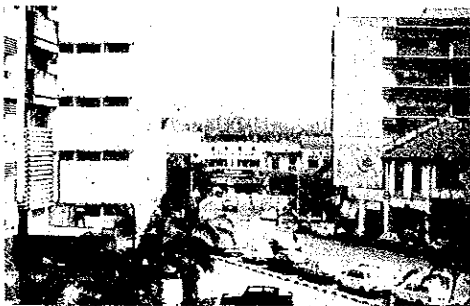


FIG. 8 SECTIONS OF THE ENVIRONMENT OF CBD, MPJB (1981)

B. FUTURE DEVELOPMENT PATTERN

The simultaneous development of all parts of the Johor Bahru metropolitan area appears to be the most likely pattern for future development, given an equitable and balanced development policy by the Government and the existing development plans. (See Table 2)

This development pattern is predicated based on the regional development potential, the development of urban activities and the creation of an appropriate urban community as well as a better urban environment in future. (See Fig. 9)

As for macro-level development, metropolitan Johor Bahru is expected to be a major nucleus of growth in the southern part of peninsular Malaysia acting as state capital, regional commercial and business center.

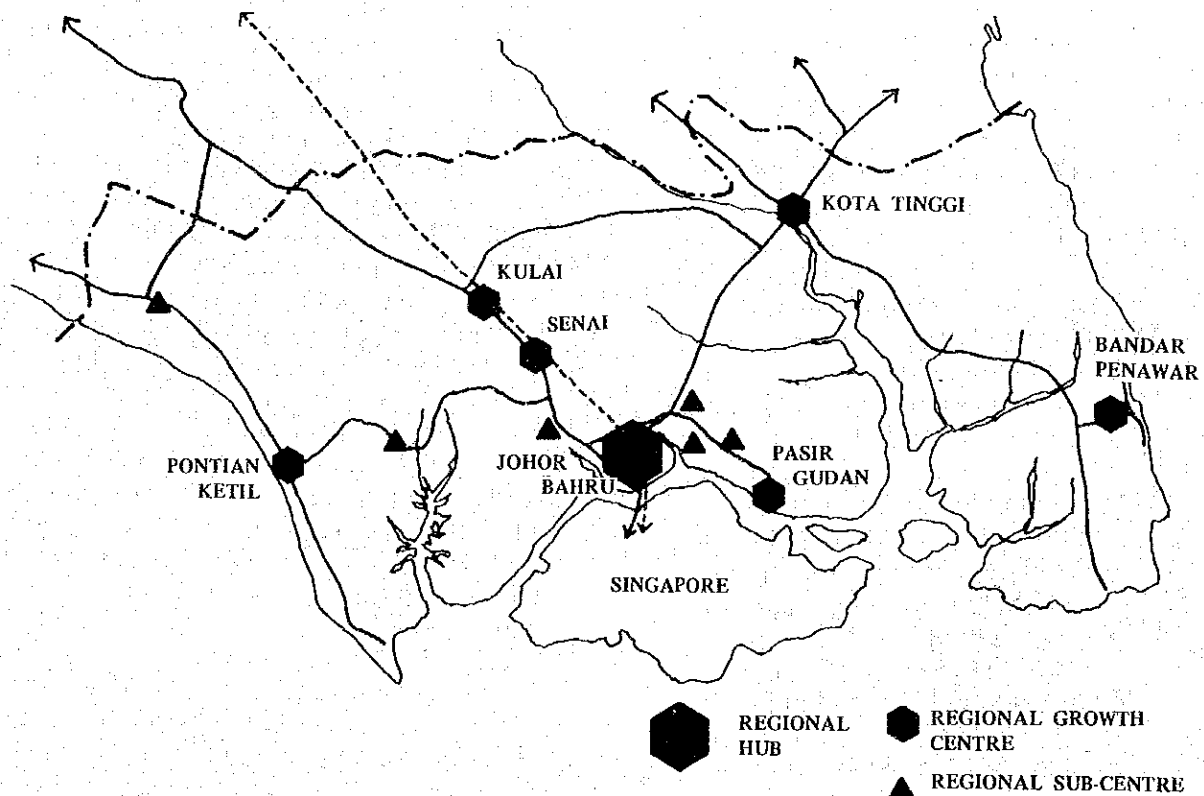


FIG. 9 URBAN HIERARCHY 2000

Source: Adopted from Structure Plan Unit Proposal

This implies that Johor Bahru should extend a regional network in radial form to Batu Pahat, Melaka, Kuala Lumpur, Kota Tinggi and its surrounding area, and the east coast where a large recreational compound is now under construction.

The region will be expected to pursue rural development that is well balanced between its eastern and western areas, the former being at present less developed than the latter.

Because unexpected environmental problems may arise due to rapid urbanization along the Johor Straits, conditions should be carefully monitored and steps quickly taken to mitigate those that are detected. The causeway improvement is also urgently needed to solve traffic problems in Johor Bahru. (See Fig. 10)

TABLE 2 FUTURE LAND USE PROJECTION

LAND USE \ YEAR	1980 (1)	1990	2000
URBAN LAND (KM ²)	155.7	211.1	265.9
AGRICULTURAL LAND (KM ²)	2,802.8	2,838.5	2,874.1
OTHER LAND USE (KM ²)	1,749.1	1,658.0	1,567.7
TOTAL AREA (KM ²)	4,707.6		

Source: Study Team Estimates

(1) Existing Land Use Adjusted by the Study Team

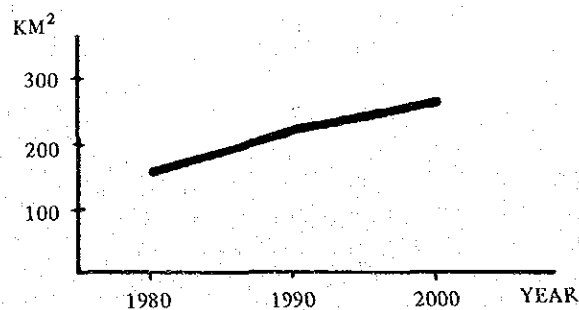
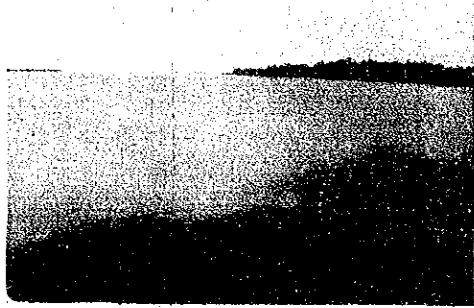
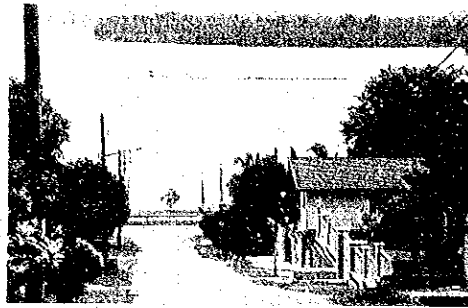


FIG. 10 INCREASE OF URBAN LAND



a



b



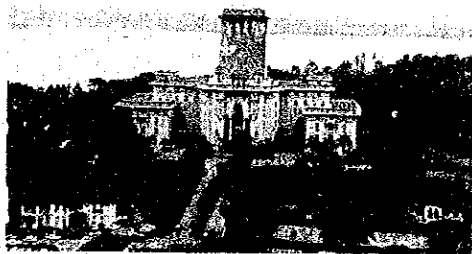
c



d

- a. THE STRAITS OF JOHOR
- b. QUIET ENVIRONMENT
- c. PADAN
- d. LANDSCAPE IN A GARDEN

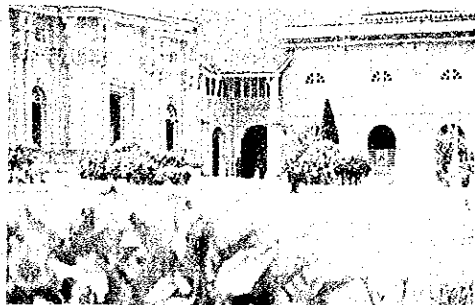
FIG. 11 TYPICAL ENVIRONMENTS TO BE CONSERVED



a



b



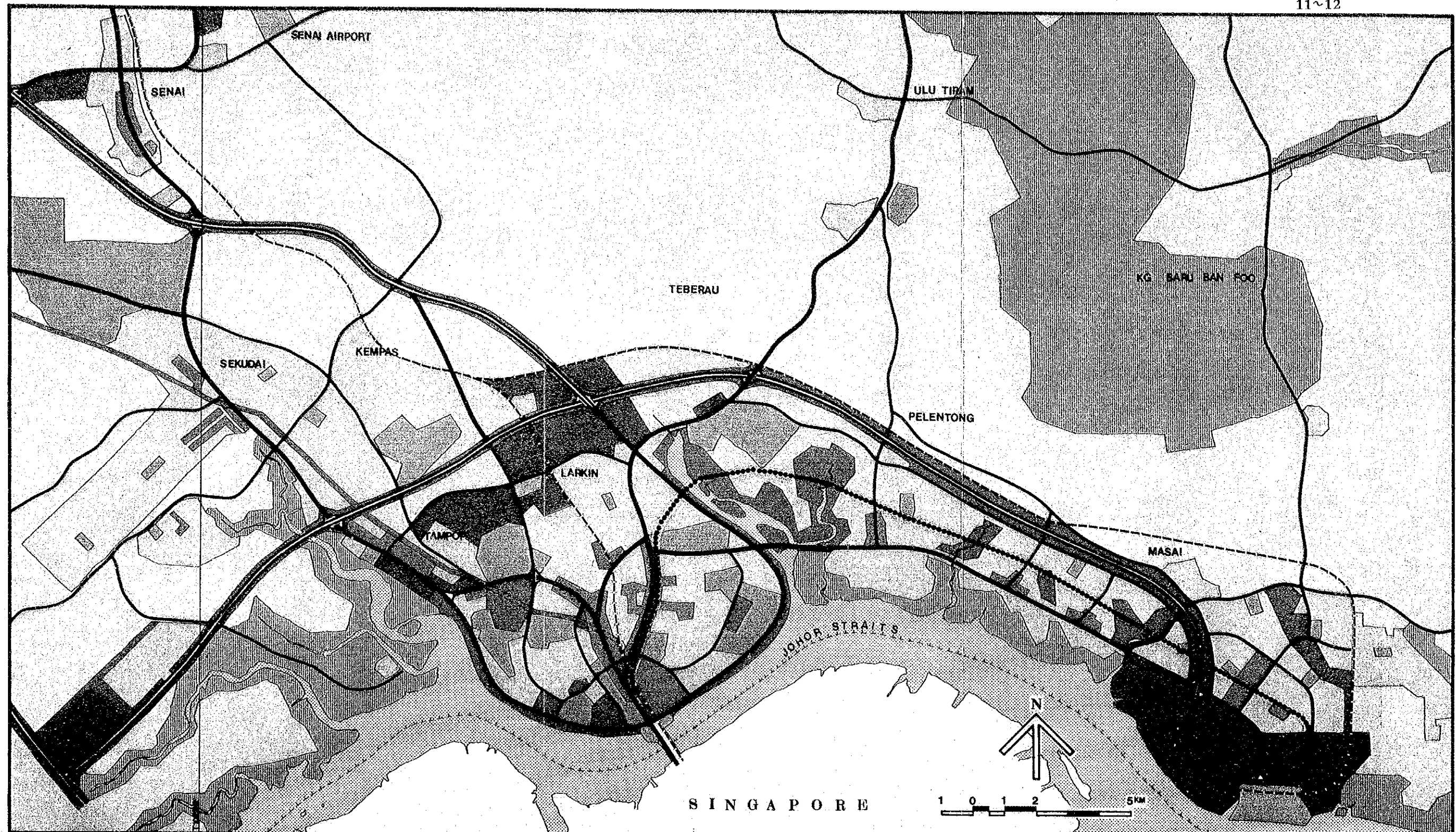
c



d

- a. THE STATE GOVERNMENT BLDG
- b. THE STATE MOSQUE
- c. THE SULUTAN HOUSE
- d. ROYAL MOSAELEM

FIG. 12 TYPICAL BUILDINGS TO BE CONSERVED



LEGEND:

RESIDENTIAL	INDUSTRIAL	NATURAL & RESERVED	RAILWAY
COMMERCIAL	TRANSPORTATIONAL	PRIMARY DISTRIBUTOR ROAD (INTER-REGION)	NEW TRANSIT SYSTEM
INSTITUTIONAL	RECREATION & BUFFER GREEN	PRIMARY DISTRIBUTOR ROAD (INTRA-URBAN)	INTERNATIONAL BOUNDARY
AGRICULTURAL	DISTRICT DISTRIBUTOR		

FIG. 13:
JB-PG CORRIDOR FUTURE LAND USE AND TRANSPORT NETWORK PLAN - 2000

1-3 TRAFFIC DEMANDS

A. EXISTING TRAFFIC DEMAND

On the basis of the 1981 OD surveys, the total number of vehicular trips produced in the Study Area (referred to as trip production) was 462,000 passenger car unit (PCU) per day, of which 411,900 were internal trips, 41,700 were external trips and 8,400 were through trips.

Figure 14 shows one of the summary of traffic survey, which is existing traffic composition in the study area.

