URBAN TRANSPORT STUDY

in GREATER METROPOLITAN AREAS
of GEORGE TOWN, BUTTERWORTH AND BUKIT MERTAJAM

Summary & Recommendations

APAN INTERNATIONAL
OOPERATION AGENCY

GOVERNMENT OF
MALAYSIA

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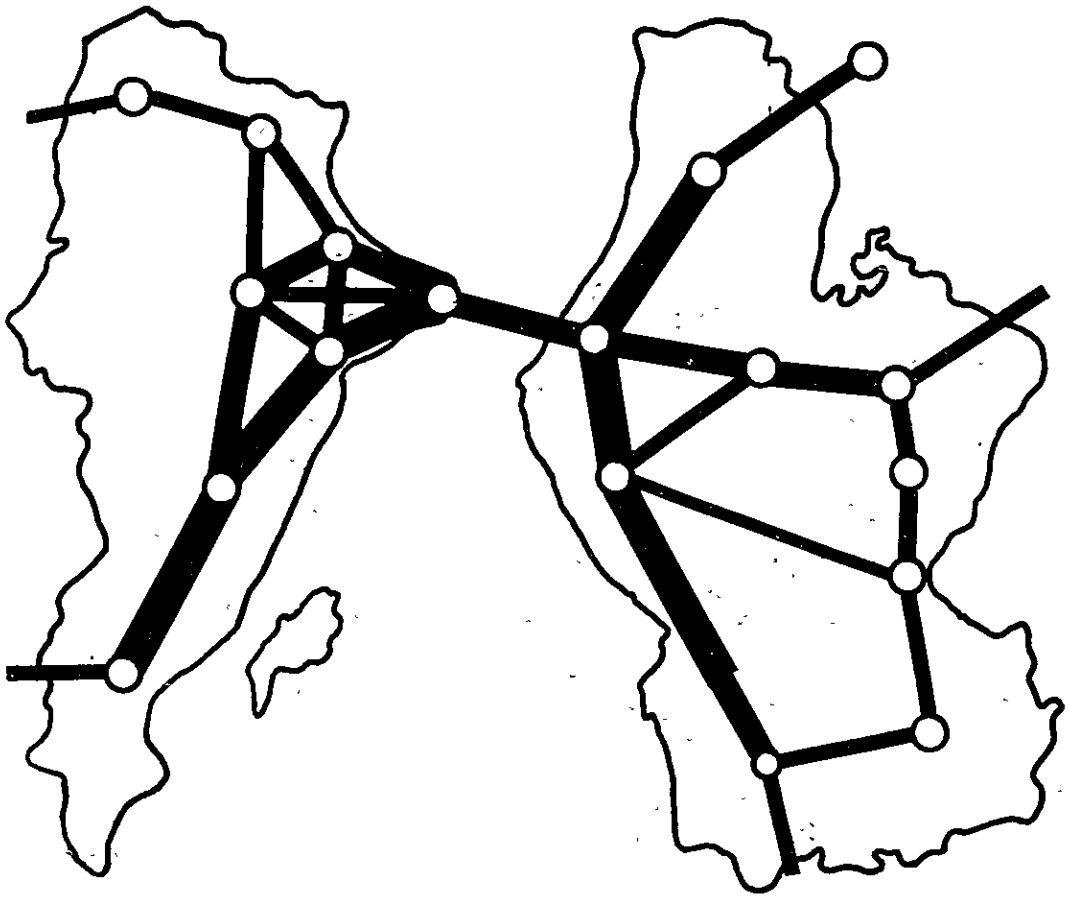

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JAPAN INTERNATIONAL COOPERATION AGENCY

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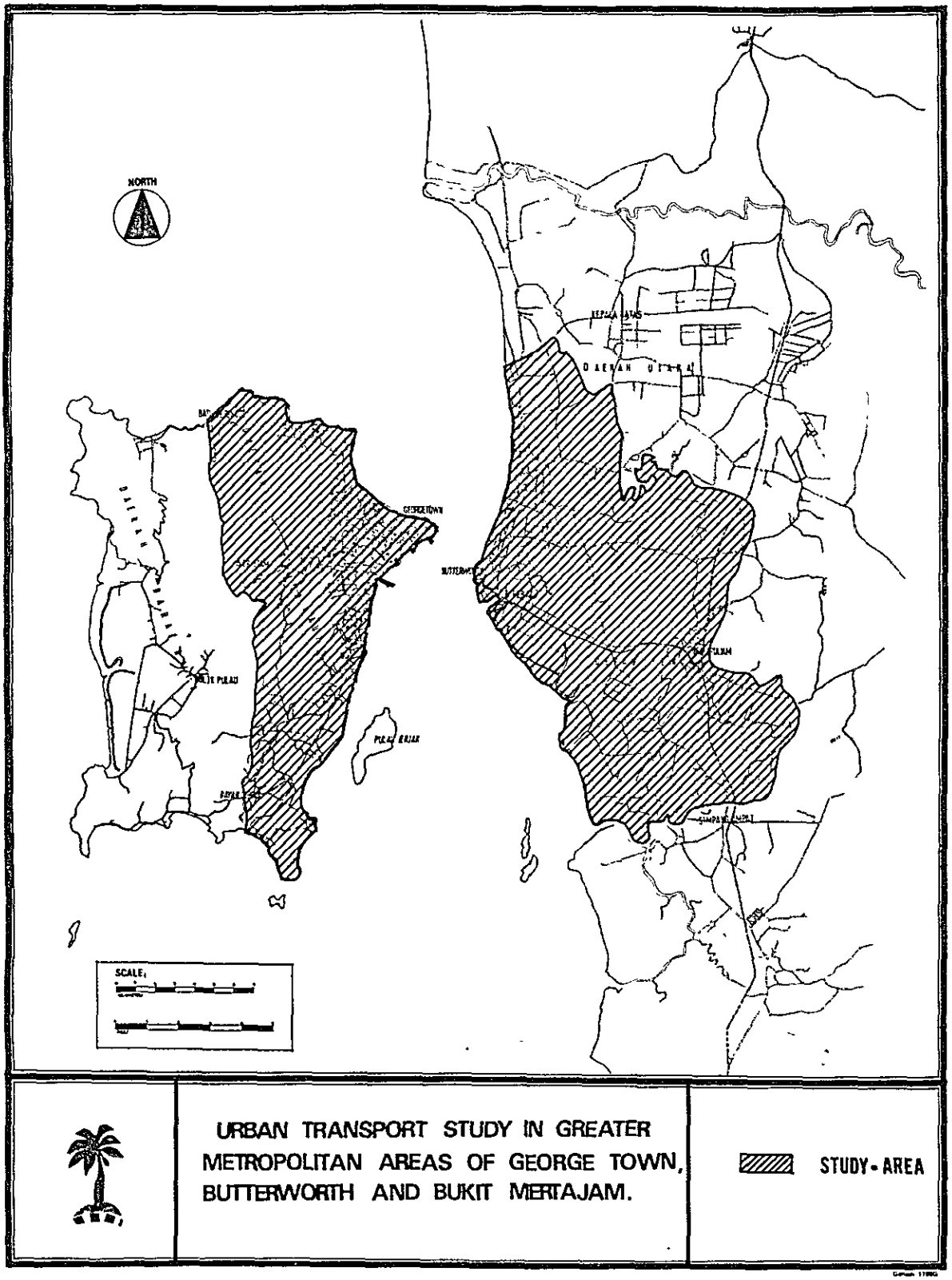

NORTH
SCALE:
URBAN TRANSPORT STUDY IN GREATER METROPOLITAN AREAS OF GEORGE TOWN, BUTTERWORTH AND BUKIT MERTAJAM.
STUDY-AREA

CONTENTS

1. INTRODUCTION

The Greater Metropolitan Area of George Town, Butterworth, and Bukit Mertajam (referred to as the "Penang Metropolitan Area"), comprises the second largest metropolitan area in Malaysia and is located in northwest Peninsular Malaysia.

