URBAN TRANSPORT MASTER PLAN STUDY FOR THE JOHOR BAHRU CONURBATION MALAYSIA

TECHNICAL REPORT 4 POPULATION STUDY

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JAPAN INTERNATIONAL COOPERATION AGENCY

GOVERNMENT OF MALAYSIA

TECHNICAL REPORT 4
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1.0 INTRODUCTION

1.1 An Overview

Central to the task of preparing the Urban Transport Master Plan Study for the Johor Bahru Conurbation is the explicit need to evolve, not only the present and future economic framework but also the demographic base from which traffic analysis and transportation studies and planning can be carried out. At the very outset, it can be reckoned that such demographic study is important, if not indispensable, for the population and their socio-economic enities and activities are capable of generating movement trips and travel demands-tantamount to the complex interactions between travel behaviour, transportation system supply and the urban structure.

Also within this background, are four major Regional and Development Studies for the State of Johor viz. the Johor Tenggara (KEJORA, 1971 & 74)[1], Johor Barat, Johor Timor (Draft, on-going) and the South Johor Regional and Development Studies (1974). At the more strategic level, are the preparation of Kulai-Senai Structure Plan (Draft 1978), concept Plan for Pasir Gudang (August 1981) and the Johor Bahru Sewerage and Drainage Studies (1981). However, the actual growth of population at an unprecedented rate and of the rapid pace of development particularly in the South Johor region had been faster than anticipated. The rapid pace of housing development had been occuring in the region ever-since massive investments had poured into the State after the region's economic independence from Singapore and the role of Johor Bahru as the regional administrative, economic, cultural and social centre. Such fast pace of development if uncontrolled could lead to sprawls and indeed, detrimental to well-being of populace and their immediate environments. On the other hand, in other areas like the Johor Tenggara, etc, the actual growth has fall short of

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1. The Johor Tenggara Regional Study was carried out by Shankland Cox Partnership in 1971 and in 1974, the Johor Tenggara Transportation Study was prepared by the Malaysia International Consultants (MINCO)

the predetermined population target. With these adherent situations, it was deemed expedient for the Johor State Structure Planning Unit (SPU), among other tasks to review the implications, issues and to undertake the preparation of the Regional Framework[2], as an underlying base for the subsequent preparation of Johor Bahru and Pasir Gudang Structure Plans.

It was realised from the very start that if the studies and plans were to be prepared in isolation without consideration of the surrounding regions, they will only prove futile and utterly unrealistic. It was in view of this that the preparation of the Demographic, Economic and Landuse components in this Study had been undertaken to represent firstly, the analysis at the regional level and secondly as the culmination of closely coordinated efforts with the Structure Planning Unit.

1.2 The Study Area in Regional Setting

Situated at the Southern tip of Peninsular Malaysia, the Study Area of approximately 530,000 ha (equivalent to a third of the State of Johor) is linked to Singapore by a causeway which spanned across the Straits of Johor. Consisting essentially of the South Johor region and part of Kota Tinggi district, the Study Area is also delineated into the Primary Area (308,000 ha) and Secondary Area (222,000 ha) for purposes of this study. (see Fig 1.1).

Topographically, the Study Area is generally undulating except for the only high peak of Gunung Pulai (exceeding 2000 feet). In terms of transport network, there is linkage both by rail and road to the west and east coast of Peninsular Malaysia. Besides Johor Bahru town (MPJB)[3], prominent settlements in the Study Area include Kulai, Pontian, Senai, Kota Tinggi, Pasir Gudang and the new township

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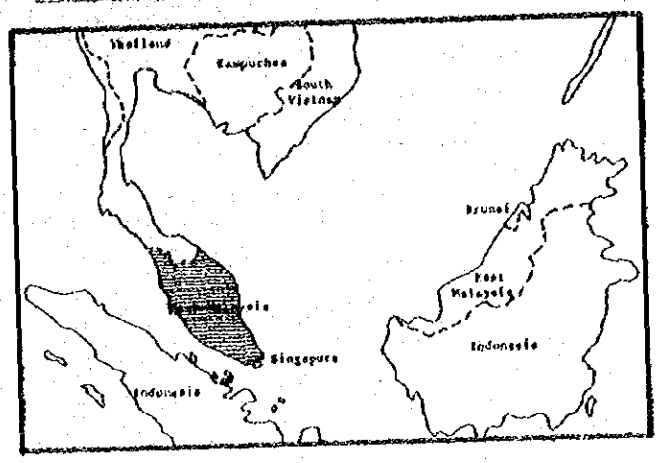
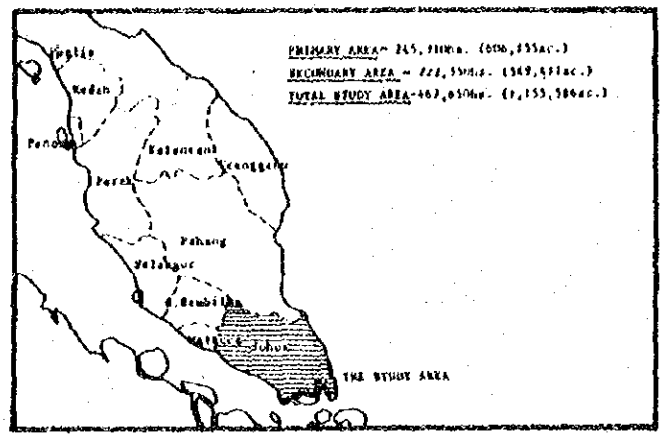
2. SPU's Terms of Reference are contained in Appendix 1.1