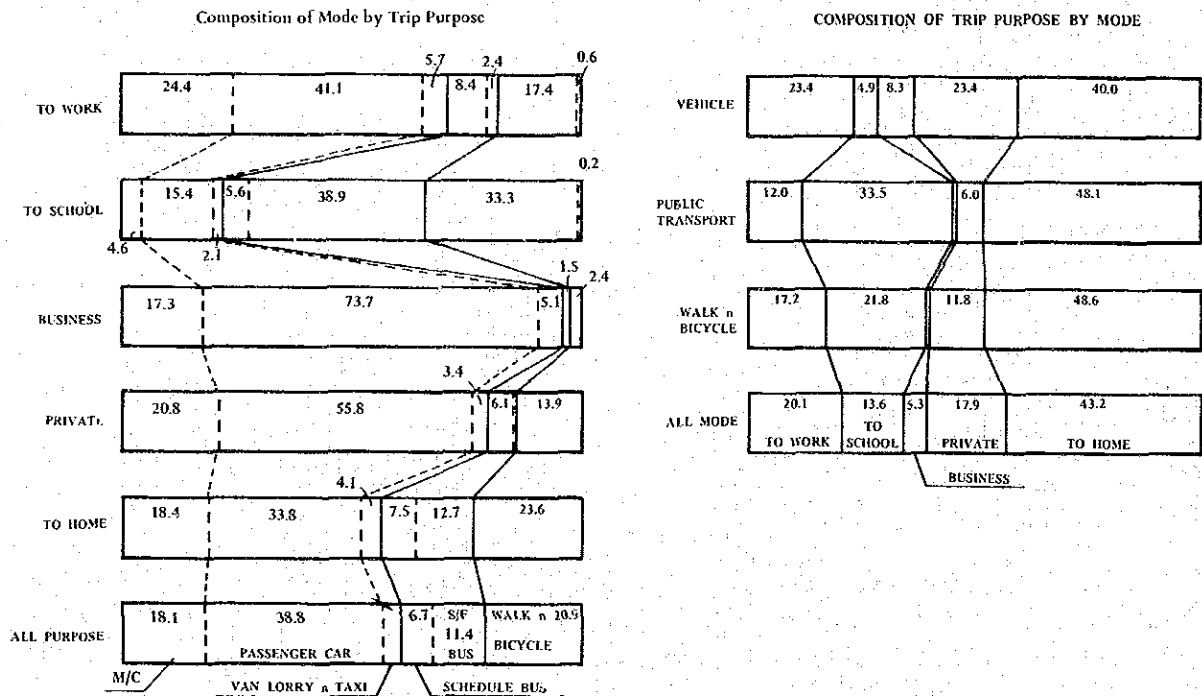
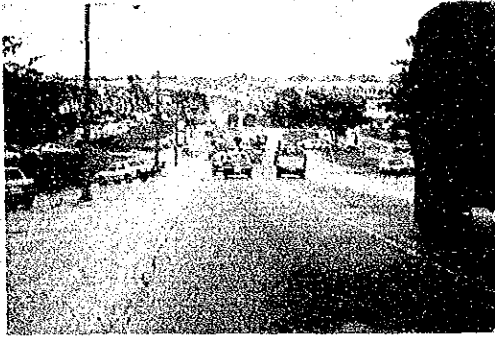


FIG. 14 EXISTING TRAFFIC COMPOSITION

Source: Study Team Survey Data (1981)



Jln. Tebrau



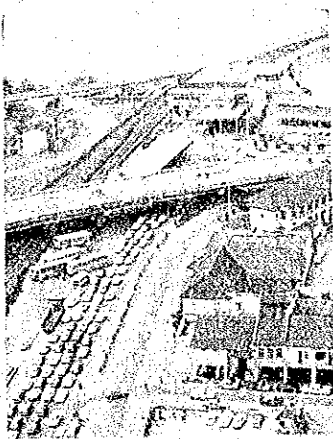
Jln. Tebrau



Jln. Ismail



Jln. Skudai



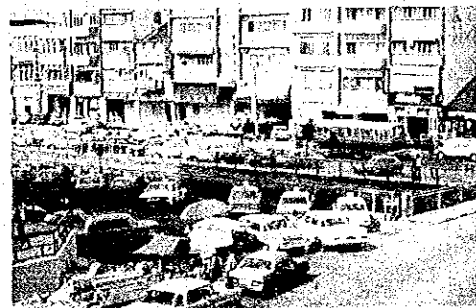
Causeway Entrance



A Bus Stop along Jln. Seget



Jln. Seget



SG. Seget

FIG. 15 EXISTING TRAFFIC CONDITIONS ON MAJOR ROADS

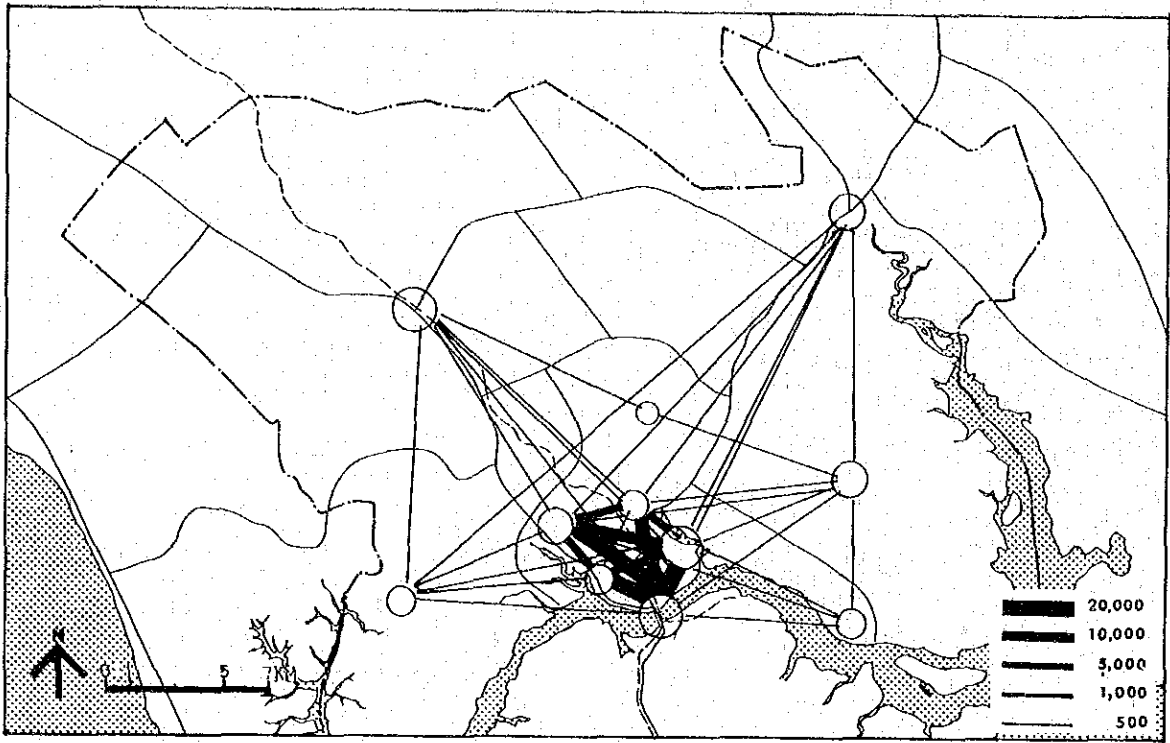


FIG. 16 TRAFFIC DESIRE PATTERN (1981)

Source: Study Team Survey Data

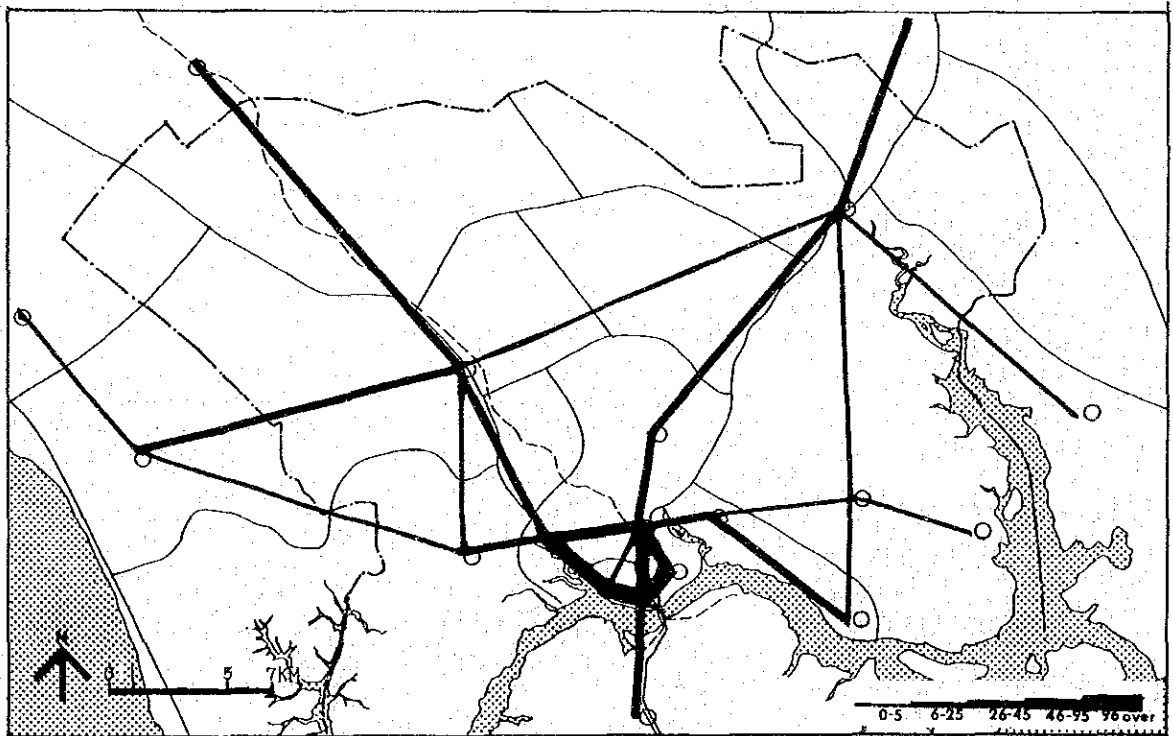


FIG. 17 PRESENT TRAFFIC VOLUME ON TRAFFIC LINES (1981)

Source: Study Team Survey Data (1981)

B. FUTURE TRAFFIC DEMAND

As a result of the rapid growth of population, economic activities and car ownership, the number of trips is expected to increase year by year with the total number of trips growing from 462,000 pcu (passenger car unit) in 1981 to 788,000 pcu in 1990 and 1,425,000 pcu in the year 2000 if no traffic restraint measures are taken. (See Table 3)

TABLE 3 PRESENT AND PROJECTED TRAFFIC VOLUME 1981,
1990 AND 2000*1

	1981 (1)	1990 (2)	2000 (2)	Average Annual Growth Rate (%)
Motor Car				
To Work	67,300	104,700	171,200	5.0
Business	26,600	49,600	99,200	7.2
Private	48,900	90,700	180,200	7.1
To Home	89,400	166,600	332,800	7.2
Sub-Total	232,200	411,600	783,400	6.6
Lorry	108,500	197,400	383,900	6.9
Motorcycle	112,000	166,100	257,400	4.5
Total	462,000	775,100	1,424,700	6.1

Note: *1 Excluding Schedule Buses

Source: (1) Origin and Destination Survey in 1981

(2) Study Team Estimate

TABLE 4 TRAFFIC VOLUME ON CORDON LINE
OF MPJB 1981 AND 2000 *1

	1981 (1)	2000 (2)	Average Annual Growth Rate (%)
Johor Bahru – Pasir Gudang	21.3	155.0	11.0
Johor Bahru – Kota Tinggi	21.7	43.9	3.8
Johor Bahru – Senai/Kulai	24.6	130.5	9.2
Johor Bahru – Pulai	10.9	46.6	7.9
Johor Bahru – Singapore	25.5	64.1	5.0