The metropolis faces serious urban transport problems due to intensive industrial and urban developments as well as a rapid increase in the number of private cars. In addition, the permanent linkage connecting Penang Island with Wellesley (referred to as the "Penang Bridge") is expected to result in drastic changes in the present transport pattern.

In the light of these foreseeable changes, it is imperative that improvement of the transport system be urgently made.

Daily Traffic Congestion

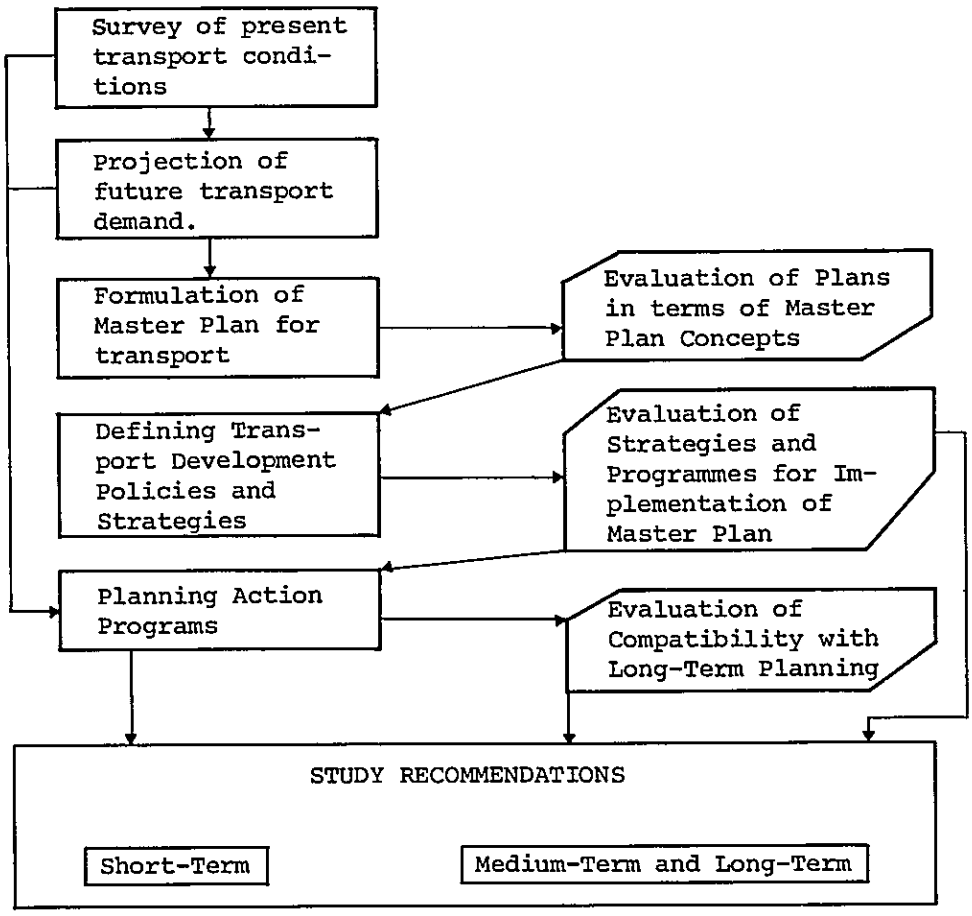
In this connection, the Government of Malaysia requested the Government of Japan to conduct an Urban Transport Study in the Penang Metropolitan Area in 1978. In response to the request, the Government of Japan through the Japan International Cooperation Agency has been carrying this project out jointly with the Government of Malaysia since March, 1979.

This study is divided into two phases. The objective of the Phase One Study is to formulate a master plan for the urban transport system of the Penang Metropolitan Area and recommend major transport policies.

The Phase Two Study is a feasibility study of the projects identified in the Phase One Study and started in April, 1980.

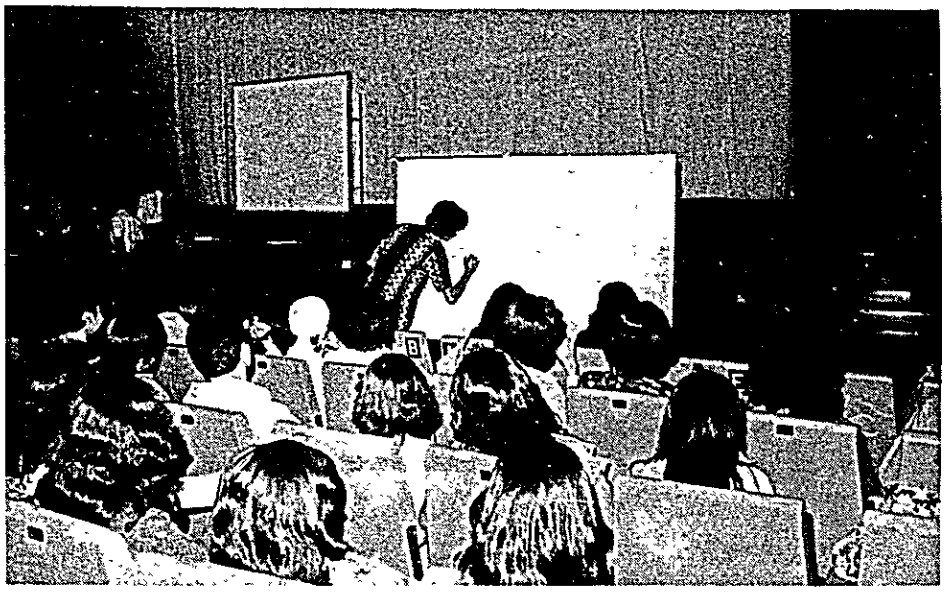
This report summarizes the Phase One Study and makes recommendations for two planning horizons:

1. A short-term action programme.
2. A long-term programme for transport and development planning.



Study Approach

Roadside Interview



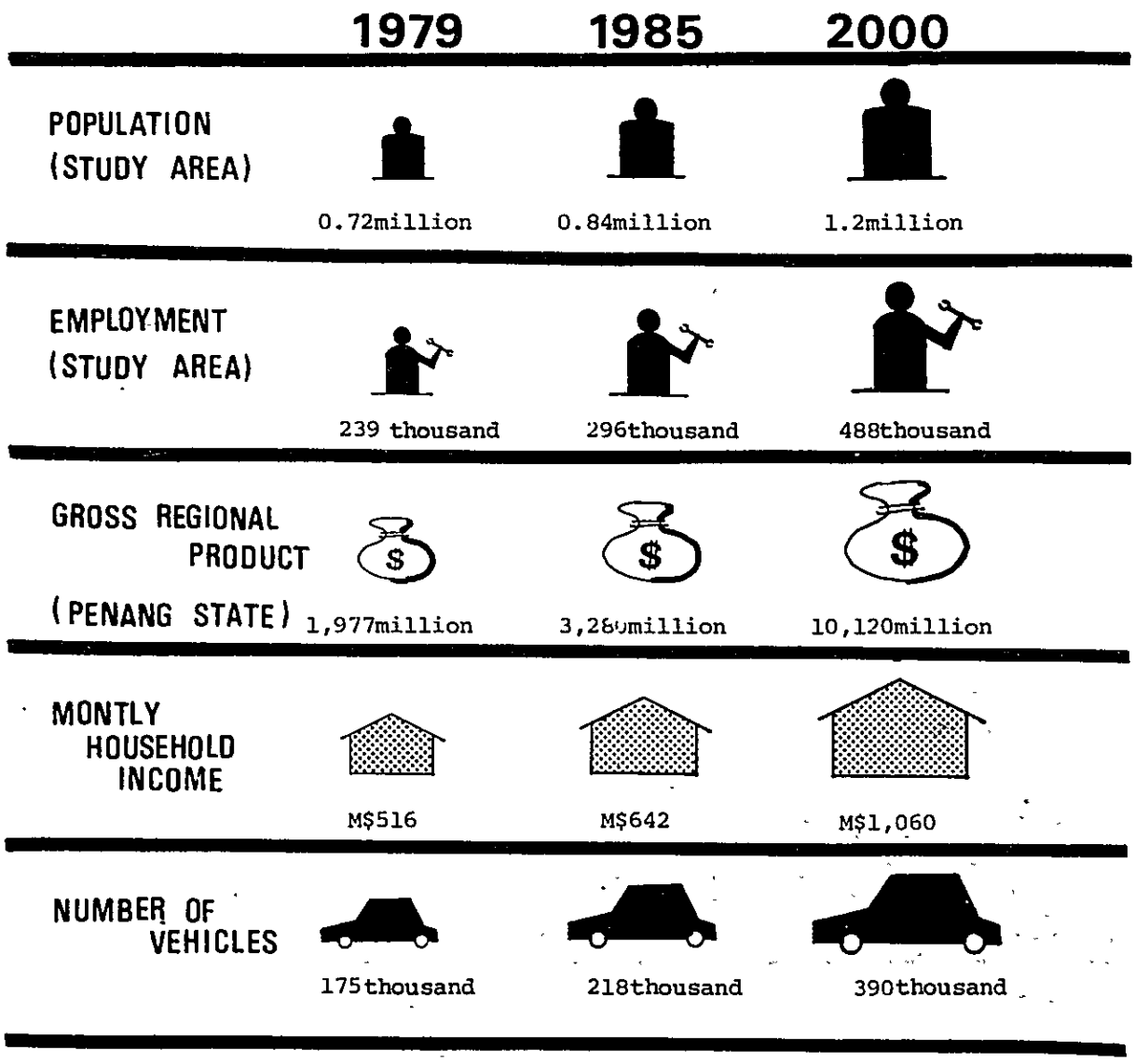
Training of Interviewers

2. CONCLUSIONS AND RECOMMENDATIONS

2.1 Socio-Economic Framework

The socio-economic framework for the study area is based on the premise (also held by the State of Penang) that in both the functional and regional contexts, the Penang Metropolitan Area will be the highest developed community center in the northwestern Peninsular Malaysia.

Socio-Economic Profile



2.2 Future Traffic Demand

2.2.1 Future Development Pattern

The simultaneous development of Penang Island and Province Wellesley seems the most likely development pattern for the future, due to the fact that it follows past development trends. Since this development pattern caters to the regional development potential, the creation of an urban community, as well as providing due consideration towards a better urban environment, the pattern was adopted in the study as a model of future growth. (illustrated in Fig. 1)

2.2.2 Future Traffic Demand

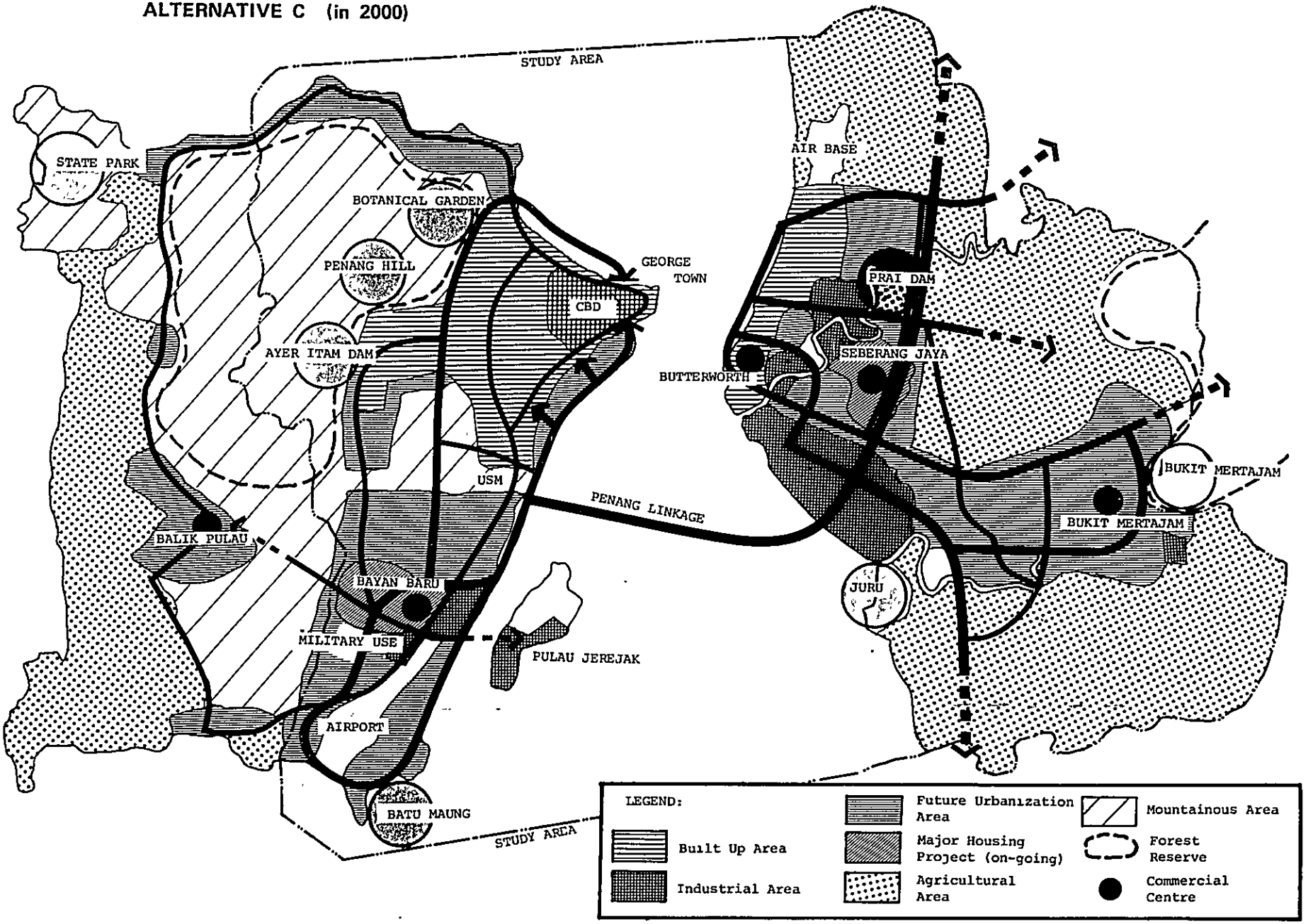
According to the rapid growth of car ownership, the number of trips are increasing year by year and in future the total number of trips will become 776,600 and 1,538,100 in 1985 and 2000 respectively from a total of 609,800 trips in 1979.