3. Refers to Majlis Perbandaran Johor Bahru (Johor Bahru Municipality/Town Council)

PENINSULAR MALAYSIA IN SOUTH-EAST ASIA



THE STUDY AREA WITHIN THE NATIONAL CONTEXT



THE STUDY AREA

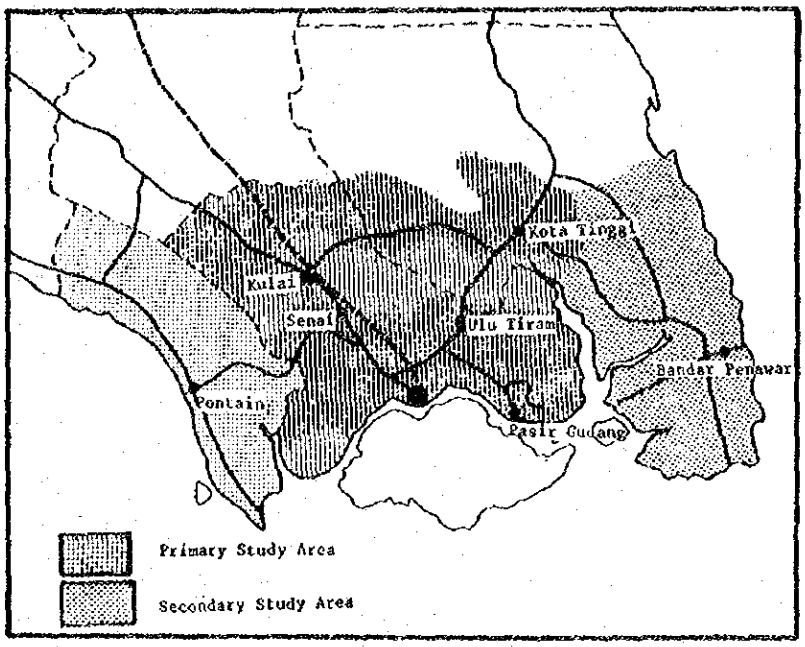


Fig. 1.1 : The Study Area in the Regional Contexts.

of Bandar Penawar. Most of the settlements are oriented along major regional linkage routes.

1.3 The National Development Policy: Fourth Malaysia Plan and the NEP

As embodied in the New Economic Policy (NEP) and the Fourth Malaysia Plan (FMP), the two basic objectives of the Regional development strategy is firstly to develop more fully the resources in the country and secondly, to bring about a more equitably balanced growth among and within regions and the states of Malaysia. In order to achieve closer integration among regions or states, there is a need in most instances, to redress the prevailing economy and bring about structural changes in the economy. As it is, new land development schemes such as FELDA, etc, in lagging and poor areas had represented the major strategy of the government towards narrowing the gap of economic imbalances; very often this involves the selective relocation of the population to new areas or it may entailed the continued reinforcement of existing regional production systems and linkages. The latter approach would include the channelisation of more public investments into poor regions or via the strengthening of linkages among cities and towns in the hope that positive spin-off effects will spread to their hinterland. In this respect, to ensure the integration of urban centres and their rural hinterland, there is a need to upgrade and increase facilities (notably urban facilities) in rural areas. Indeed, in cases where resources do not pose serious constraints for development, the primary objective preferred is oriented towards the reduction of polarization among regions via dispersing urban developments, rather than concentrating them in already highly urbanised centres. In this relation, large urbanised areas particularly metropolitan

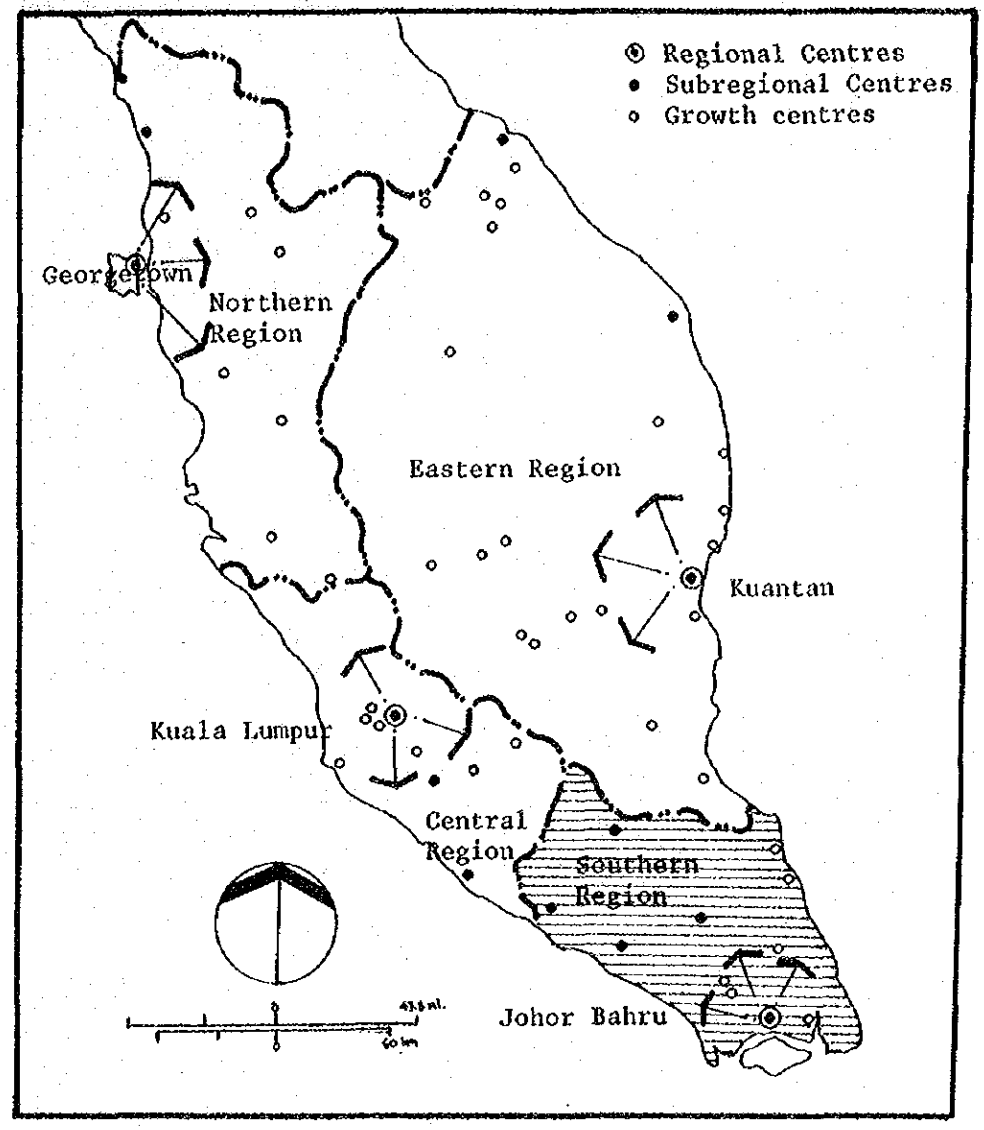
regions should not be permitted to grow excessively and to uncontrolled proportions as the diseconomies of scale may set in thereby, giving rise to a host of inter-related social and economic problems.