Note: *1 Excluding Schedule Bus

Source: (1) Origin and Destination Survey in 1981 n 1981

(2) Study Team Estimate

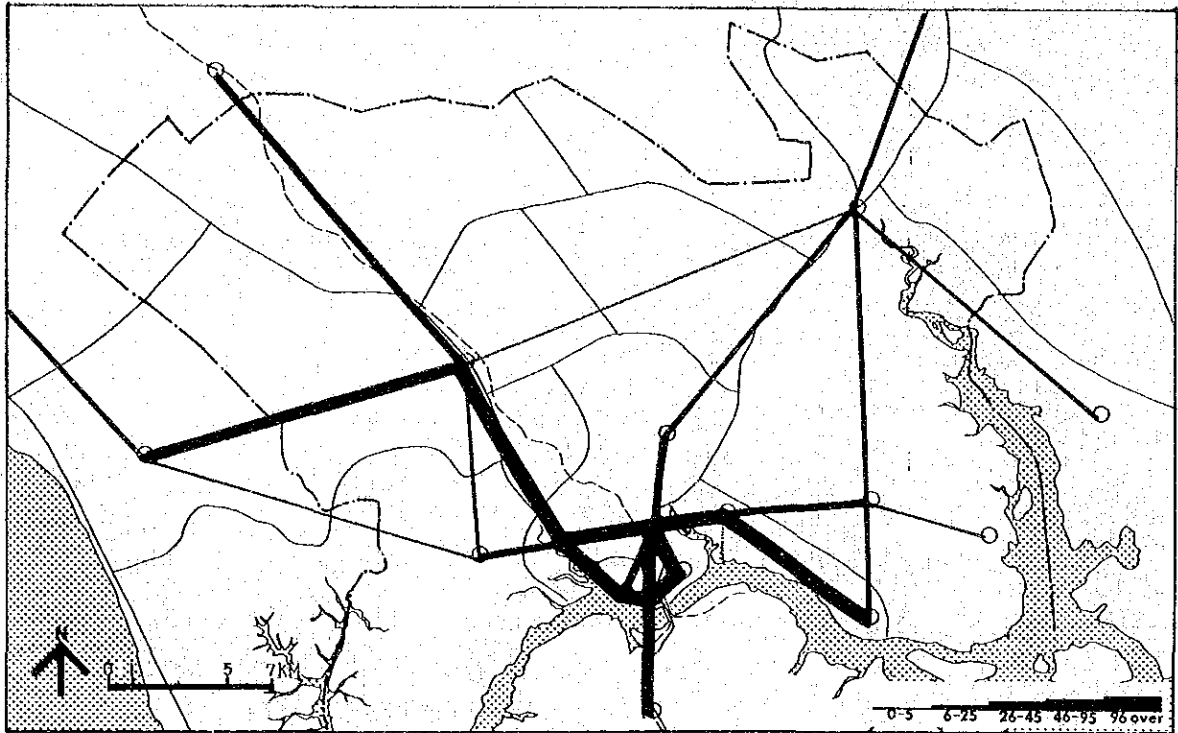


FIG. 18 TRAFFIC VOLUME PATTERN IN 2000
Source: Study Team Estimate

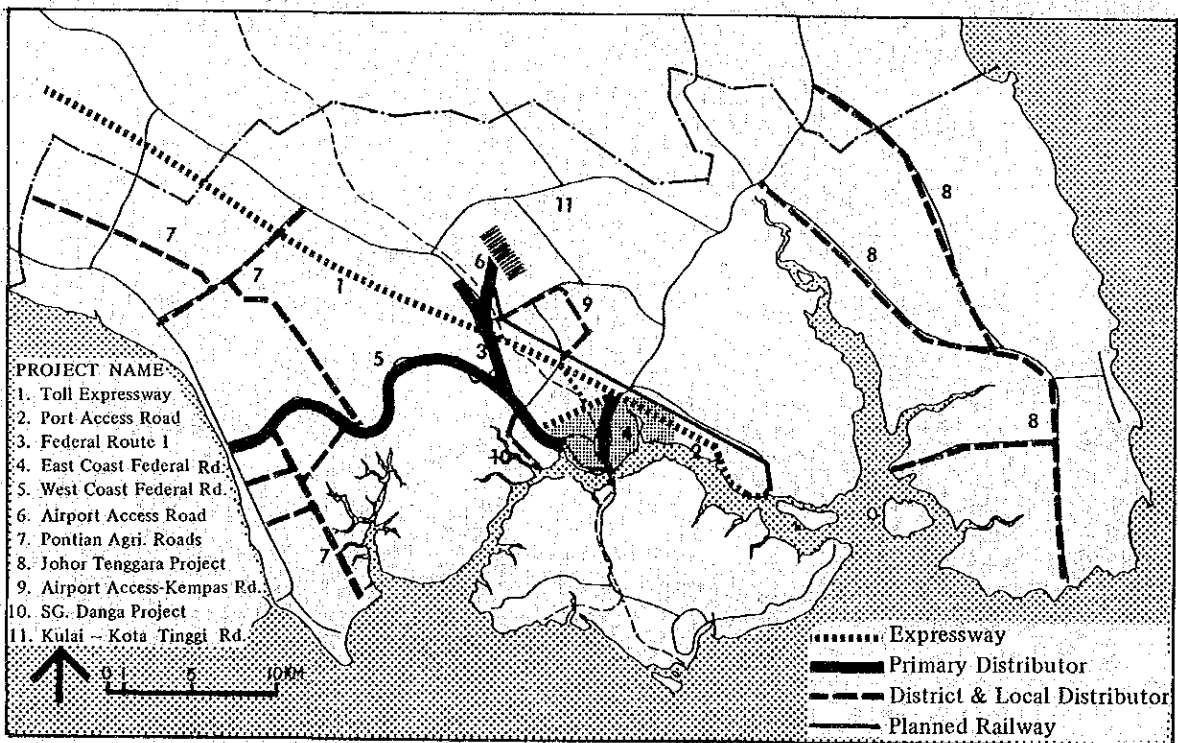


FIG. 19 COMMITTED TRANSPORT PROJECTS
Source: HPU, JKR, SJKR

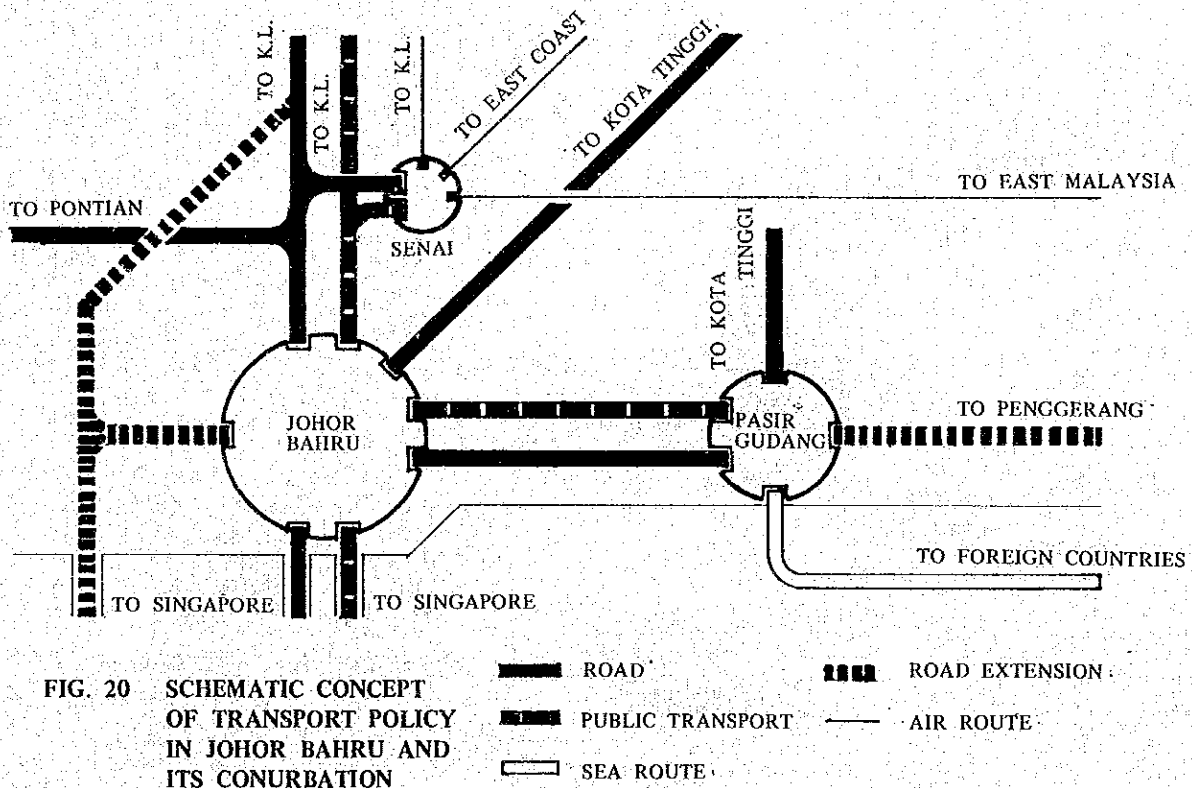
2. RECOMMENDED OVERALL TRANSPORT PLAN

2-1 POLICY AND STRATEGIES

In order to create a better urban transport system, the following objectives must be attained:

1. maximizing the benefits to the urban economy;
2. ensuring mobility of the residents;
3. minimizing resource consumption;
4. providing a safer means of transport;
5. creating and maintaining a high quality of urban environment;
6. maintaining social equity for transportation of the urban poor.

The major difficulty hindering the attainment of these objectives in Johor Bahru and its conurbation is the inability of the present transport system to cope with the rapid increase in transport demand resulting from the intensive economic development of the area and the inevitably great alteration of traffic conditions to be brought on by the completion of the Toll Expressway. (See Fig. 20)



With these factors taken into consideration, the following package of transport strategies are recommended:

1. effective use of existing transport facilities;
2. improvement and expansion of bus transport system;
3. introduction of innovational bus/public transport system;
4. traffic restraints;
5. traffic engineering and management;
6. road improvement and construction;
7. expansion of monitoring system.

The schedule for implementation of each strategy will differ since some strategies will be short-term actions, while others will be implemented as a long-term plan. The recommended implementation schedule is shown on Table 5.

TABLE 5 TIMING OF IMPLEMENTATION FOR EACH STRATEGY

	Short-term Actions	Longer-Term Plan
1 Effective use of existing transport facilities	●	●
2 Improvement and expansion of bus transport system	●	●
3 Introduction of innovational bus/public transport system	•	●
4 Traffic restraint measures	•	●
5 Traffic Engineering and Management	●	•
6 Construction and Improvement of roads	●	●
7 Monitoring System	●	●

- High priority
- Medium priority
- Low priority

2-2 ROAD NETWORK CONCEPT

A future road network which is the most feasible and likely to achieve the identified objectives from the viewpoint of future land use structure, future traffic demand and economic considerations is proposed in Fig. 21.

The road network planned for Johor Bahru is fundamentally a grid and radial road system while that for other areas is basically a grid or a ladder pattern, or a combination of these.

2-3 TRAFFIC DISPERSAL AND CIRCULATION SCHEME IN MPJB

Since the large volume of through traffic as well as traffic coming from other areas will disturb the traffic flow in the Central Business District (CBD) of MPJB, it is necessary to disperse these. For this purpose the set of traffic strategies which consists of the introduction of exclusive bus lane system, parking control and the design of traffic circulation is recommended.

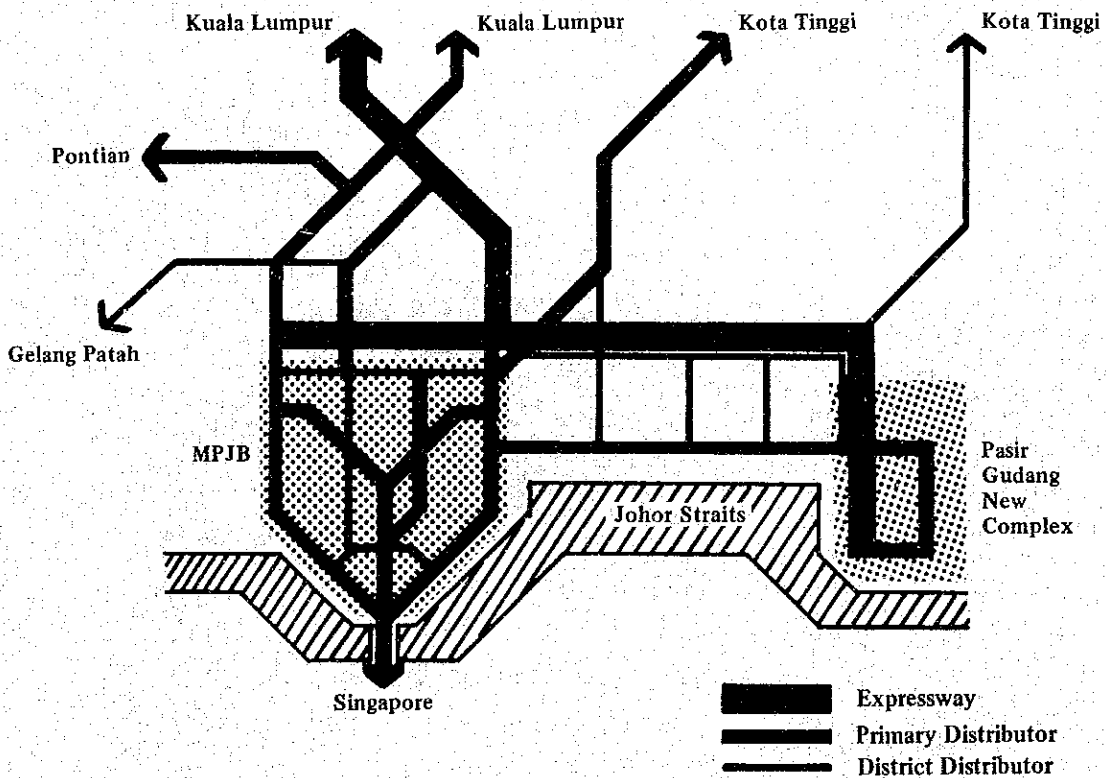


FIG. 21 ROAD NETWORK CONCEPT IN SB-PG CORRIDOR

2-4 MONITORING SYSTEM

The conditions of a transport system vary day by day and year by year. Since the projected traffic demands change on the basis of the assumptions made, the monitoring system should be strengthened in order to review the study and to implement the recommended projects smoothly.

Therefore, the Study Team recommends the following:

1. establishment of a transport committee consisting of government officials, planners and citizens;
2. establishment of an urban transport planning and implementation unit in the State Public Works Department;
3. introduction of a computer system for compiling data and traffic control. (see Fig. 22)

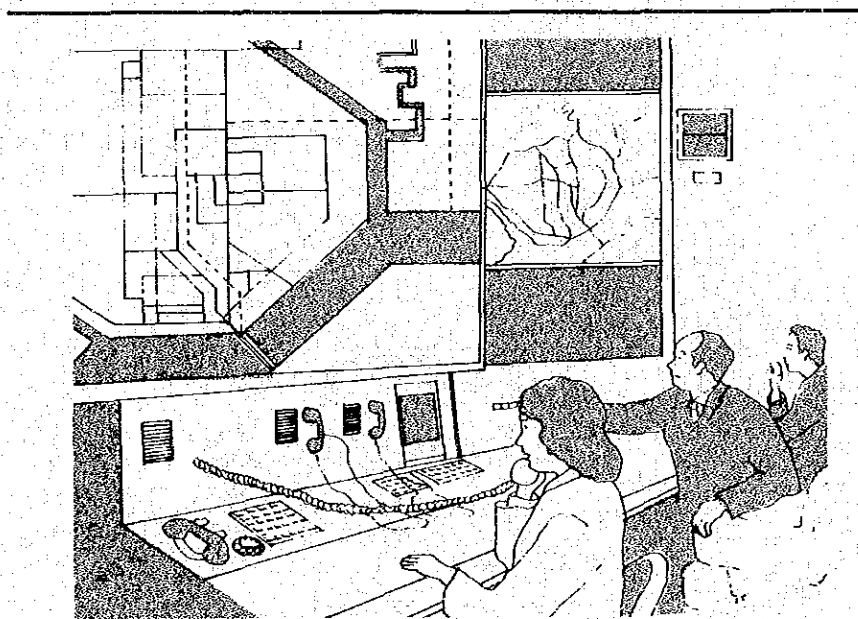


FIG. 22 AN IMAGE OF A MONITOR ROOM FOR TRAFFIC CONTROL

3. LONG-TERM TRANSPORT PLANS

The long-term transport plans are concerned with the structural planning of all transport systems such as roads, buses and other forms of public transport, and urban transport facilities.

1. Road construction and improvement plan
2. Public transport development plan
3. Transport terminal plan
4. Traffic dispersal and circulation plan
5. Private vehicle restraints plan
6. Environment-oriented network plan
7. Linkage improvement plan

3-1 ROAD CONSTRUCTION AND IMPROVEMENT PLAN

The recommended plan seeks to make full use of the existing road system to form an adequate road system capable of serving the predicted traffic demands. This is to be accomplished by:

1. construction of new roads;
2. improvement of existing roads;
3. development of grade-separated interchanges and improvement of intersections.

Table 6, Fig. 23, and 24 show the roads to be improved or constructed by the year 2000 to meet future traffic demands.