Table 1. NUMBER OF TRIPS IN EACH TRAFFIC TYPE

(Unit: 1000 trips)

		Vehicle									
		Car									
	Year	Going to Work	On Business	Private	Going Home	Sub-Total	Lorry	Taxi	Bus	Total	M/C
Internal trip	1979	66.4	33.4	53.1	83.2	236.0	28.4	2.7	19.0	286.1	397.3
	1985	88.1	44.0	70.8	110.1	312.9	43.2	6.1	24.7	386.9	437.7
	2000	200.1	100.1	160.7	249.9	710.7	92.2	24.5	51.5	878.9	449.3
External and through trip	1979	4.3	4.8	6.4	7.5	23.2	9.8	2.1	0.4	35.3	25.1
	1985	6.0	7.2	9.8	10.3	33.3	15.8	3.4	0.6	53.1	27.7
	2000	14.4	21.6	27.3	25.5	89.0	66.4	9.2	1.4	166.0	28.6
Total	1979	70.7	38.2	59.5	90.7	259.2	38.2	4.8	19.4	321.5	422.4
	1985	94.1	51.2	80.6	120.4	346.2	59.0	9.5	25.3	440.0	465.3
	2000	214.5	121.6	188.0	275.4	799.7	158.6	33.6	52.9	1,044.9	477.9

Fig. 1 CONCEPTUAL DEVELOPMENT PATTERN ALTERNATIVE C (in 2000)



2.3 Recommended Overall Transport Plan

2.3.1 Policy

The objectives and goals of improving transport systems are as follows:

* To provide adequate means of transport for everyone
* To provide a safe traffic environment
* To minimize resource consumption and to ensure effective use of transport facilities
* To preserve and to create a better urban environment

The major difficulties hindering achievement of those objectives in Penang are that the present transport system cannot afford to meet the rapid increase of transport demand resulting from the intensive economic development of the state of Penang much less the completion of the Penang Bridge and the New Federal Route I will bring about a great change of traffic conditions of the state.

Taking those conditions and an overall appraisal of transport strategies, the following policies are recommended.

1. Improvement of public transport.
2. Restraint of private vehicle use in congested areas.
3. Ensuring the effective use of existing road space.
4. Construction of new roads and improvement of existing ones.
5. Construction of transport facilities.
6. Preservation and creation of a better urban environment.
7. Monitoring the effectiveness of the implementation.

2.3.2 Road Network

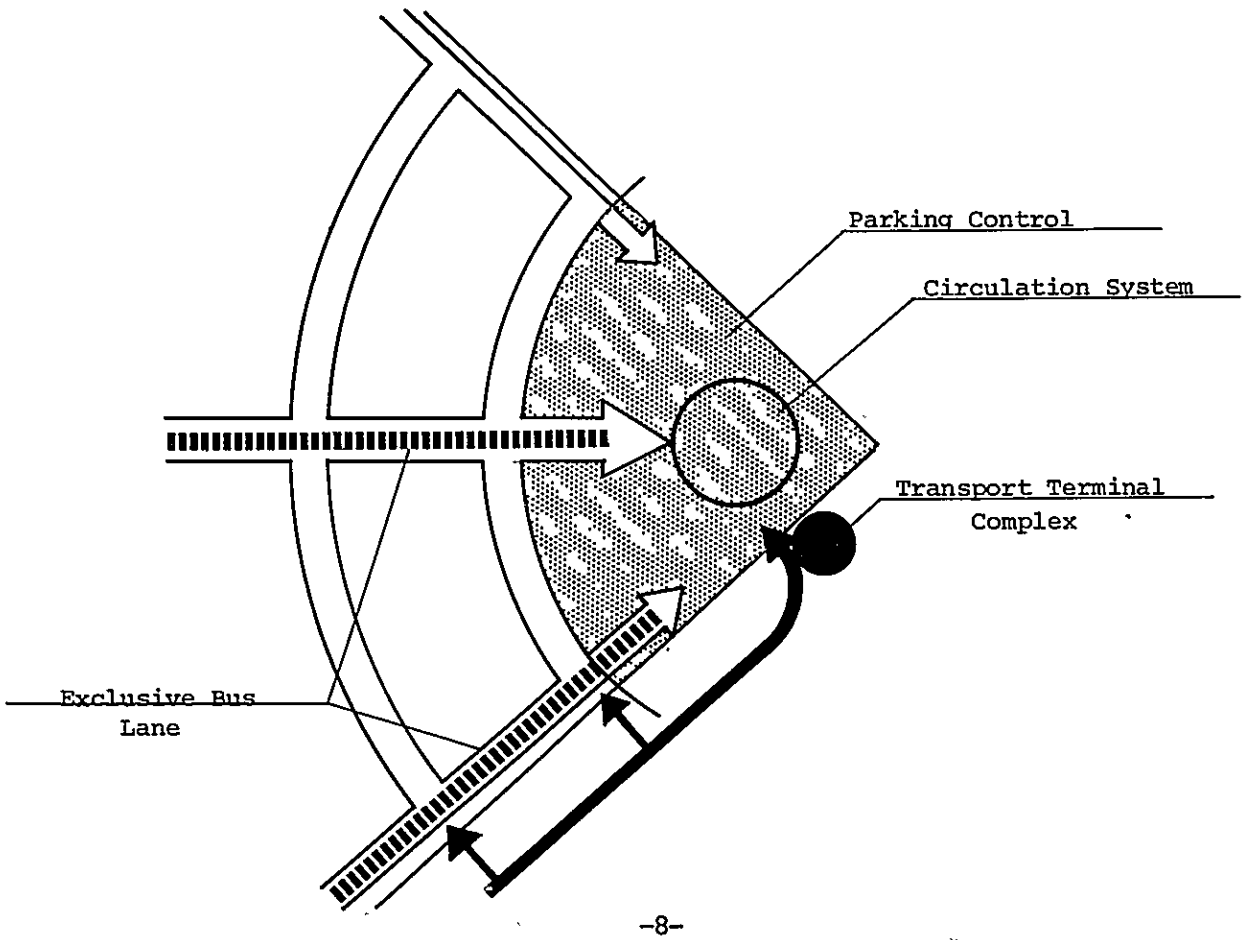
Based on the policy and the strategies, the future road network master plan is proposed as shown in Fig. 2.