Within this framework of balanced regional development, four major regional growth foci are selected for high priority development and from which spread effects can be disseminated to their surrounding regions. In this respect, there is Georgetown in the northern region, Kuala Lumpur in the central region, Kuantan to the eastern side and Johor Bahru serving the southern region.

1.4 The State And Regional Development

As delineated in the Regional Development framework, Johor Bahru, the state capital city of Johor is expected to play the role of a regional growth centre servicing the Southern Peninsular Malaysia. (see Fig. 1.2). At the same time, to avoid concentration of development in major urbanised regions and to complement their growth, new towns and service centres will be developed in the state. In the ultimate form, corridors of urban development are envisaged with the linking of these towns to their rural hinterlands as well as with the regional growth centres. Such is the case of development anticipated with the establishment of the industrial complex at Pasir Gudang, the airport at Senai, large scale development programmes of Johor Barat region and opening up of land schemes at Johor Tenggara for agriculture and settlement.

Fig 1.2: Designated Growth Poles and the Regional Development Framework

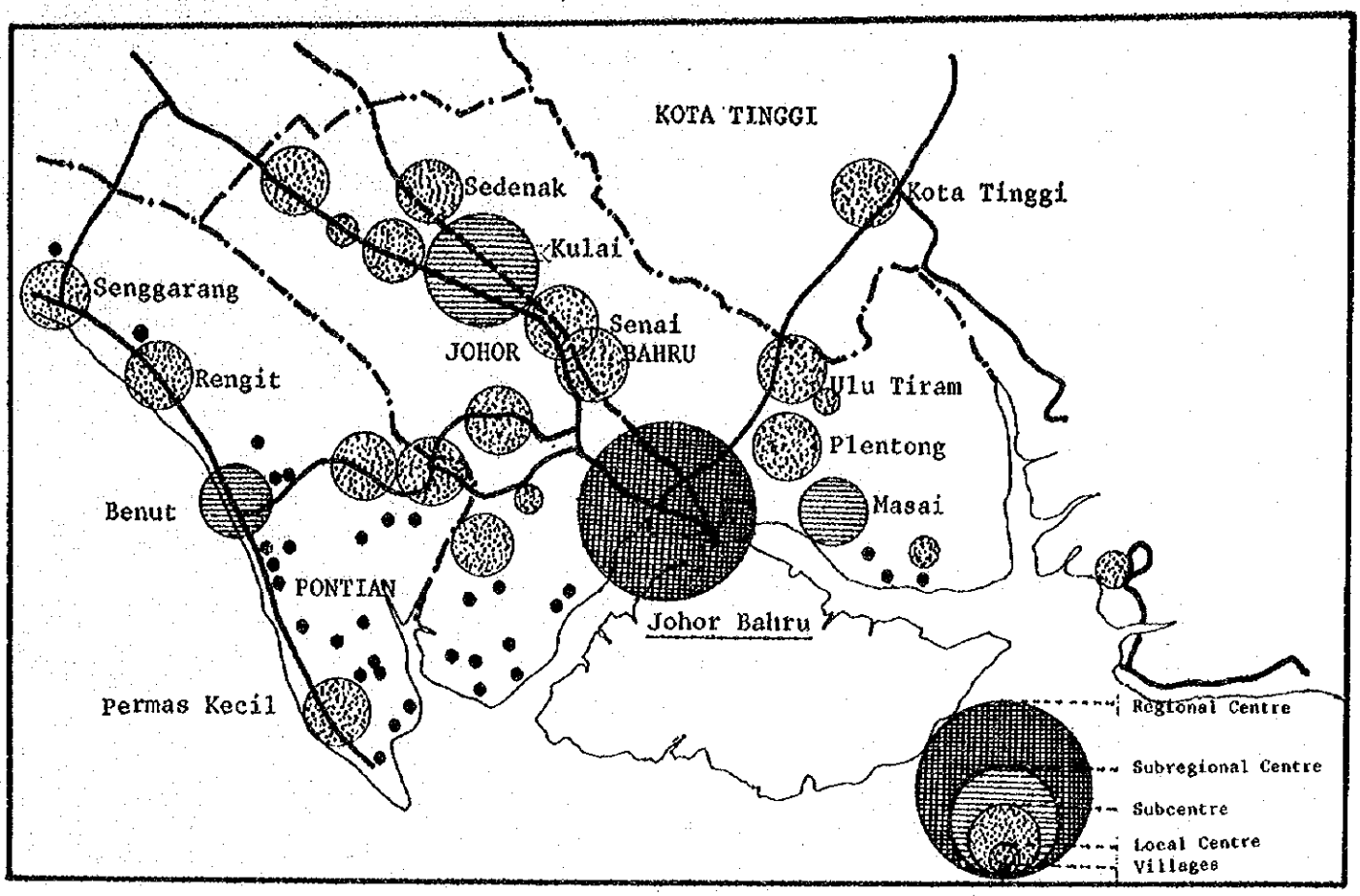


Source: Third and Fourth Malaysia Plans.