TABLE 6 RECOMMENDED ROAD PLAN 2000

	Number of Project	Total Kilometerage of Projects
1 Improvement of Existing Roads	30	210.2
2 Construction of New Roads		136.4
3 Grade-separated Interchanges	19	—
4 Improvement of Intersections	4	—

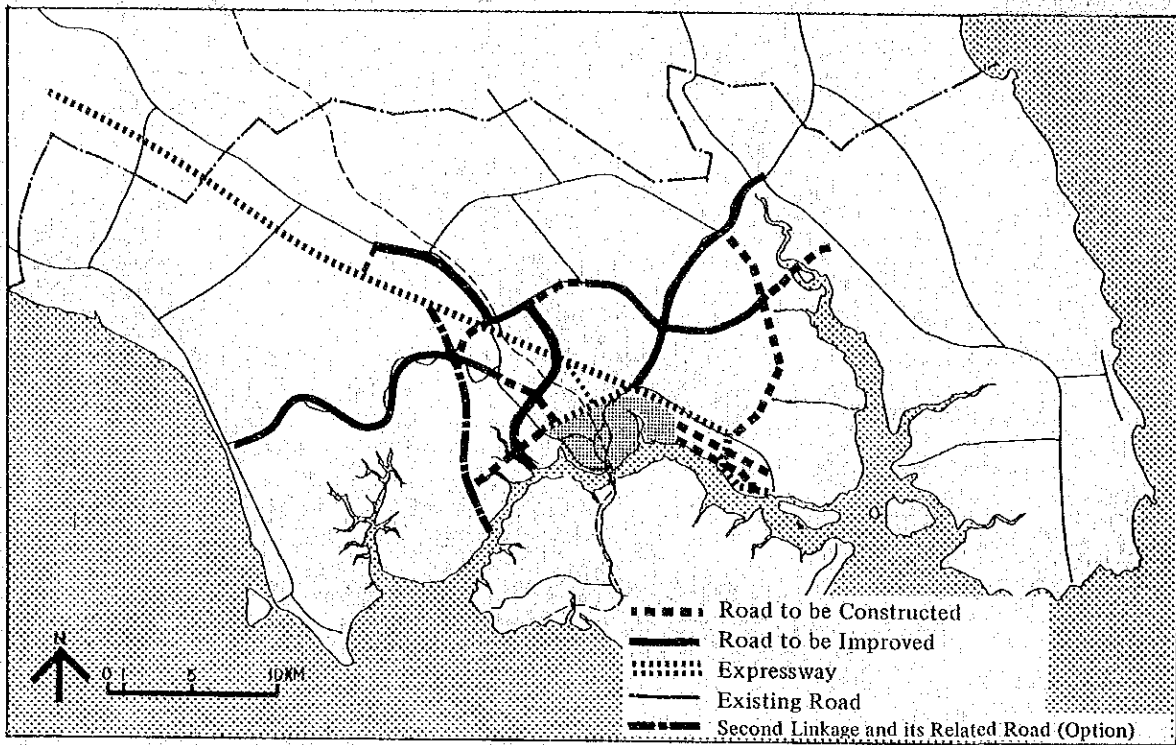


FIG. 23 RECOMMENDED ROAD NETWORK (STUDY AREA)

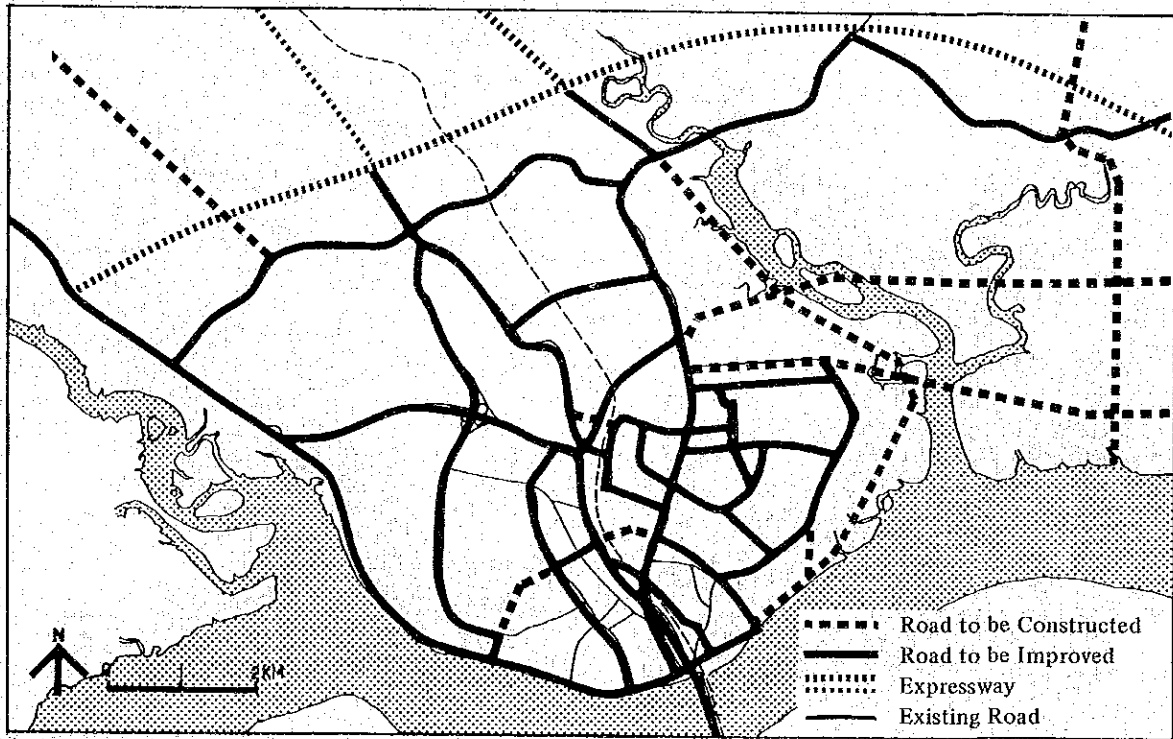


FIG. 24 RECOMMENDED ROAD NETWORK (MPJB)

3-2 PUBLIC TRANSPORT DEVELOPMENT PLAN

The public transport system should be improved and developed in line with the overall transport strategies.

1. Exclusive bus lanes should be introduced on the following roads:
 - Jalan Tebrau
 - Johor Bahru – Pasir Gudang Southern Linkage (See Fig. 25/26)
2. Bus transport services should be improved in the following ways:
 - a. reorganization of routes and schedules;
 - b. provision of appropriate bus stops and stands;
 - c. renovation of and additions to existing bus fleets.
3. An innovative transit system should be introduced between the CBD in Johor Bahru and Pasir Gudang.

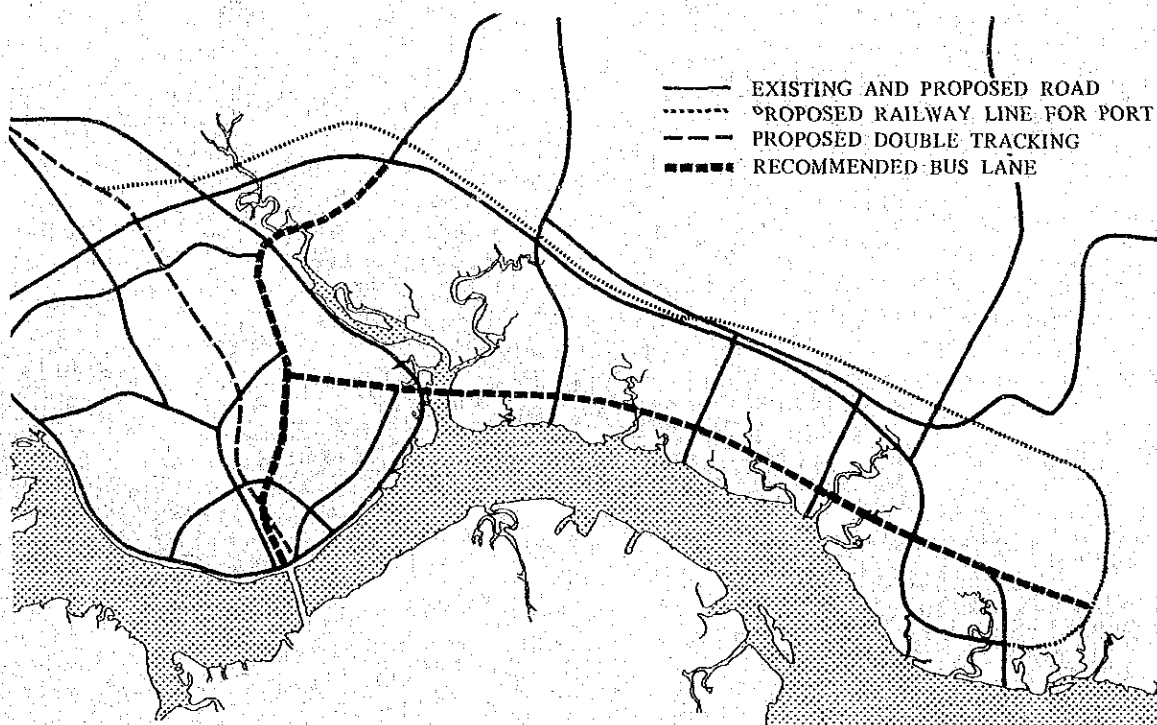


FIG. 25 RECOMMENDED BUS LANE TO BE INTRODUCED

4. From the point of view of quality of service and transport economy, a long distance line-haul system should be provided by a scheduled bus system while the mini-bus should be introduced to the routes between regional towns and low-density areas; i.e. Kulai, Kota Tinggi and Ulu Tiram based routes.
5. The future demand for railway commuter services will not be sufficient to make double tracking financially viable. However, if the Malayan Railway is to undertake double tracking as a part of a system of nationwide double tracking, commuter services between Johor Bahru and Senai/Kulai should be introduced.
6. The future passenger and freight demands for a railway extension to Senai airport will be expected to increase. Therefore, the railway extension from Senai to Senai airport should be taken into consideration, in the light of the national development strategies.

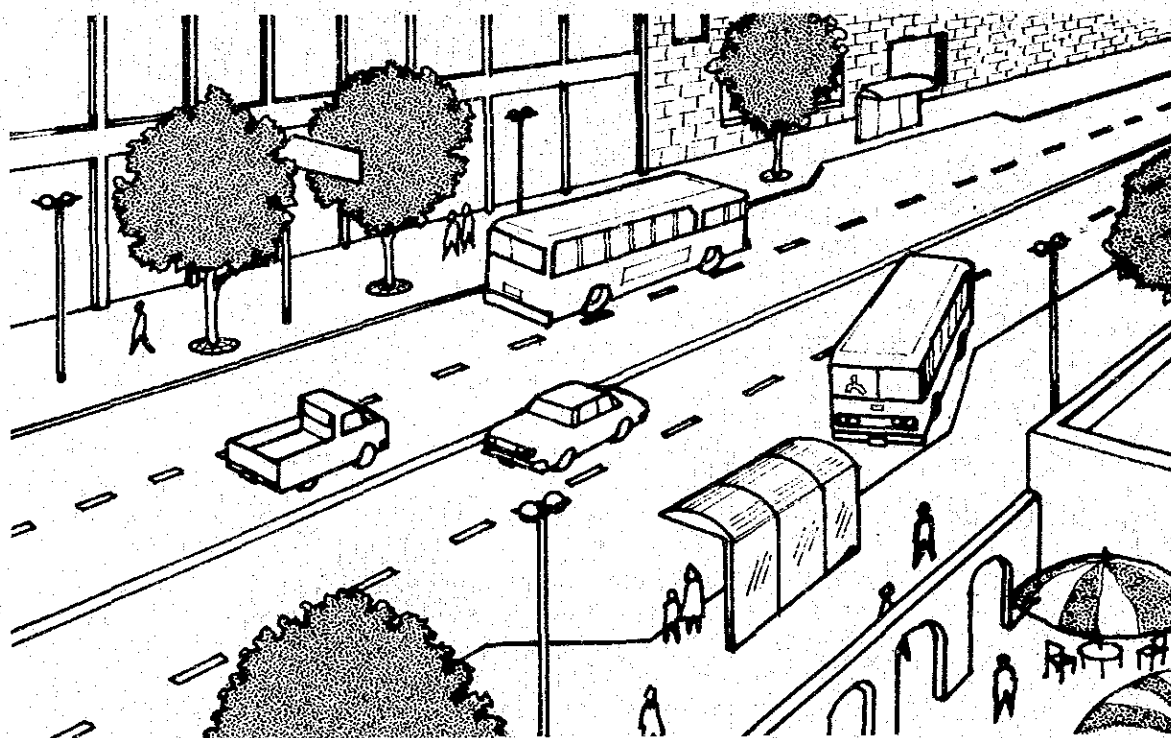


FIG. 26 AN IMAGE OF A SECTION OF EXCLUSIVE BUS LANE

7. Introduction of New Transit System

The results of careful economic and financial examination show that the introduction of a new transit system between Johor Bahru and Pasir Gudang is viable. However, this system will be needed after 1995 when the Johor Bahru – Pasir Gudang Corridor will have become highly developed. Therefore, the new transit system should be re-examined by monitoring the increasing traffic volume on roads and the increasing number of residents to be settled in the Johor Bahru – Pasir Gudang Corridor. It is also suggested that land should be reserved in this corridor for the eventual introduction of this system. (See Fig. 27)

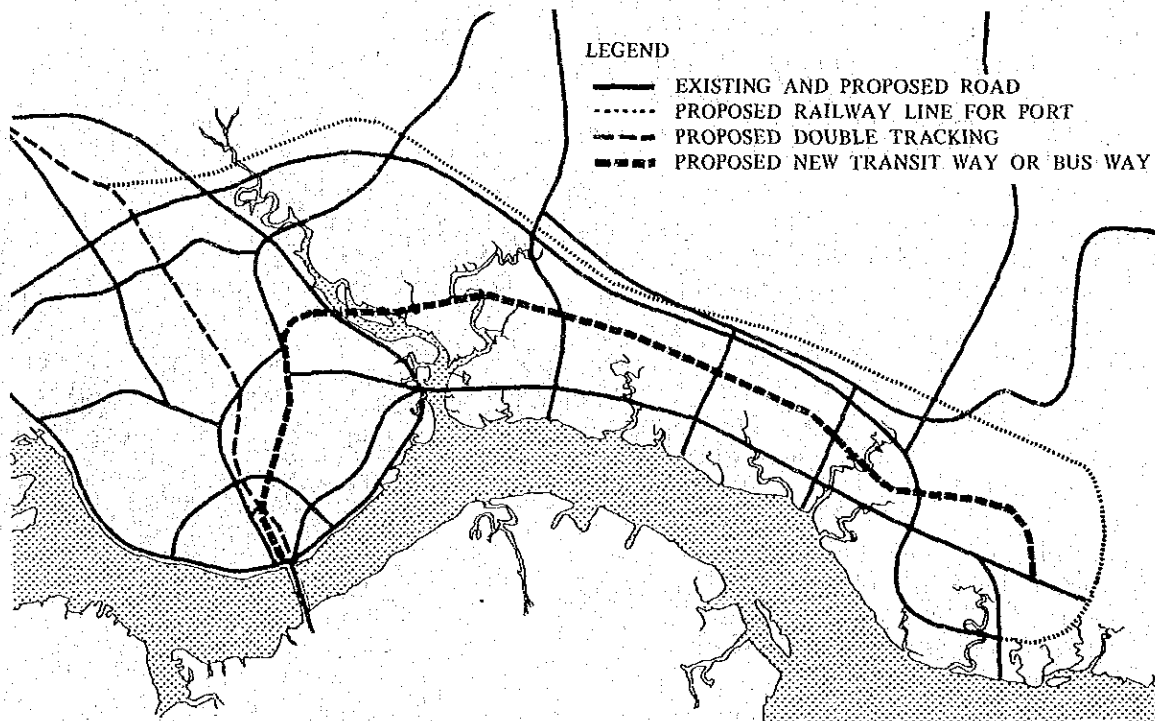


FIG. 27 LONG TERM PUBLIC TRANSPORT PLAN

3-3 TRANSPORT TERMINAL PLAN

The establishment of two types of transport terminals, one a freight terminal and the other a passenger terminal, is proposed. (See Fig. 28)

A. FREIGHT TERMINAL

The major function 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 improve transport efficiency.