The form of road network adopted for George Town is fundamentally a ring and radial road system, while that for the other areas is basically a grid pattern.

2.3.3 C.B.D. of George Town

Since a great deal of traffic coming from the other areas will deteriorate the traffic flow in the Central Business District (C.B.D.) of George Town, it is necessary to improve roads and public transport, and also to control transport demand to the C.B.D. Therefore the package of strategies, illustrated below, is recommended.

Package of Recommended Traffic Strategies



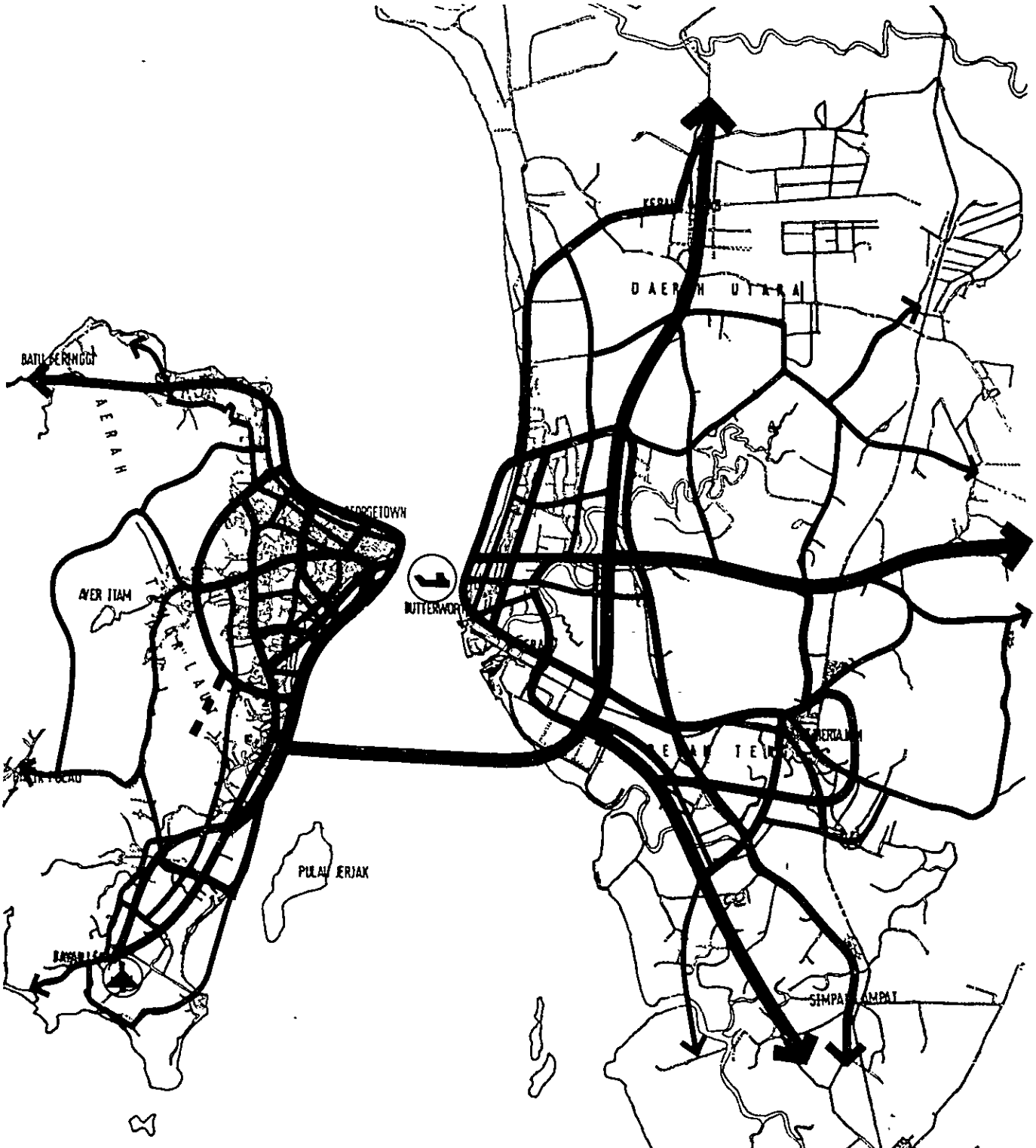


FIG.2 : PROPOSED ROAD NETWORK

- Primary Distributor (Inter-Urban)
- Primary Distributor (Intra-Urban)
- District Distributor
- Park-Way

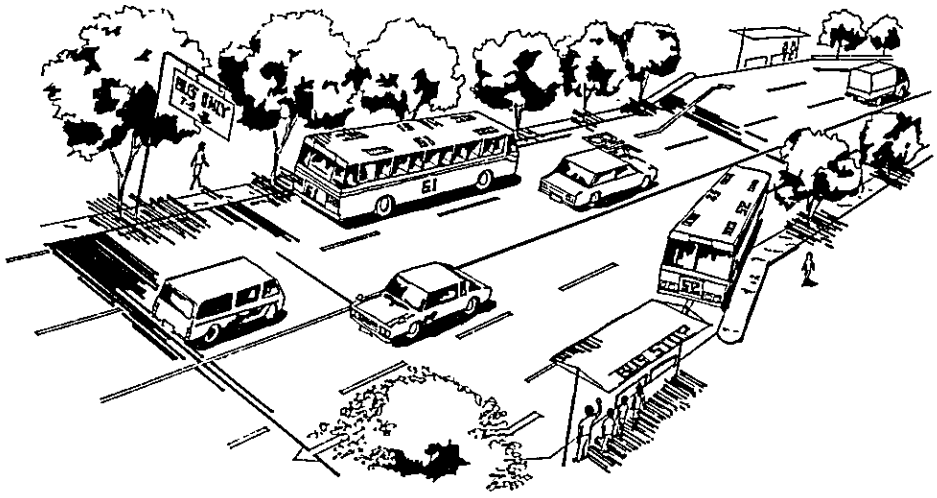
2.4 Long-Term Transport Plans

2.4.1 Improvement of Public Transport

Public transport should be expanded as follows in line with the overall transport strategies.

1. To introduce an exclusive bus lane on the following roads:

Penang Island:		Green Lane.
		Ayer Itam Road.
		Jalan Dato Keramat.
		Jalan Jelutong.
Province Wellesley	:	Existing Federal Route 1.



2. To improve bus transport services in the following ways:
   a. Reorganization of routes and schedules.
   b. Provision of adequate bus stops and bus terminals.
   c. Renovation of bus fleets.
   d. Revision of bus fare.
   e. Establishment of a bus transport committee.
3. It is not recommended to introduce the mini-bus system as an entire bus system because in terms of quality of service and transport economy, there is a difference

between the scheduled-bus and the mini-bus.

Therefore, it is suggested that long distance line-haul services should be mainly be served by the scheduled-bus system while the mini-bus system is selectively introduced as a feeder system.

4. Introduction of the New Transport System.

The need to introduce the new transport system will be generated by the year 2000. Nonetheless, it is suggested that the new transport system should be re-examined by monitoring the increasing volume of traffic on roads after 1990.