1.4.1 Towns And The Urban Hierarchy

The ranking of towns by population size is one of the criterion used to denote the relative significance of each town. An analysis of the town size population in 1970 showed that there existed lognormal distribution in the various towns in the state. (See Fig. 1.3). However, in terms of urban centres, they are not distributed equitably over the districts

Fig 1.3: Distribution of Major Towns in the Study Area, 1970.



but instead, concentrated in the two districts of Johor Bahru and Kluang.

At the national level, the ranking of hierarchical functions of towns (in terms of services provision) showed that Johor Bahru is one of the regional centres after Penang and Ipoh. (see Table 1.1). At the state level, the urban hierarchy of towns in the South Johor region showed that the sub-regional centres[4] include Pontian Kechil, Kulai and Masai, and those falling into the sub-centres include Pekan Nenas, Senai, Ulu Tiram, Sekudai, Benut, Gelang Patah and Ayer Baloi. Those towns under local centre category include Kelapa Sawit Pulai, Sedenak, Saleng, Ulu Choh, Bukit Batu, Permas Kechil, Plentong, Sengkang, Ayer Bemban, Seelong and Lima Kedai. (See Table 1.2)

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4. Note that this category of classification is also used at the national level but the degree of importance differ - depending on the interpretation as both are from two different perspectives.

Table 1.1: National Grading of Major Towns in Peninsular Malaysia

Suggested Grade	Town	1970 Population
I National Centre	Kuala Lumpur	452,000
II Regional Centres	Penang	331,000
	Ipoh	248,000
IIa	Johor Bahru	136,000
IIb	Petaling Jaya	93,000
III Sub-regional Centres	Malacca	86,000
	Seremban	80,000
	Alor Star	66,000
	Kuantan	43,000
	Kota Bahru	55,000
	Klang	113,000
	Batu Pahat	53,000
	Taiping	55,000

Source: South Johor Regional Planning and Development Study, 1974

Analysis revealed that even between the districts of Kota Tinggi, Pontian and Johor Bahru, there exists disparity in that the latter is comparatively more urbanised and has higher proportion of urban-oriented employment (includes primarily of secondary and tertiary ones) than the former two districts. In Pontian and Kota Tinggi districts which are basically agro-based, have approximately 61.3% and 51% of their total employment in the primary sector in 1970 respectively.

Major findings[5] on urban hierarchy and town function distribution are:-

(1) If future concertive intervention by the public sector is not forthcoming, there is a strong possibility that the economic imbalances between the two districts of Pontian and Kota Tinggi will aggravate, creating negative impacts even to areas

5. This section on the major findings are based on SPU's analysis on the urban hierarchy and town functions (1981).

Table 1.2: Heirarchy of Urban Centres in South Johor, 1970

	Towns	Population	Function
1. Regional Centre	Johor Bahru	135,936	Centre of administration for the State. Contains higher order services like specialist clinic, police HQ., all State Department HQ., etc., Centre of all functions.
2. Sub-regional Centre	Pontian Kechil	8,290	Normally this is a centre for the district. Services not as specialise and higher order as the Regional Centre. Might contain a district office, police district HQ., district hospital, and other facilities in that order. Centre of business for agriculture and hinterland.
	Kulai	11,843	
	Masai	2,248	
3. Sub-Centre	Pekan Nenas	8,983	Serving hinterland normally at mukim level. Services provided of limited scope. Contain administrative function equivalent of a town council, a health sub-centre, and facilities in that order of magnitude.
	Senai	4,621	
	Ulu Tiram	3,976	
	Sekudai	3,595	
	Benut	2,606	
	Gelang Patah	2,334	
	Air Baloi	1,849	
4. Local Centre	Kelapa Sawit	4,695	This centre normally serves unspecialise services and hinterland too is limited to the local populace. Administrative function contain is equivalent to that of a local council, postal agent, rural health centre, and other facilities in that order.
	Pulai	2,539	
	Sedenak	1,998	
	Saleng	1,713	
	Ulu Choh	1,436	
	Bukit Batu	1,414	
	Permas Kecil	1,251	
	Plentong	1,457	
	Sengkang	980	
	Ayer Bemban	992	
	Seelong	716	
	Lima Kedai	695	

Source: Unit Pelan Struktur Study, 1981

outside these regions;

(2) Besides Kulai, only Pasir Gudang when fully developed will be the next important town in the region after Johor Bahru, functioning as second order growth centres in the region. It was felt that Pontian should be included in the list of growth centres at the national level;

(3) Related to (2), however, Pontian at status quo, is not in a position to generate a pull, sufficiently strong to attract private investments. This is in contrast to prevailing situations in Kulai and Johor Bahru which possessed comparative advantages, due mainly to the fact that both are located on the major transport routes as well as historical and administrative reasons;

(4) As delineated under the TMP, the attempt of creating a series of urban corridors in each region in South Johor is seemingly taking effect only along the Johor Bahru-Kulai and Johor Bahru-Pasir Gudang corridors. Spread effects into Pontian district are almost negligible, judging from its population growth and extent of current housing and other developments in the region;

(5) The current pace of rapid development in Johor Bahru at the regional and national scene should be cautiously reviewed especially if its growth may lead to a situation whereby it was at the expense

of other towns in the region or the state as a whole. In this relation, in order to ensure a more equitable distribution of economic benefits, it warranted concertive efforts on the part of the government for it was felt that market forces alone will not deliver the 'goods', and

(6) It is anticipated that with proposed developments in the Johor Bahru-Pasir Gudang corridor, the latter will develop into an agglomeration of urban areas of the magnitude comparable to that of the Klang valley.

1.4.2 Brief Review Of the State's Regional Development Development Studies

Spatially, the regional development in the state is undertaken within four regions viz. Johor Tenggara, Johor Barat, Johor Timor[6] and Johor Selatan (See Fig. 1.4). Owing to regional imbalances[7] within the state, these regional development study programmes were carried out in the hope that problems of urban congestion, rural depletion and inequitable distribution of resources and opportunities can be alleviated, if not eradicated altogether.