The location of the proposed terminal is the Kempas Site, which has an easy access to MPJB and Pasir Gudang via either the trunk roads such as the Toll Expressway and the Port Access or the railway lines.

B. PASSENGER TERMINAL

The main purpose of a passenger terminal is to connect various transport modes in various directions for the sake of passengers' convenience.

The Tebrau Site which is located on the outskirts of MPJB is recommended for a bus terminal, and the Central Market Area, preferably the existing taxi station area in the CBD, is recommended for a passenger terminal complex.

The Study Team reviewed the MPJB urban reconstruction project in the Central Market Area and ascertained that this terminal complex plan is compatible with the MPJB proposal.

The proposed passenger terminal complex can function as a transfer center for inter-modal passengers using buses, taxis and railway and also as a shopping complex.

The bus terminal at Tebrau will serve mainly inter-regional and intra-regional buses.

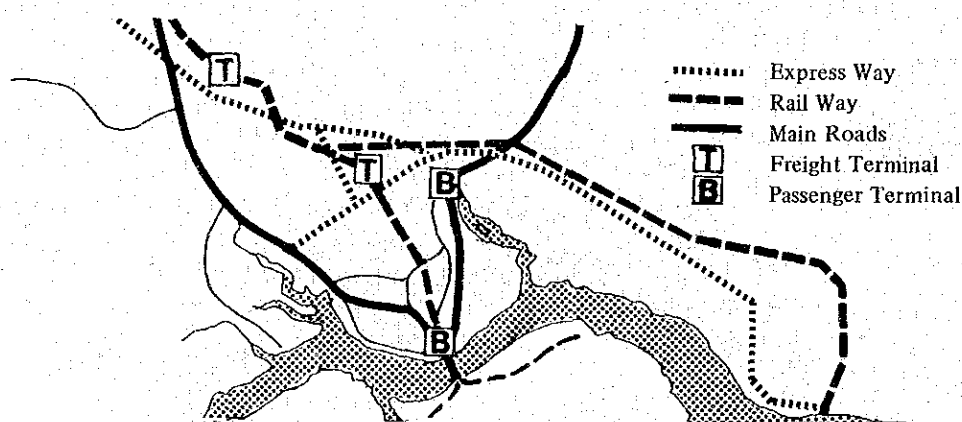


FIG. 28 PROPOSED LOCATION OF TRANSPORT TERMINALS

3-4 TRAFFIC DISPERSAL AND CIRCULATION PLAN

The longer-term traffic dispersal and circulation plan is based on the recommended traffic dispersal concept.

The plan includes the following set of strategies:

1. construction of a coastal road and an inner ring road as well as a lorry route;
2. construction of a grade-separation in front of the custom and immigration complex on the causeway;
3. implementation of a circulation system in the CBD of MPJB.

In order to ensure that the circulation system is effective the following measures are also recommended for implementation:

- a. introduction of two pairs of one-way roads:
Jalan Tun Abdul Razak/Jalan Wong Ah Fook and Jalan Trus/Jalan Ibrahim;
- b. on-street parking control on the circulation roads;
- c. introduction of a bus lane and a new transit system.

3-5 PRIVATE VEHICLE RESTRAINTS PLAN

The team recommends that control of car parking be introduced as a restrictive measure against private vehicles within CBD in MPJB.

After 1990, it will be necessary to expand the parking control area to the fringe area of the CBD in MPJB and to introduce area pricing in the said areas.

3-6 ENVIRONMENT-ORIENTED NETWORK PLAN

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

In road network planning at the master plan stage consideration was given to the preservation of neighbourhood community units. In order to create a pedestrian environment, it is strongly recommended that a shopping mall, sidewalks, pedestrian signal lights and pedestrian crossings be provided. In addition, when the primary and district distributor roads are being planned and constructed, a wide right-of-way should be reserved for the planting of trees. (See Fig. 29)

When a transport project is implemented, an environmental assessment on the impacts of the project from the natural, social and physical viewpoints should be made.

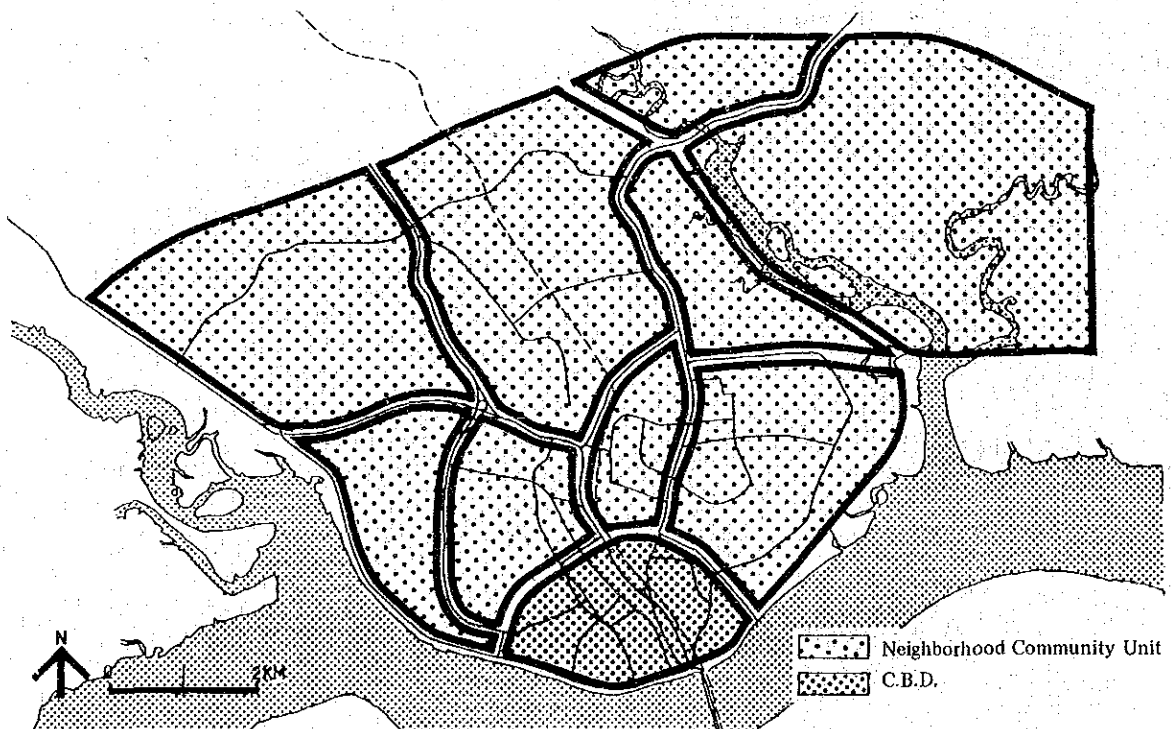


FIG. 29 A CONCEPT OF TRAFFIC CELLS

3-7 LINKAGE IMPROVEMENT PLAN

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 environmental aspects should be carried out to determine the feasibility of the second linkage.



FIG. 30 LORRY TRAFFIC ON THE CAUSEWAY (1981)

4. SHORT-TERM ACTION PLANS

Short-term actions should focus on the implementation of the following measures in various fields which are comparatively inexpensive and which if implemented early will have a substantial effect on the transport system.

The implementation of the following plans as short-term actions is recommended.

1. Traffic engineering and management plan
2. Road construction and improvement plan
3. Bus transport plan
4. Taxi control plan

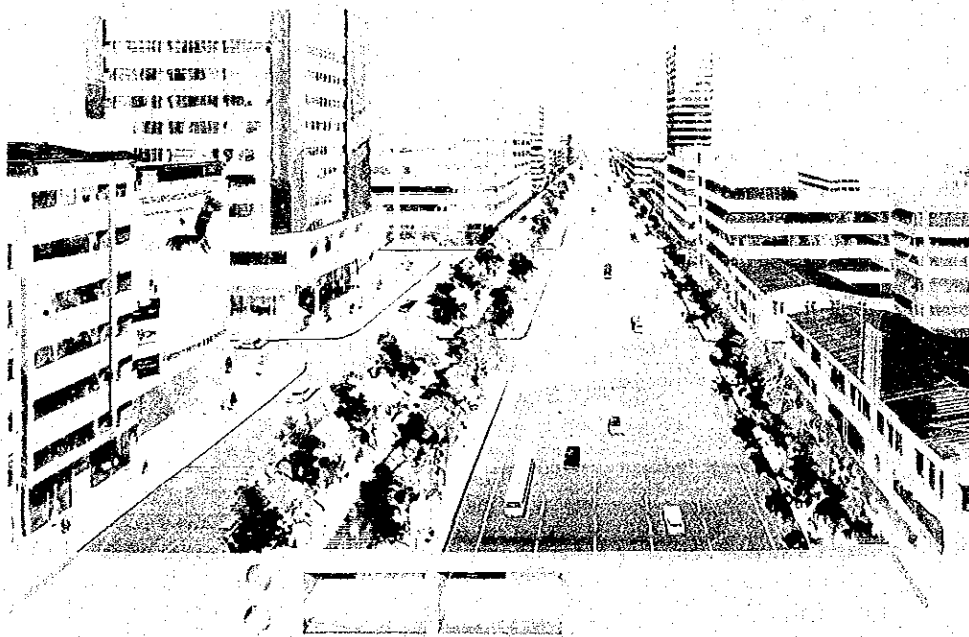


FIG. 31 A FUTURE IMAGE OF JL. SEGET

4-1 TRAFFIC ENGINEERING AND MANAGEMENT PLAN

1. The interim traffic control scheme in the Central Business District (CBD) of MPJB should be implemented at the earliest possible time. The implementation of this control scheme will ensure an effective and smooth traffic flow. (See Fig. 31)
2. In order to ensure an effective and smooth traffic flow, the interim circulation road system in some areas should be established as soon as possible. Based on the circulation plan, the following measures should be implemented: (See Fig. 32)
 - a. parking prohibition on primary distributors;
 - b. channelization at key intersections;
 - c. institution of one-way system in congested areas.
3. In order to improve the present disorderly traffic flow caused by mixed traffic, the following measures should be undertaken:
 - a. marking of road lane demarcation lines;
 - b. separation of lanes by vehicle type, e.g. one for high-speed vehicles and others for motorcycles and bicycles.
4. A traffic signal system is recommended as the most suitable measure for achieving higher traffic capacity on primary distributor roads in peripheral and suburban areas as well as in the CBD. (See Fig. 33)

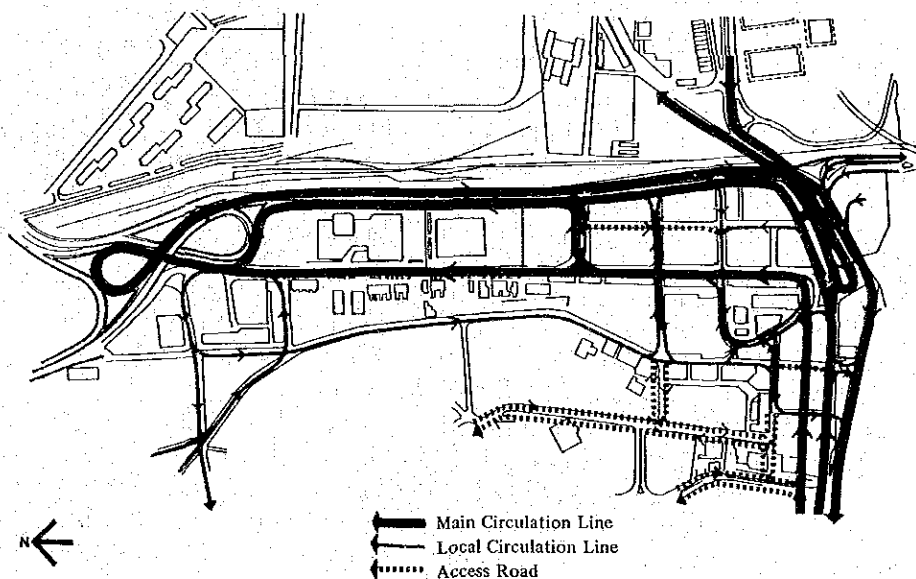


FIG. 32 ONE-WAY TRAFFIC FLOW SYSTEM IN CBD, MPJB

5. In order to improve pedestrian facilities, the following should be installed:

- a. sidewalks;
- b. pedestrian crossings, especially in front of the causeway;
- c. shopping mall;
- d. pedestrian signal lights.

It is suggested that Jalan Meldrum be opened exclusively to pedestrians as a pedestrian mall even if on a part-time basis. (See Fig. 34)

6. The following traffic facilities should be installed, based on standards.

- a. traffic signs;
- b. lane markings;
- c. traffic signals with improved visibility; the existing traffic signal system should be reviewed.