2.4.2 Private Vehicle Restraints

The team recommends that the management and the control of car parking should be introduced as a form of private vehicle constraint before 1990. After 1990, it will be necessary to strengthen the control of parking or to introduce a car-pooling system.

2.4.3 Construction of New Roads and Road Improvements

The major recommendation for the study area is the construction and improvement of the roads and grade-separated intersections.

The recommended plan for the three phases of construction and improvement, i.e., phase 1 (1981 - 1985), phase 2 (1986 - 1990) and phase 3 (1991 - 2000), is as shown in Figs. 3, 4 and 5.

2.4.4 Construction of Transport Terminal Complex

In order to establish efficient and convenient public transport service and to meet the future demand of transport services caused by the Penang Bridge and the Bayan Lepas Development, a transport terminal complex which can handle and coordinate various modes of transport will be necessary. It is suggested that a transport terminal should be located north of the recramation area, as the surrounding areas are

expected to form a new city center through various urban redevelopment projects like the KOMTAR Project. Furthermore, it is convenient to control traffic flow from the Penang Dispersal Road.

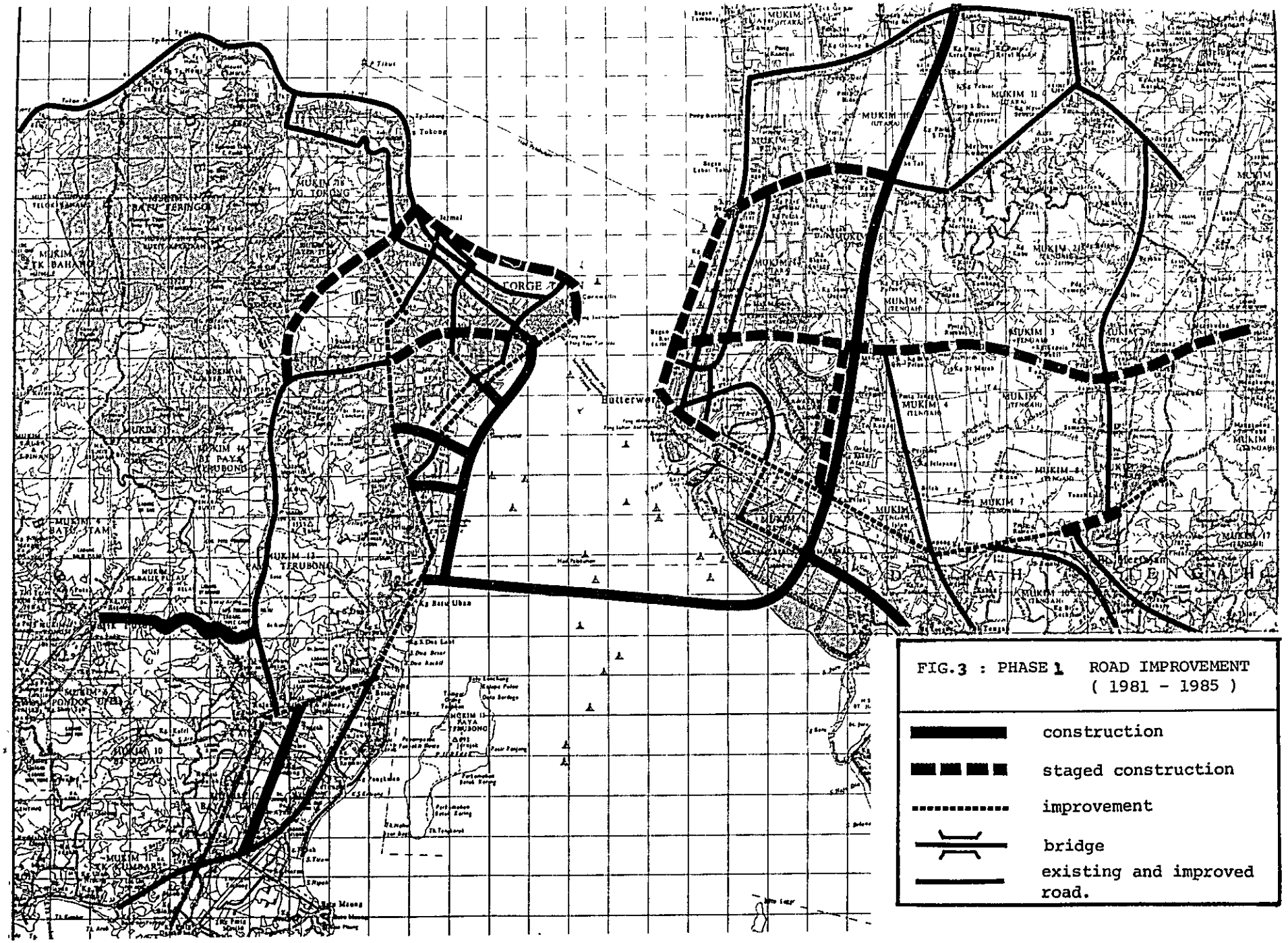


FIG.3 : PHASE 1 ROAD IMPROVEMENT
(1981 - 1985)
construction
staged construction
improvement
bridge
existing and improved road.