Johor Tenggara regional development scheme, covering approximately 300,000 ha., is aimed at promoting social and economic growth via land development and settlement. In brief, it is essentially the clearing of forests for purposes of agriculture and animal husbandry as well as the

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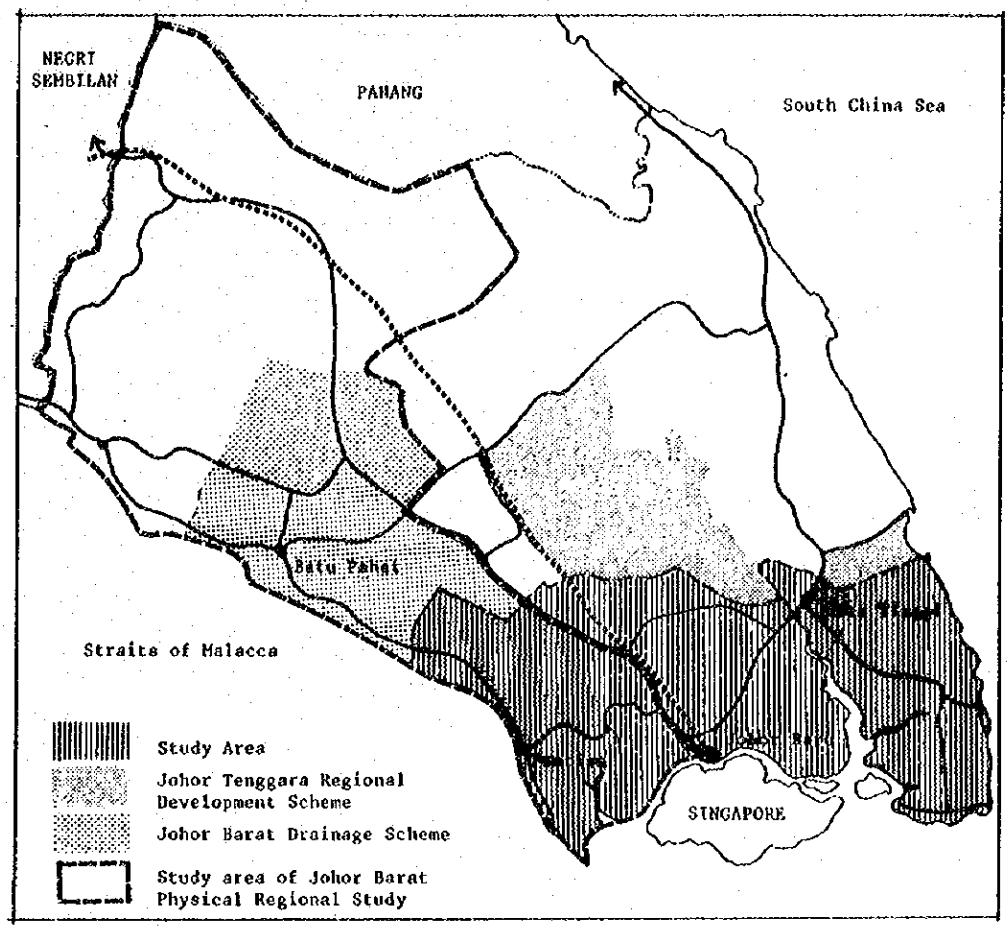
6. Refers to Central, west and east Johor regions.

7. In this relation, South Johor growing the fastest, has every indication of having stronger pull and could posed much detriment to the other regions.

Fig 1.4: Regional Development Schemes in the State of Johor



establishment of 15 growth centres and 2 main towns viz. Bandar Penawar and Bandar Tenggara.

Johor Barat Drainage scheme, covering some 870,000 ha., is basically a comprehensive agricultural development plan, aimed at increasing agricultural productivity via improvements in infrastructural facilities provision particularly in irrigation schemes.

As for Johor Timor Regional Study, it is an on-going study and preliminary findings showed that the region is experiencing net-outmigration due in turn to a number of inter-related factors such as low employment and economic opportunities, relatively low standard of living, and also the pull from other more prosperous regions.

In the South Johor region, the growth of the region is taking place at such rapid pace that it is anticipated that by the year 2000, a total of 1.5 million people will be obtained based on fully implemented committed developments in the region. Its economy is self-perpetuating and so are the increasing private sector involvements. However, to attain the targetted population and employment, there is a need to rely on migrant population.

2.0 THE PAST AND PREVAILING DEMOGRAPHIC STRUCTURE AND CHARACTERISTICS

Prior to 1800 Peninsular Malaysia was sparsely populated. The population which consisted almost entirely of Malays found mainly in the coastal and marine settlements, was probably no more than a quarter million."[1] There were few urban settlements, the most important being Melaka and Georgetown founded in 1403 and 1786 respectively.

Between 1931 and 1947, the population in Peninsular Malaysia increased from 3.8 to 4.9 million, at an average annual increase of only 1.7 per cent. This relatively slow rate of increase was due to the following factors viz:

(1) The economy was adversely affected by the world-wide economic depression thereby causing "a catastrophic fall in the price of rubber, in the production of which nearly one-third of the working population on the whole at that time engaged."[2] The low price of tin together with (1) resulted in widespread unemployment and consequently, considerable emigration of the population, particularly among the Chinese and Indians.

(2) Prior 1930s, the main factor in the population growth in the Peninsular is due to unstable flows of emigration and immigration (the male immigrants being controlled by a quota system which varied from one period to another depending on the socio-economic and political situations). From 1933 - 1938, natural

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1. Dobby, E.H.G., 'Southeast Asia', 1956, p. 128
2. Fisher, C.A., 'The Problem of Malayan Unity in its Geographical setting, 1956, p. 290.

increase became increasingly important, and

(3) The adverse impacts of the Second World War on population growth - deaths mainly attributed to lack of food, malnutrition and war casualties, were exceedingly high.