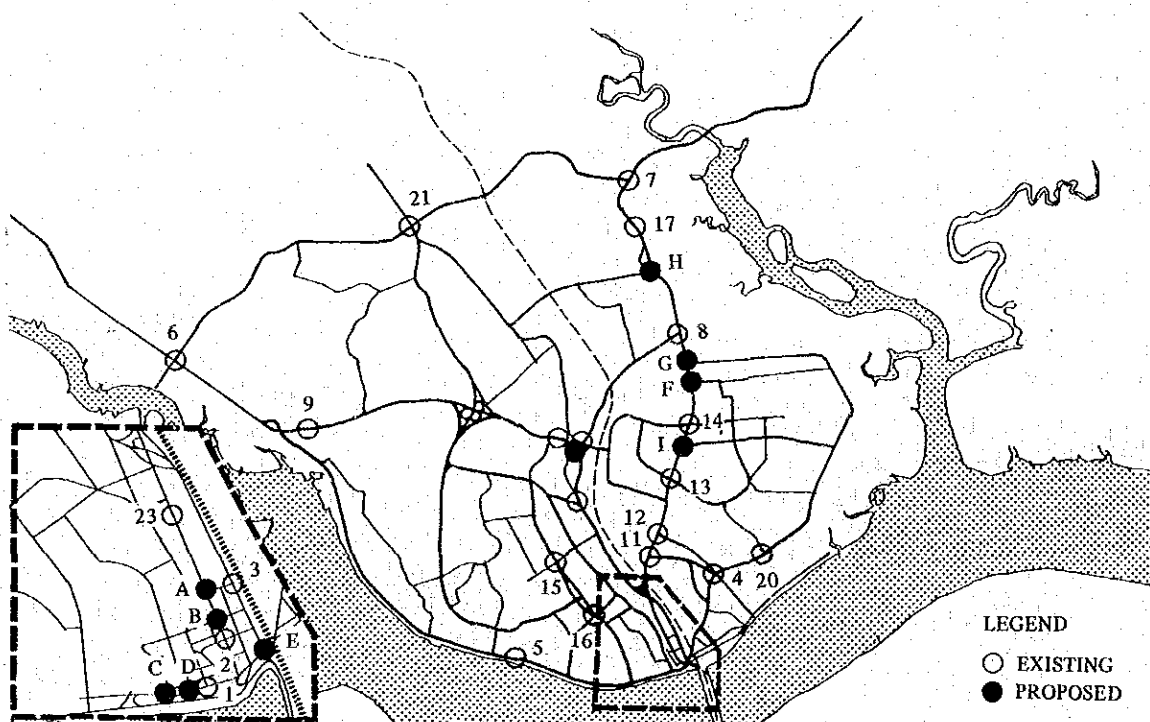


FIG. 33 TRAFFIC SIGNAL INSTOLLATION PLAN

7. In order to improve the present and future traffic situation in congested as well as newly developed areas implementation of the following traffic regulatory measures is recommended:
 - a. parking prohibition on primary distributor and district distributor roads;
 - b. one-way system in congested areas;
 - c. adequate traffic signs and marking;
 - d. provision of pedestrian facilities.
8. Information boards for roads related to the causeway should be installed at strategic points to improve the inadequate information system for causeway traffic.
9. In line with the beautification programme and implementation of the circulation plan in the CBD, Sungai Segget should be covered in order to accommodate roadway and pedestrian facilities.
10. In order to achieve traffic safety and smooth traffic flow, the following modifications of road facilities should be undertaken:
 - a. removal of obstructions on roads in the CBD; i.e. electric poles on Jalan Wong Ah Fook and Jalan Segget;
 - b. widening of the roadway at the point where Jalan Tun Abdul Razak and Jalan Tebrau merge.

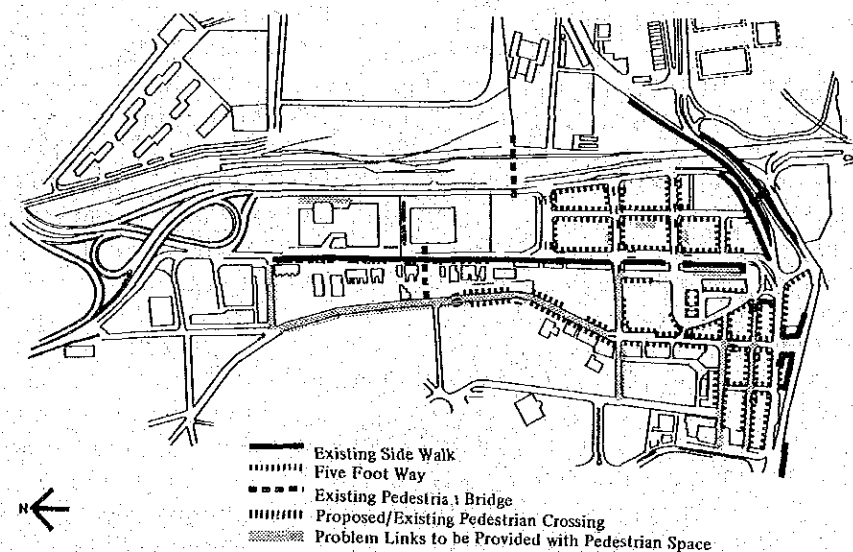


FIG. 34 IMPROVEMENT OF PEDESTRIAN FACILITIES IN CBD, MPJB

4-2 ROAD CONSTRUCTION AND IMPROVEMENT PLAN

The following improvement or construction of roads should be undertaken.

1. Widening of Jalan Tebrau to a dual carriageway as a step toward further expansion in the future to six (6)–lanes; (See Fig. 35).
2. To support the development of regional growth pole, the following two (2) federal roads should be upgraded in their alignment.
 - a. East Coast Federal Road from the Toll Expressway to Kota Tinggi Town;
 - b. Johor Bahru – Pontian Road.
3. Engineering studies including feasibility studies should be conducted for the following road projects:
 - a. Johor Bahru – Pasir Gudang Southern Link;
 - b. Causeway Traffic Dispersal Scheme;
 - c. Johor Bahru – Toll Expressway Access Road;
 - d. Inner Ring Road including lorry route.
4. In order to improve accessibility to Senai Airport, it is recommended that a Senai – Ulu Tiram road be either constructed or improved as a two (2) – lane road.

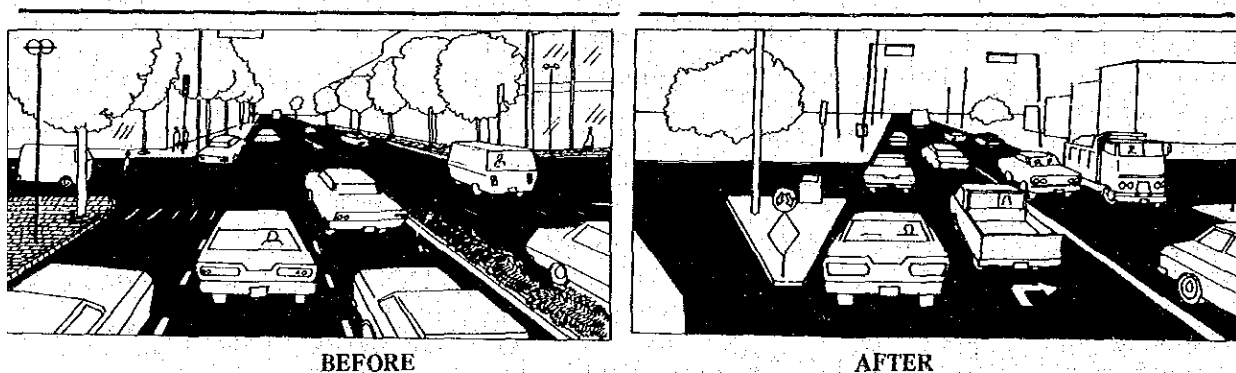


FIG. 35 AN IMAGE OF ENVIRONMENT; BEFORE AND AFTER IMPROVEMENT

4-3 BUS TRANSPORT PLAN

1. In order to improve bus services, the following measures should be implemented:
 - a. expansion of bus services into newly developed areas;
 - b. improvement in bus routing;
 - c. improved reliability;
 - d. courtesy campaign among bus-users.
2. The following improvements in bus transport facilities should be installed:
 - a. improved bus-stand;
 - b. improved access to bus-stand;
 - c. improved information system.
3. The bus fleets should be upgraded through the introduction of more suitable and increased-capacity buses.
4. The introduction of the following fare and pricing policies should be considered:
 - a. social equity policy for special-user groups such as handicapped and elderly people;
 - b. fare-prepayment scheme;
 - c. premium service-premium fare scheme.
5. The management and operation system of the bus company must be reviewed constantly by the Government.

4-4 TAXI CONTROL PLAN

The following measures for taxis should be implemented:

1. taxi stands should be set up at strategic areas;
2. taxi operators should be compelled to use a taxi meter;
3. pirate taxis should be eliminated through enforcement;
4. taxi users should be encouraged to cooperate with various law enforcement agencies;
5. in order to ensure convenience to the residents and smooth traffic flow, the provision of both town taxi and out-of-town taxi stands is recommended.

5. IMPLEMENTATION PROGRAMME AND INVESTMENT REQUIREMENT

5-1 SUMMARY

Table 7 summarizes the implementation programme for the short-term (1983 – 85), medium-term (1986 – 90) and long-term (1991 – 2000) periods, such as the recommended improvements for roads, public transport system, private vehicle restraints and traffic engineering and management. (See Fig. 36)

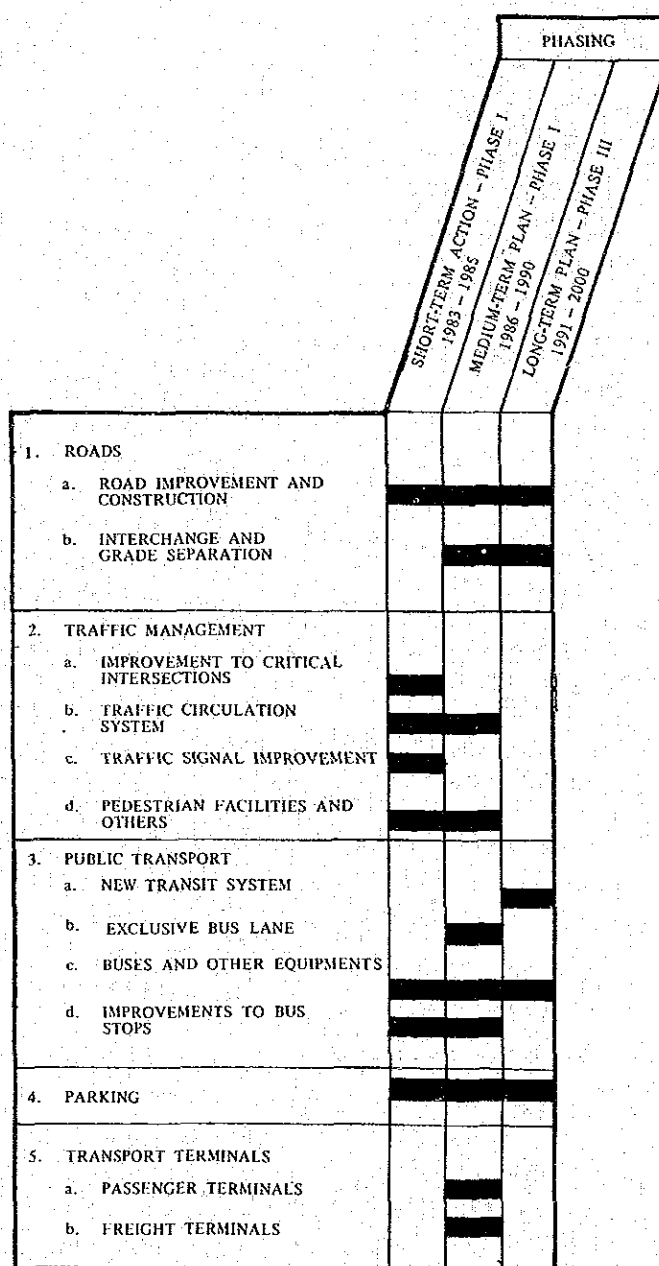


FIG. 36 RECOMMENDED PHASING PLAN

Estimated capital investment in transport facilities and equipment by both the public and private sectors in the years to 2000 is estimated at \$1,437,130. Table 7 shows that new and improved roads will require investment totalling nearly \$981,370. Short and medium term traffic engineering and management improvements will entail a further \$15,600,000. Public transport will require \$395,140,000, about ten (10) per cent of which will be for buses and equipment to be provided by the private sector.