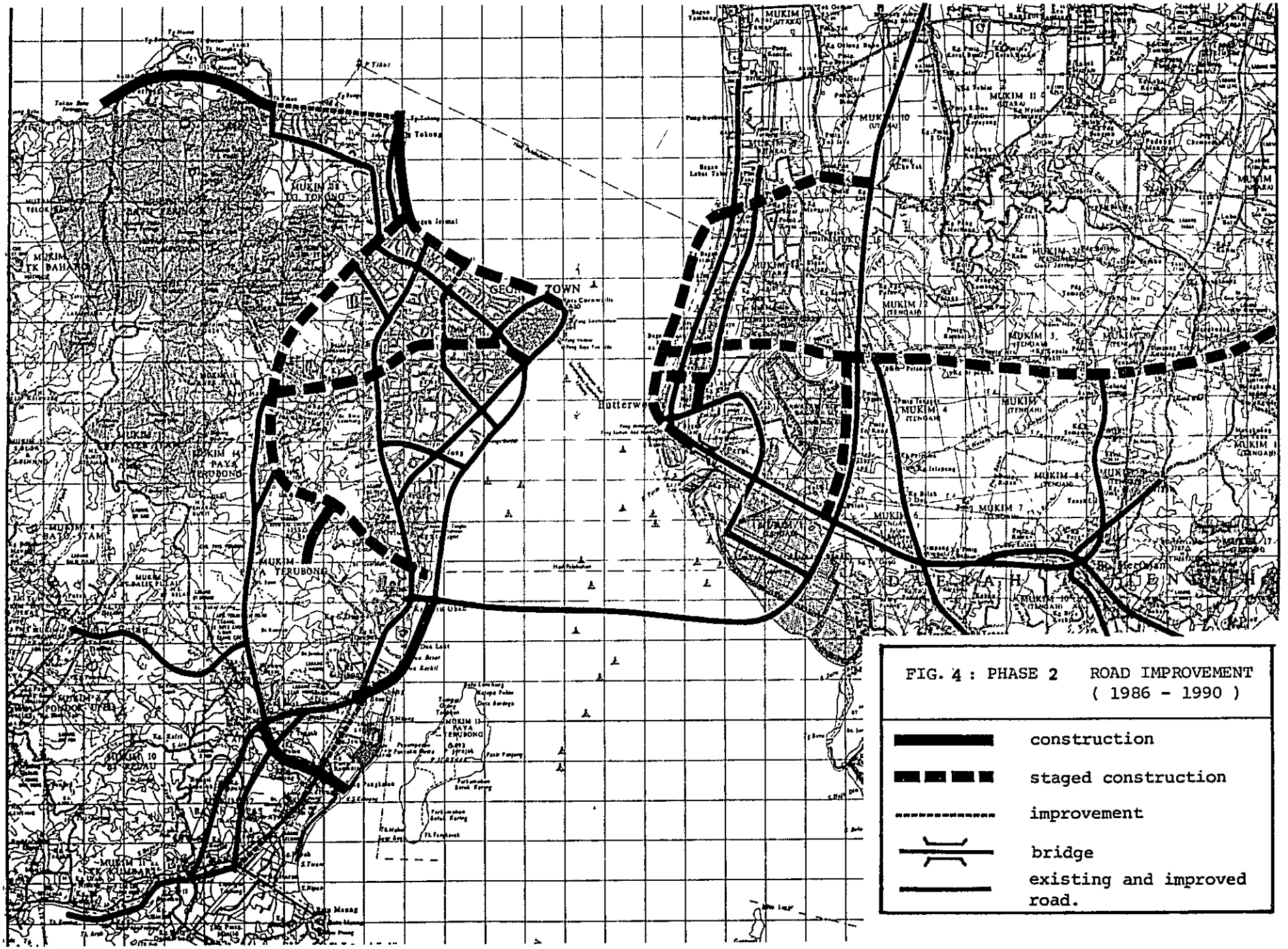


FIG. 4 : PHASE 2 ROAD IMPROVEMENT
(1986 - 1990)
construction
staged construction
improvement
bridge
existing and improved road.

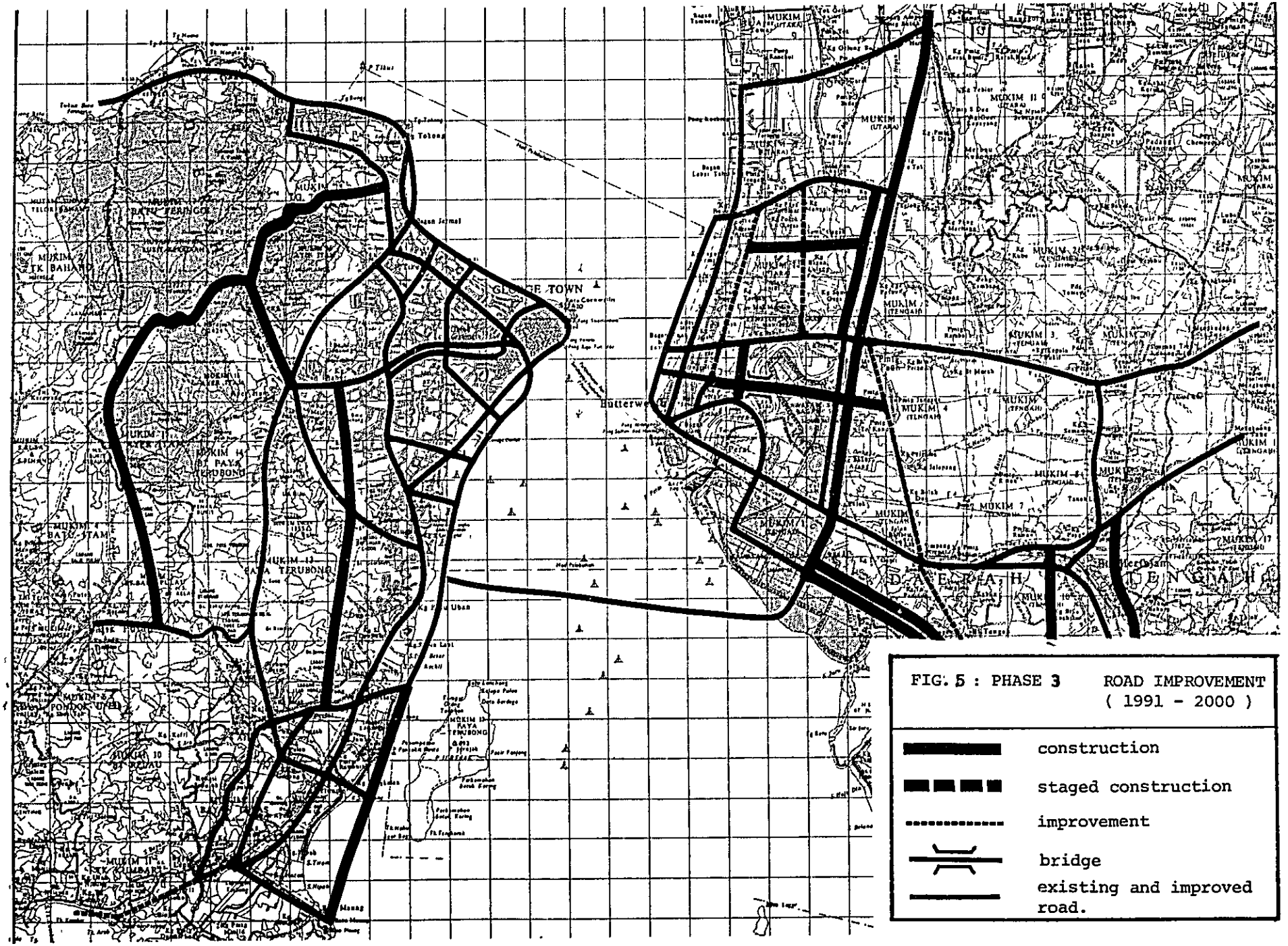
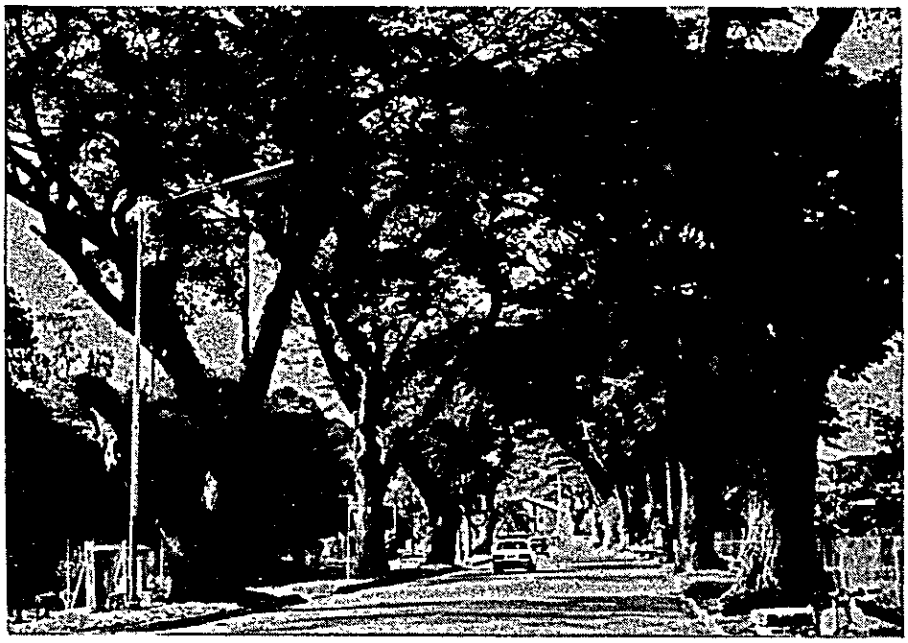


FIG. 5 : PHASE 3 ROAD IMPROVEMENT
(1991 - 2000)
construction
staged construction
improvement
bridge
existing and improved road.