The 1947 census was considered a crucial point in the demographic history of Peninsular Malaysia. It marked the end of the phase in which the changing population size was mainly due to the net outcome of rather unstable flows of immigration and emigration and the beginning of the period in which substantial population growth was to occur through the excess of births over deaths in an increasingly settled population. "Population growth would no longer be sensitive to changing economic conditions but would instead be in the in-exorable outcome of fertility and mortality trends and the underlying population structure."[3]

2.1 Population Size and Trends

For the past twenty years, the demographic situation in the Peninsula has undergone a major transitional change. The prevailing mortality rates are low (See Fig. 2.1), fertility rates moderate and declining and rates of natural increase tending towards below 2.5 per cent per annum. The natural increase rate has persisted close to 2.5 per cent per annum since 1969 despite great reductions in fertility. This was due to changes in age structure favouring high birth and low death rates as well as declines in mortality.

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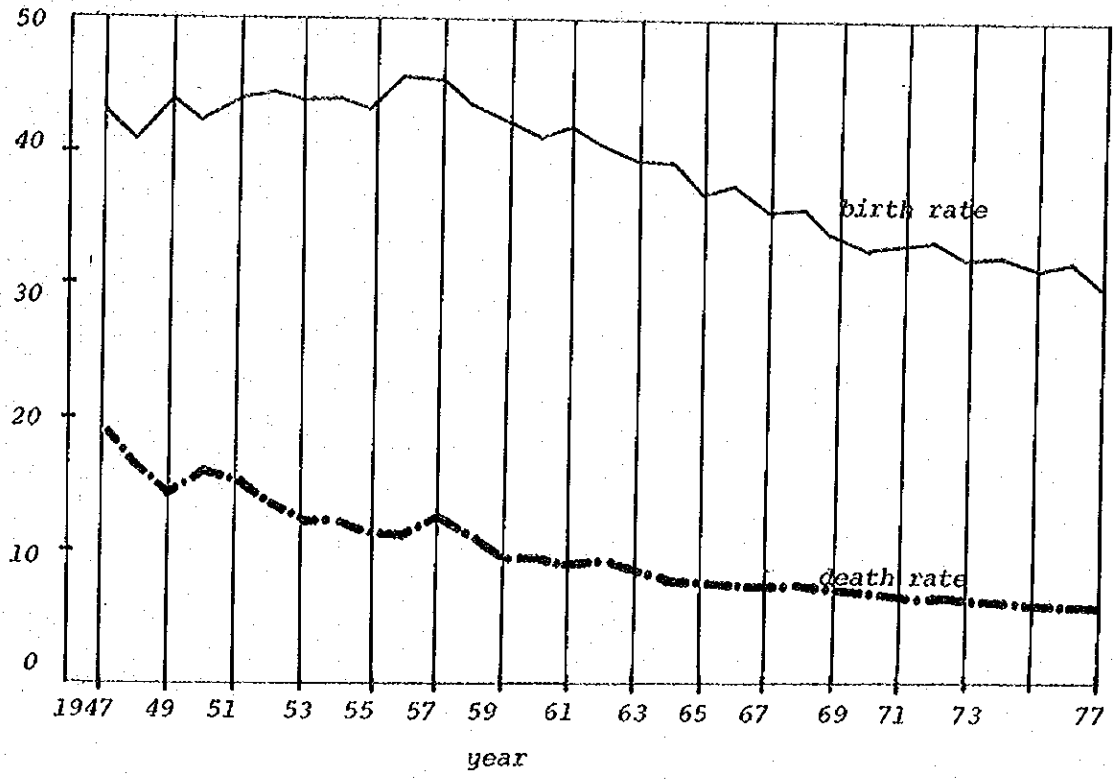
3. Manjit S. Sidhu and Gaving W. Jones, 'Population Dynamics in Plural Society : Peninsular Malaysia, 1981.

Fig 2.1: Trends in Birth and Death Rates (per 1000) in Peninsular Malaysia, 1947-77



In terms of average annual growth rates, the inter-censal population figures from 1947 to 1980 for both Peninsula and Johor State showed the trend towards yearly declining average growth rates. In comparison with that of the Peninsula, the average annual rates in the Johor State have been much slower. (See Table 2.1). In 1970, the population in Peninsular Malaysia was 8,810,000 and 1,277,000[4] in the Johor State. In 1980, the population in the Peninsula grew to a size of 11,138,000 and 1,602,000 in the Johor State.

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4. These census figures do not account for under-enumeration and are more accurate to use if analysis was on inter-censal basis such as between 1970 and 1980. Note also that the 1980 Population figures are from the Preliminary Fieldcount Summary which also do not account for under-enumeration. Accounting for under-enumeration, the population in the Peninsula in 1970 was 9,147,000.

Table 2.1 : Past Population Trends 1947 -1980

	Populations ('000)				Average Annual Growth Rate (%)		
	1947[1]	1957[1]	1970[1]	1980[1]	'47 - '57	'57 - '70	'70 - '80[4]
Peninsular Malaysia	4,908	6,283	8,810	11,138	2.5	2.6	2.4
Johor State	737	927	1,277	1,602	2.3	2.4	2.3
Study Area	n.a.	n.a.	444	620	n.a.	n.a.	3.4
Primary Area	n.a.	n.a.	307	459	n.a.	n.a.	4.1
Secondary Area	n.a.	n.a.	137	161	n.a.	n.a.	1.6
Metropolitan Johor Bahru	n.a.	n.a.	245	378	n.a.	n.a.	4.4
MPJB[3]	n.a.	n.a.	151	247	n.a.	n.a.	5.0

Sources : (1) Department of statistics, 'Population Census 1970'.

(2) Ibid, 'Preliminary Fieldcount Summary of 1980 Population and Housing Census of Malaysia.'