TABLE 7 SUMMARY OF INVESTMENT COST BY TRANSPORT FACILITY

Transport Facility	Capital Cost ('000 \$)
Road	
Improvement of Existing Roads and Construction of New Roads	939,870
Interchanges and Grade Separations	41,500
Sub-Total	981,370
Public Transport	
New Transit System	341,480
Bus Exclusive Lane	670
Buses and Other Equipment	48,500
Improvement of Bus Stops	4,490
Sub-Total	395,140
Traffic Management	
Improvement of Critical Intersections	2,000
Traffic Circulation System in CBD	10,150
Traffic Signal Improvement	1,530
Pedestrian Facilities and Others	1,920
Sub-Total	15,600
Parking	
Off-Street Parking in Central Business Area	20,360
Transport Terminals	
Passenger Terminal Complex/Bus Terminal	17,677
Freight Terminal	9,449
Sub-Total	27,126
Total of all Programmes	1,439,596

TABLE 8 SUMMARY OF INVESTMENT COST FOR THE CONSTRUCTIONS AND IMPROVEMENTS OF ROADS BY PHASE

No. of Roads	Name of Roads	Number of Lanes	Total Length (km)	Phase			Project Cost ('000 \$)
				1 1983-1985	2 1986-1990	3 1991-2000	
1	Johor Bahru - Pasir Gudang Southern Link	4 & 6	14.0				113,720
2	East Coast Road in MPJB	4 & 6	9.7				109,940
3	West Coast Road in MPJB	4 & 6	7.3				32,260
4	Federal Route 1 in MPJB	6	10.8				17,250
5	Jalan Tebrau	6	11.0				49,070
6	West Access to Toll Express Way	2 4	6.2				19,640
7	Inner Ring Road	4	5.1				58,960
8	Lorry Route	2	2.7				16,040
9	Jalan Tampoi	4	7.4				19,050
10	Jalan Yahya Awal	4	3.8				10,690
11	Jalan Kebun Teh and its Extension	4	3.8				13,300
12	Jalan Langkasuka and its Crossing	2 4	6.0				22,610
13	Jalan Stulang Baru	2 4	2.0				6,260
14	Jalan Serampang	4	2.0				4,940
15	Jalan Pasir Pelangi	2 & 4	3.0				12,250
16	Tampoi - Skudai Road	4	8.5				19,230
17	Pelentong Road	4	10.6				18,720
18	Masai Road	2	14.8				47,980
19	North South Connectors	4	4.0				8,560
20	Road Improvement in Taman Century	2	3.5				1,750
21	Road Improvement in New Development Area	2	5.2				2,600
	JB - P. Gudan Sub-Total		141.4	50,350	260,196	294,274	604,820

No. of Roads	Name of Roads	Number of Lanes	Total Length (km)	Phase			Project Cost ('000 \$)
				1	2	3	
31	East Coast Federal Road	4	40.0				68,040
32	Federal Route 1	4	13.6				23,500
33	Senai – Pengerang Road	2	44.1				81,070
34	P. Gudang – Kota Tinggi Road	2	24.6				34,550
35	Port Access Extension	4	8.4				44,570
36	Skudai – Pontian Road	2 & 4	13.6				20,000
37	Seelong – Sg. Danga Road	2	27.4				10,960
38	Airport Access Extension	2 & 4	8.2				16,360
	Outer Area Sub-Total		179.9	77,420	23,500	198,130	299,050
S-1	Causeway Improvement Scheme (Medium Term)						
S-2	Second Causeway and its Related Roads						
	Special Project Sub-Total				36,000	(246,650)	36,000 (282,650)
	Total		321.3	127,770	319,696	492,404 (739,054)	939,870 (1,186,520)

5-2 PHASE I (SHORT TERM: 1983 - 1985); IMPLEMENTATION PROGRAMME AND INVESTMENTS

TABLE 9 PHASE I (SHORT TERM: 1983 - 1985); IMPLEMENTATION PROGRAMME AND INVESTMENTS *1

Programme Category	Action to be Taken	Major Facility Cost (x 1,000 \$)
1. Traffic Engineering	a. Implementation of the interim traffic disposal and circulation plan.	
	b. Improvement of traffic regulatory measures such as marking and traffic signs.	
	c. Improvement of visibility and timing of existing signals extension of signal lights and introduction of pedestrian signals at key locations.	
	d. Installation of pedestrian crossings and sidewalks in CBD including introduction of pedestrian mall on the Jalan Meldrum.	
	e. Implementation of intersection improvements.	
	f. Installation of information boards.	
	g. Covering Sungai Segget.	
	SUB-TOTAL	4,120
2. Construction and Improvement of Roads	a. Widening of Jalan Tebrau.	
	b. Upgrading of two federal roads - Jalan Kota Tinggi and Jalan Pontian.	
	c. Engineering study of the projects for phase 2.	
	d. Construction and improvement of Senai - Ulu Tiram Road.	
	e. Implementation of renovation plan on the causeway.	
	f. Engineering and economic study on the causeway.	
	SUB-TOTAL	127,770
3. Public Transport System; Bus Transport/Taxi	a. Improvement of bus operations to enhance reliability, punctuality and comfort.	
	b. Realignment of bus routes and expansion of bus routes to serve newly developed area.	
	c. Courtesy campaign aimed at bus-users.	
	d. Replacement of over-age buses and addition of new buses; establishment of cooperative work shop for repair and maintenance.	
	e. Review management system of bus company including accounting and reporting procedure.	
	f. Establishment of public transport committee.	

TABLE 9 (Cont'd)

Programme Category	Action to be Taken	Major Facility Cost (x 1,000 \$)
	g. Provision of both town taxi and out-of-town taxi stands. h. Elimination of pirate taxis.	
	SUB-TOTAL	8,540
4. Urban Transport Facility	a. Design study for urban transport passenger terminal complex. b. Improvement of Jalan Trus bus terminal. c. Engineering study for bus terminal and freight terminal.	
	SUB-TOTAL	2,466
5. Private Vehicle Restraint	a. Enforcement of control parking. b. Development and adoption of parking provision for building. c. Elimination of on-street parking on primary and district distributors and provision of off-street parking facilities.	
	SUB-TOTAL	4,650
TOTAL		147,546

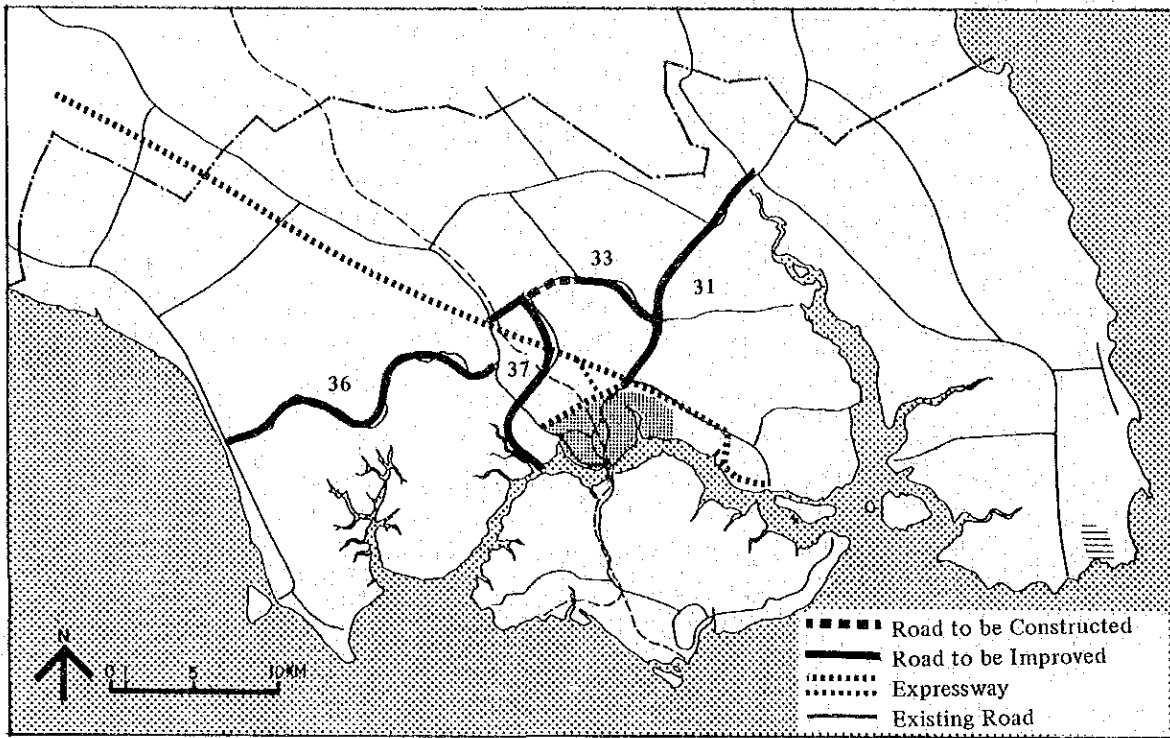


FIG. 37 RECOMMENDED IMPLEMENTATION PLAN PHASE I (1983 - 1985); STUDY AREA

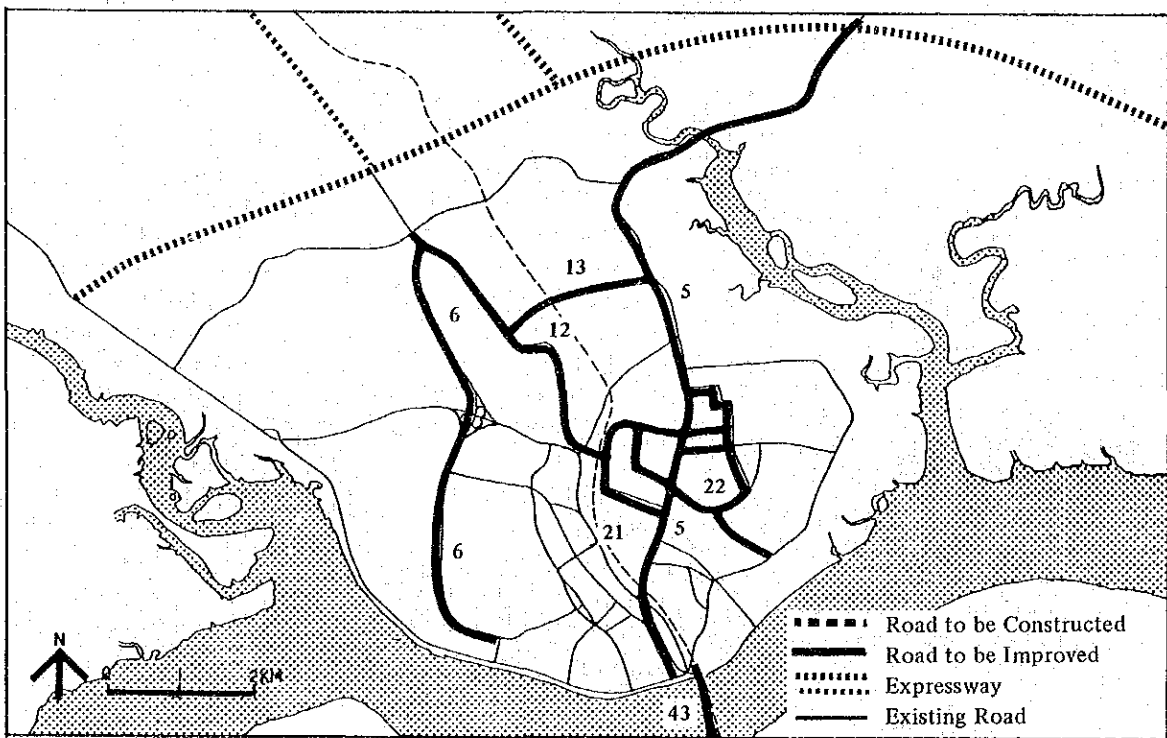


FIG. 38 RECOMMENDED IMPLEMENTATION PLAN PHASE I (1983 - 1985) ; MPJB

5-3 PHASE II (MEDIUM TERM; 1986 - 1990) IMPLEMENTATION PROGRAMME
& INVESTMENT

TABLE 10 PHASE II (MEDIUM TERM; 1986 - 1990);
IMPLEMENTATION PROGRAMME AND
INVESTMENTS

Programme Category	Action to be Taken	Major Facility Cost (x 1,000 \$)
1. Traffic Engineering and Management	a. Implement the causeway traffic disposal scheme.	
	SUB-TOTAL	11,480
2. Construction and Improvement of Roads	a. Widening of Jalan Tebrau to six-lane.	
	b. Construction and Improvement of Toll Expressway Access Road.	
	c. Construction of Johor Bahru - Pasir Gudang Southern Linkage and Related Roads.	
	d. Construction and improvement of Inner Ring Road/Lorry Route.	
	e. Widening of Federal Route No. 1 from Senai to Kulai.	
	f. Interchanges and Grade Separations	
	SUB-TOTAL	355,196
3. Public Transport System	a. Continued improvement of bus operation.	
	b. Continued route realignments and expansion of bus routings.	
	c. Introduction of exclusive bus lane on Jalan Tebrau and Johor Bahru - Pasir Gudang Southern Linkage.	
	d. Revision of CBD bus routing and introduction of bus lane in CBD.	
	e. Replacement of over-age buses and addition of more buses.	
	f. Study for introduction of public transport system between Johor Bahru and Pasir Gudang.	
	SUB-TOTAL	11,920
4. Urban Transport Facilities	a. Construction of transport passenger terminal complex facility.	
	b. Construction of bus and freight terminals.	
	SUB-TOTAL	24,660
5. Private Vehicle Restraint	a. Continued enforcement of control parking.	
	b. Continued elimination of on-street parking.	
	c. Provision of off-street parking.	5,570
TOTAL		408,826