2.4.5 Environmental Preservation

In network planning, consideration is given to the preservation and creation of a better urban environment. When the transport projects as well as the other infrastructure projects are implemented, an environmental assessment of the corridors of the project from the social and physical view points should also be made.



Beautiful Road-Side Trees (Rain Trees at KELAWEI ROAD)

2.4.6 Ferry System

On the basis of traffic demand projections, mainly motorcycles and passengers are expected to use the ferry. Therefore, it is suggested that the present ferry system be continued after the Penang Bridge is in operation. In addition, it is desirable to provide the ferry system to give users a choice of travel mode.

2.4.7 Railway

A future demand for commuter railway service will not be sufficient to make its expansion financially viable. However if any financial relief measures and/or intensive development of the adjacent land are to be undertaken, it is recommended that a detailed survey and study also be conducted at the same time.

2.5 Short-Term Actions

2.5.1 Traffic Engineering and Management

The short-term actions should focus on the implementation of the following measures which are comparatively inexpensive, easily implemented and will have substantial impact on the transport system.

1. The circulation road system in George Town should be implemented at the earliest possible time. The implementation of this circulation plan would ensure effective and smooth traffic flow.

2. Grade-intersections should be improved as follows:

   a. On Penang Island: Magazine Circus and seventeen (17) other intersections.

   b. In Province Wellesley: Five (5) grade-intersections.

3. In order to solve the present conditions of disorderly mixed traffic, a system involving the demarcation of the center line and the outer border of a car lane and motorcycle and/or trishaw-lane is recommended.

4. A traffic signal control system is recommended as the most suitable measure to achieve higher traffic capacity on primary distributor roads in peripheral and suburban areas as well as in the C.B.D. of George Town.

Typical Street in the C.B.D.

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

   a. Sidewalks
   b. Pedestrian Crossings

   For the improvement of sidewalks, careful consideration should be given to planting roadside trees from the environmental and landscape viewpoints.

6. It is recommended that Campbell Street in Gebrge Town and Jalan Pasar in Bukit Mertajam be opened exclusively to pedestrians, even if only on a part-time basis.

Insufficient Pedestrian Facilities in the C.B.D.

7. The following traffic facilities should be installed, based on a standard system:

   a. Traffic Signs
   b. Lane markings
   c. Traffic Signals to improve visibility of traffic signals, the existing traffic signal system should be reviewed.

8. In order to improve the present and future traffic situation in the congested areas, the implementation of the following traffic regulatory measures are recommended:

   a. Parking prohibitions on Primary Distributor Roads.
   b. One-way system in the congested areas.

2.5.2 Construction and Improvement of Roads

It is recommended that the following roads should be constructed and improved as short-term measures.

In Penang Island:

a. Gurney Drive Extension*
b. Outer Ring Road from Bagan Jernal to Ayer Itam*
c. Partly Widening of Green Lane**
d. Scotland Road from Ayer Itam Road to Western Road**
e. Western Road from Scotland Road to Gottlieb**
f. Bayan Lepas Road**
g. Jelutong Road**
h. Leboh Mc. Nair**
i. Maxwell Road**
j. Dato Keramat-Ayer Itam Road to Ayer Itam Intersection**

In Province Wellesley:

a. S. Dua Road from Kg. Bagan Ajam to S. Dua*
b. West Coastal Road from Kg. Bagan Ajam to New Port*
c. West Coastal Road from New Port to intersection at Alor Star-Changkat Jering Highway*
d. Federal Route I at Intersection of Alor Star-Changkat Jering Highway to Jalan Methopalaniapa*
e. Prai Road**
f. Permatang Pauh Road**

* Proposed by this study
** Projects currently being planned

2.5.3 Bus Transport

For bus transport, the following measures should be implemented immediately in order to improve the reliability of the system:

1. The bus fleets should be increased in number as well as updated through the introduction of more suitable and

higher capacity types of buses such as the standee type.

2. Bus operation in terms of frequency and punctuality should be stabilized.

3. The turn-in and turn-out facilities for buses at bus stops as well as the bus stop shelters should be improved. The bus schedule should be clearly marked and posted at each stop.

2.5.4 Taxi

As regards taxis, the following measures should be implemented.

1. The taxis should be increased in number.

2. An association or cooperative of taxis should be set up.

3. Taxi stands should be established at strategic locations.

2.5.5 Trishaw

It is suggested that the present government policy of suspending the registration of trishaws should be continued. Phase out reduction of the trishaws on some of the circulation roads should be enforced.

2.6 Investment Cost

In order to achieve the transport development in the Metropolitan Area of Penang, the capital investment required for the coming 20 years is estimated at over M$1,085 million: Government investment is over M$686 million (63%) and Public Cooperation and Private Sector investment is M$399 million (37%). The investment requirements at each of the phases are shown in Table 2.

Table 2. CAPITAL INVESTMENT BY PHASE

(In thousand Malaysian dollars at 1979 prices)

	Projects / Phase	1-A 1981-mid'83	1-B mid 1983-85	2 1986-'90	3 1991-2000	Total	
Government Investment**	Road Network	91,829	89,089	218,712	208,321	607,951	(56.0)
	Intersection	7,894	30,847	19,755	7,030	65,526	(6.0)
	Traffic Signal	1,337	2,400	679	172	4,588	(0.4)
	Traffic Sign. Marking	637	638			1,275	(0.1)
	Sidewalk	1,356	1,350			2,706	(0.2)
	Bus Facility	1,950	1,990			3,990	(0.4)
	Sub-Total	105,003	126,314	239,196	215,523	686,036	(63.2)
Public Corporation and Private Sector Investment	Penang View Road			21,340		21,340	(2.0)
	Transport Terminal		1,252	6,222	12,445	19,919	(1.8)
	Transport Park			7,640		7,640	(0.7)
	Off-Street Parking*		54,782	27,300	54,600	136,682	(12.6)
	Bus Fleet	21,600	23,040	50,490	118,260	213,390	(19.7)
	Sub-Total	21,600	79,074	112,992	185,305	398,971	(36.8)
	Total	126,603	205,388	352,188	400,828	1,085,007	
	(%)	(11.7)	(18.9)	(32.5)	(36.9)	(100.0)	

Notes: * Estimated on the assumption that all the off-street parking demand will be supplied by four-story parking buildings.

** Including costs of detailed engineering and supervision.