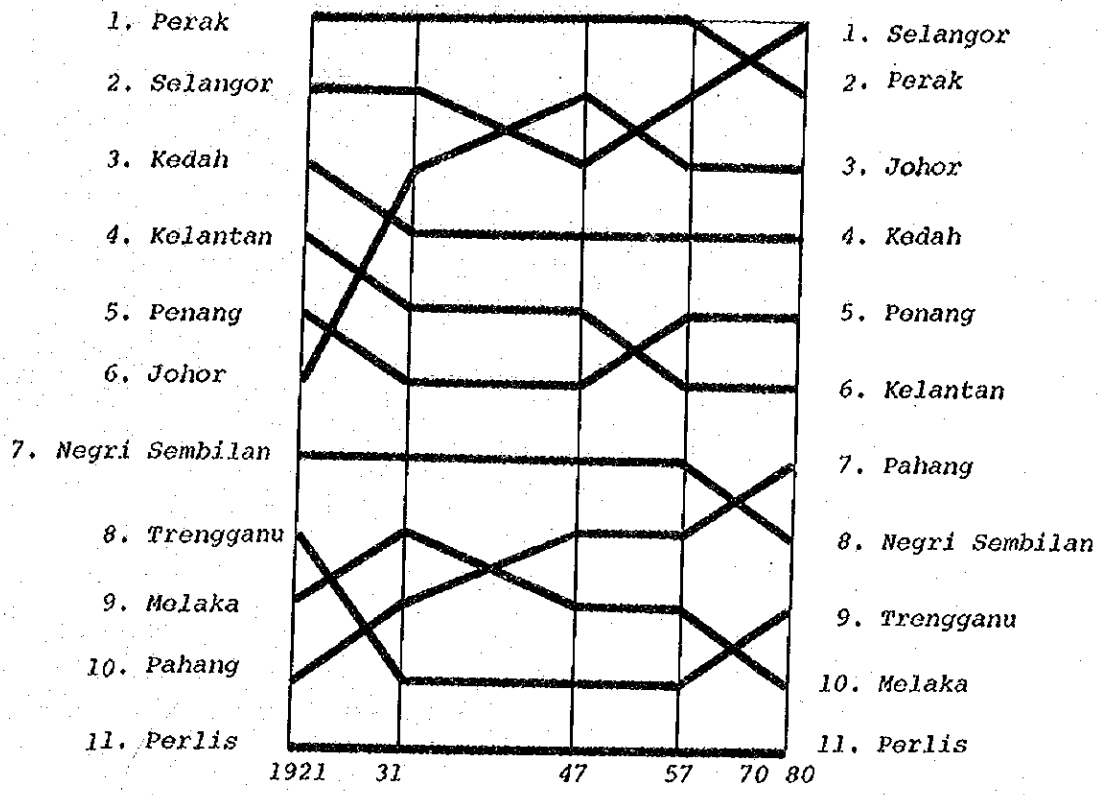
(3) Refers to Majlis Perbandaran Johor Bahru (Johor Bahru Municipality).

(4) By Urban Transport Study Team 1981.

An analysis of the total population size across the states in the Peninsula from 1921 till 1980 in terms of the changing rank order showed that the state of Johor which ranked sixth in 1921 has improved its position to the third largest populated state in 1980 after Selangor and Perak. (See Fig. 2.2).

Selangor's rise to the top rank in terms of population size in 1980 largely reflects the massive in-migration from other states to its conurbation stretching from Kuala Lumpur to Port Klang, which represented the 'heart-land region' of the Peninsula. The rapid rise of Johor's case can be attributed largely to immigration from Indonesia particularly Java and also from China and India uptill the middle of this century.

Fig 2.2: Changing rank order of States in terms of Total Population Size 1921-80



The Study Area[5] had been growing rapidly at an average growth rate of 3.4 per cent per annum between 1970 and 1980. In 1970, it has 35 per cent of the state's population and increased to 45 per cent by 1980. Further analysis by areas showed that the Primary Area not only possessed higher population than the Secondary Area in both censal years of 1970 and 1980 but also experienced very much faster average growth rates per annum during the last decade. (See Table 2.1). Spatially, this can be explained by the fact that the Primary Area encompassing the Metropolitan Johor Bahru (inclusive of MPJB) had

5. For Study Area delimitation, See Sec. 1.2.

experienced rapid urbanisation and high average growth rates per annum whilst the Secondary Area included a large part occupied by agricultural areas that are relatively sparsely populated. (See also Sec. 2.2.3).

2.2. Population Distribution and Density

2.2.1 Peninsular Malaysia

The population distribution in spatial terms in the Peninsula has been an uneven one. Historical, political as well as economic forces are the major reasons for the more densely populated West Coast as compared to the East Coast. Even in terms of urban population, the rapid increase in urbanisation was associated with wide differences in growth rates of individual towns and of towns in different regions, which in turn, are reflected in the changing distribution of large towns in the Peninsula (See Fig. 2.3). Remarkable significance of this pattern lies in the relative stagnation of Georgetown since its predominance in 1921 as compared with Kuala Lumpur, Ipoh and Johor Bahru, emergence of more large 'suburban' towns in the vicinity of large cities and substantial growth in the towns of Johor, the East Coast and interior Pahang.

In terms of population densities, population distribution within the Peninsula was highly asymmetrical with concentration on the West Coast and along the Western foothill zone whilst the East Coast remains sparsely populated, with the exception of centres around the deltas of the Kelantan, Trengganu rivers and the recently emerging conurbation around Kuantan (See Fig. 2.4). There is also emerging conurbation around Johor Bahru at the Southern tip of the Peninsula; its development has been expediated by the separation of Singapore in 1965. The opening of the causeway in 1920s contributed to the increase of inflow of Chinese migrants from Singapore to Johor.

Fig. 2.3: Changing Population Size and Ethnic Dominance in Large Towns (10,000) of Peninsular Malaysia, 1921,1947, and 1970.