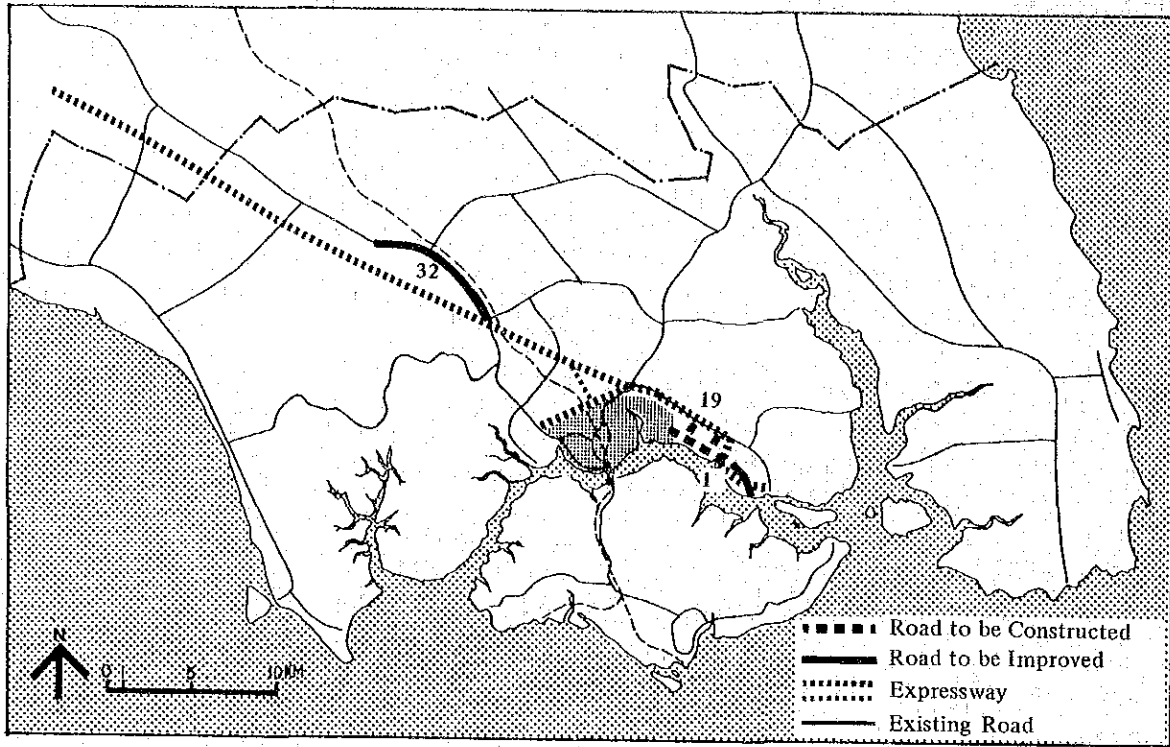


FIG. 39 RECOMMENDED IMPLEMENTATION PLAN PHASE II (1986 – 1990) ; STUDY AREA

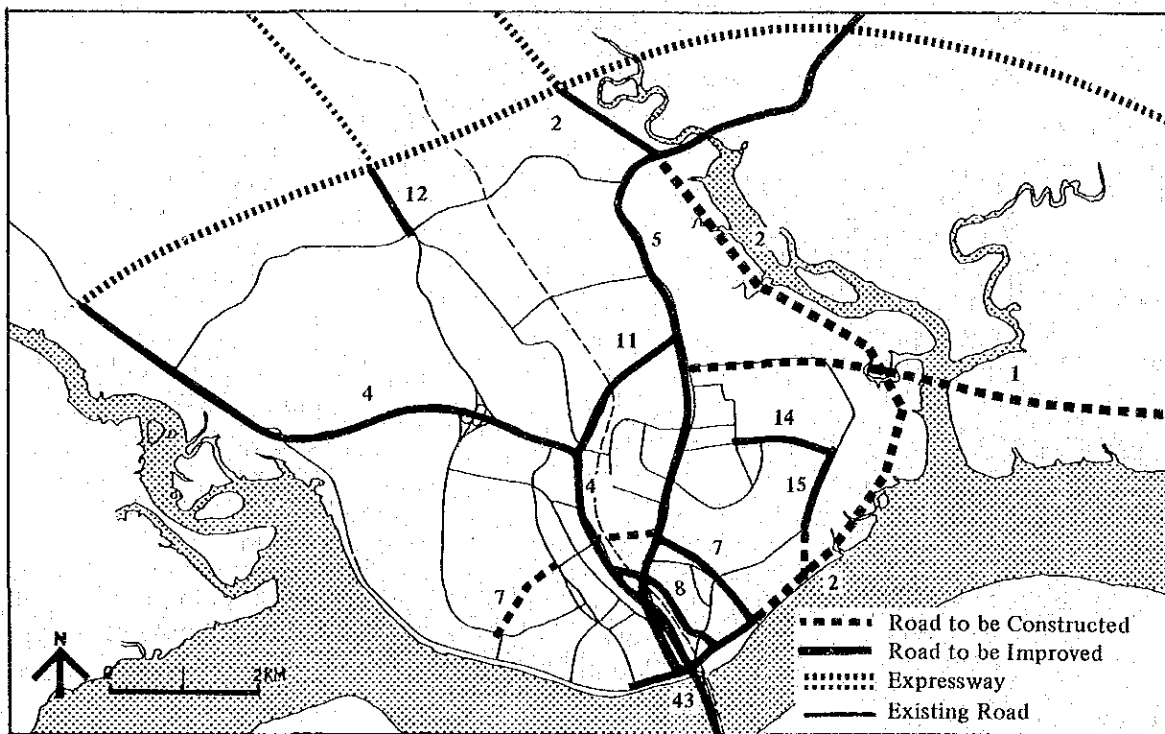


FIG. 40 RECOMMENDED IMPLEMENTATION PLAN PHASE II (1986 – 1990) ; MPJB

5-4 PHASE III (LONG TERM; 1991 - 2000); IMPLEMENTATION PROGRAMME AND INVESTMENTS

TABLE 11. PHASE III (LONG TERM; 1991 - 2000); IMPLEMENTATION PROGRAMME AND INVESTMENTS

Programme Category	Action to be Taken	Major Facility Cost (x 1,000 \$)
1. Construction and Improvement of Roads	a. Implementation of all phase 3 and 4 road construction and improvement projects.	
	b. Interchanges and grade separations.	
	SUB-TOTAL	498,404
2. Public Transport	a. Continued expansion of bus routing.	
	b. Introduction of new transit system between Johor Bahru and Pasir Gudang.	
	c. Introduction of commuter services for Malayan Railway.	
	d. Replacement of over-age buses and addition of more buses.	
	SUB-TOTAL	374,680
3. Private Vehicle Restraints	a. Continued review and monitoring of traffic operating conditions.	
	b. Examination of possibility of introducing cordon pricing to the CBD.	
	c. Off-street parking in CBD.	
	SUB-TOTAL	10,140
TOTAL		883,224

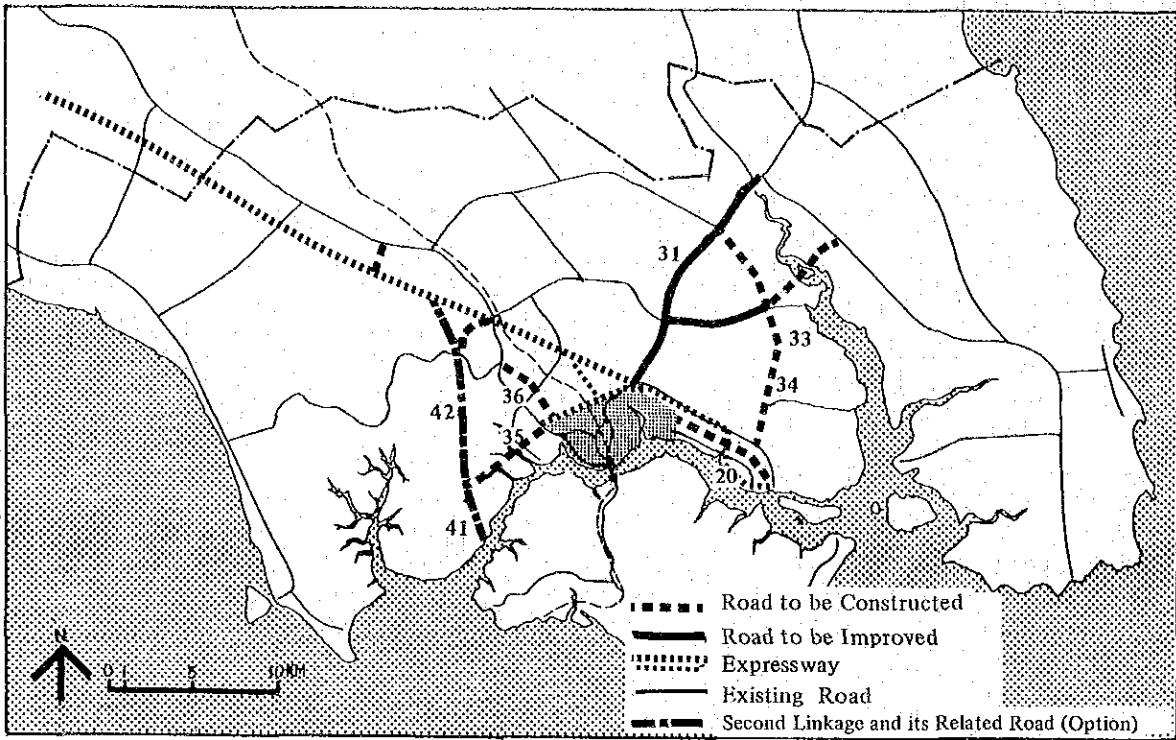


FIG. 41 RECOMMENDED IMPLEMENTATION PLAN PHASE III (1991 – 2000) ; STUDY AREA

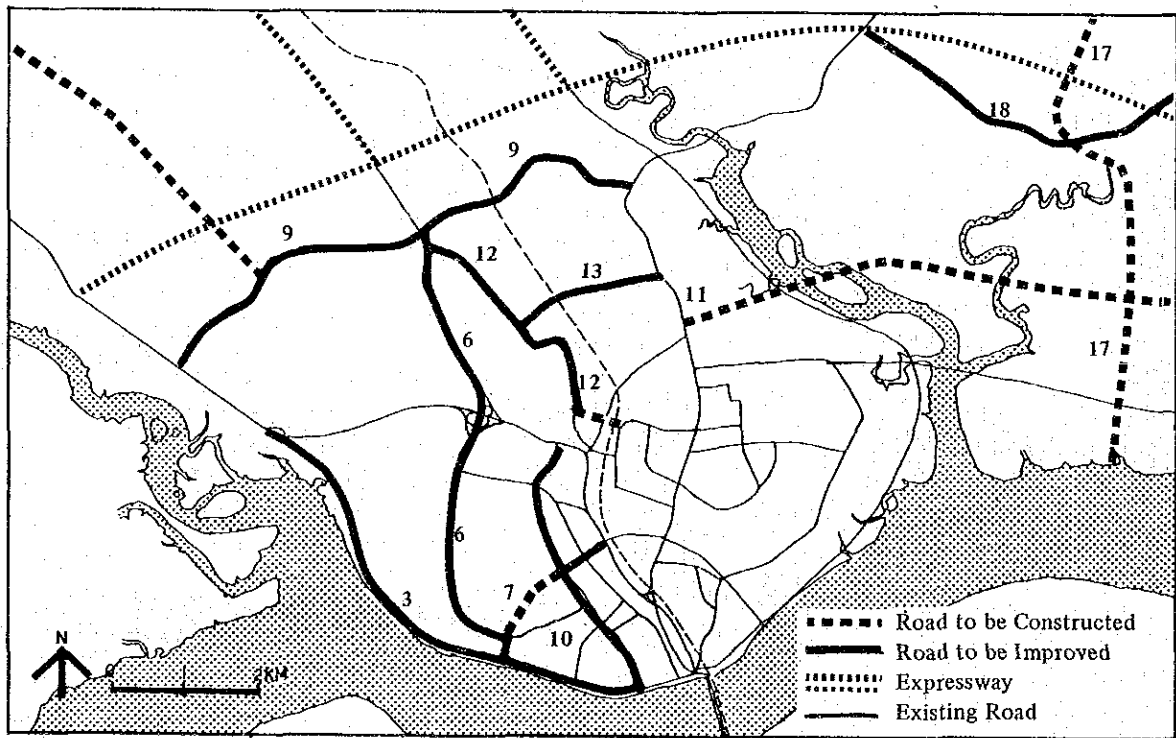


FIG. 42 RECOMMENDED IMPLEMENTATION PLAN PHASE III (1991 – 2000) ; MPJB

AFTERWORD

This report shows what implications the New Economic Policy predictions have for urban transport problems, specifically in the Johor Bahru Area.

If economic development and urban population concentration proceed as the policy forecasts, the transport demand generated will be tremendous and the existing urban transport system in Johor Bahru will need to be markedly altered. As can be seen from Japan's past example, the cost-effectiveness of investment in improvements diminishes once the pace of urbanization picks up. Urban improvements must precede development. What is needed for this purpose is a master plan-based, incremental approach which establishes definite priorities through feasibility studies and implements projects in their order of importance. With effort on the part of those concerned, Johor Bahru can develop into an exemplary city.

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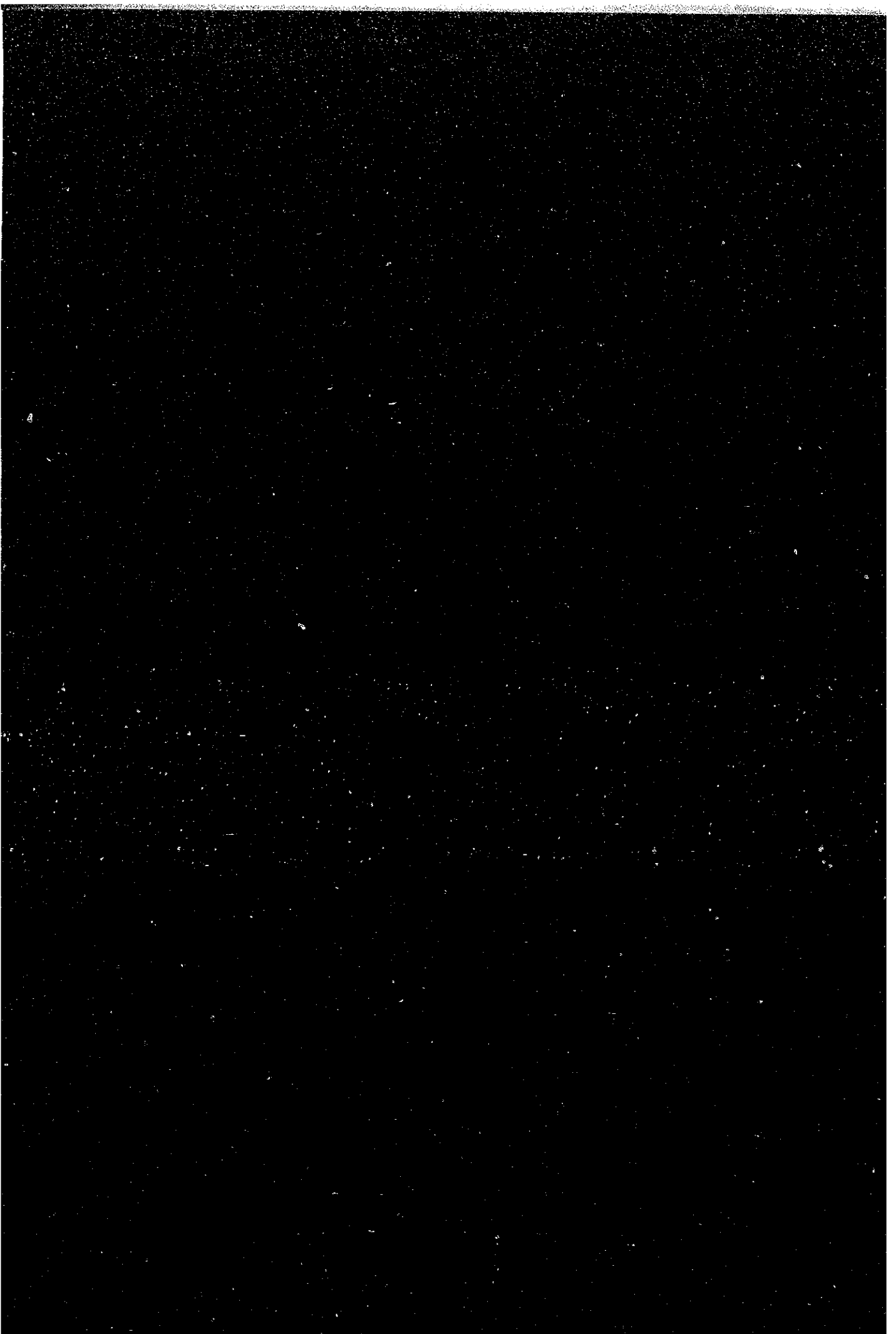
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