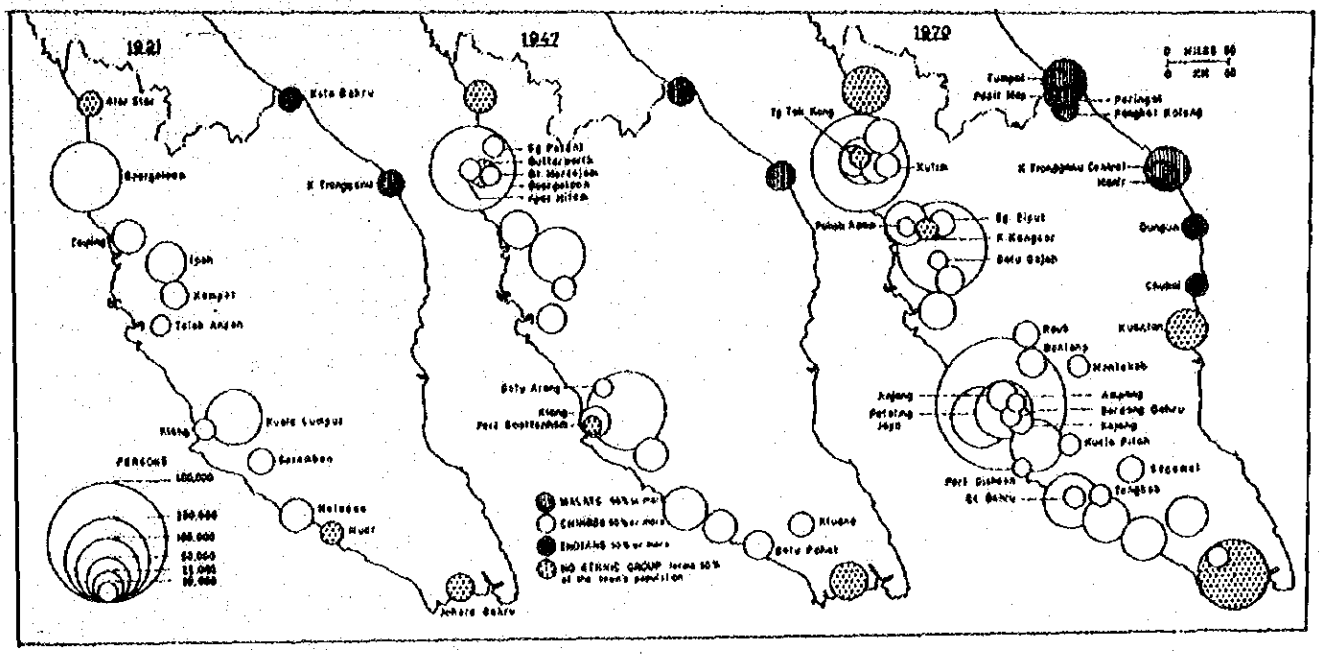
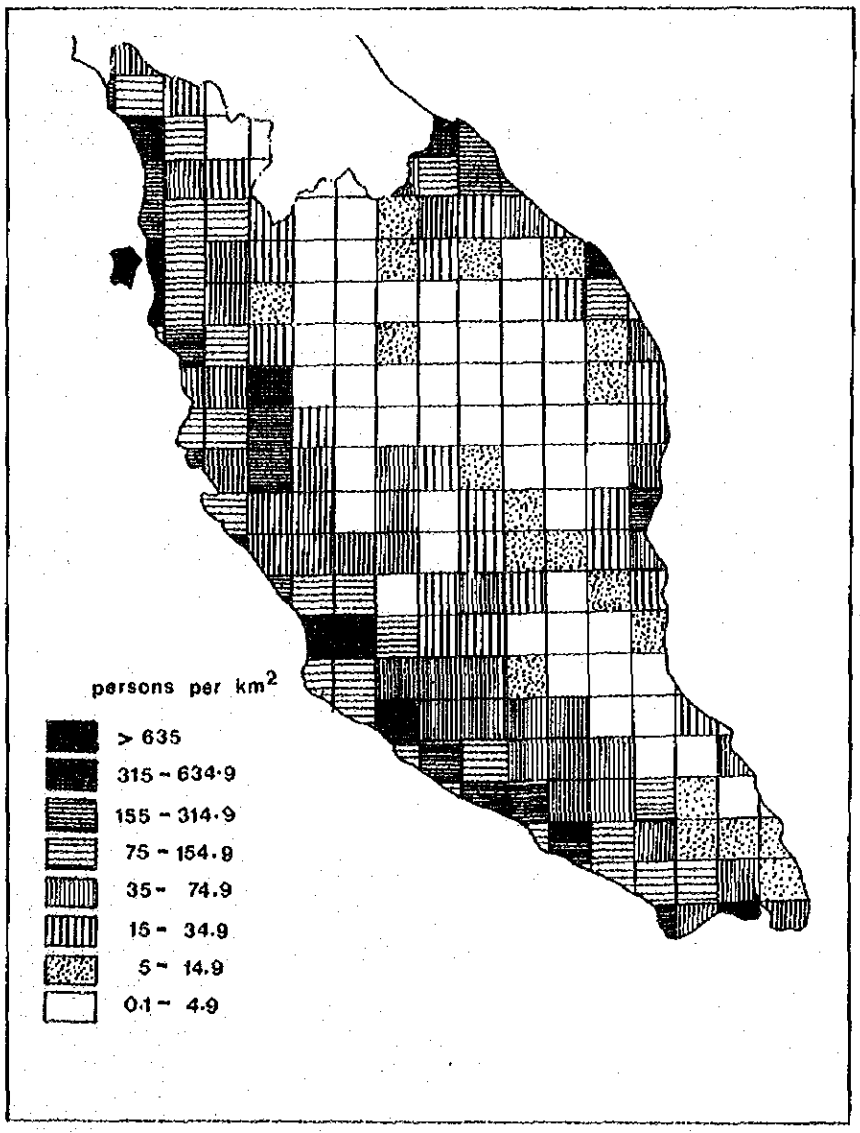


Fig. 2.4: Population Density Per km^2 in Peninsular Malaysia 1970.



2.2.2 Johor State

Even within the State of Johor, the population distribution at district levels has also been asymmetrical. In 1970, the highest population in the State had been in the Muar District and this was followed closely by Johor Bahru district; the district of Mersing and Kota Tinggi were among the lowest populated districts (See Table 2.2). The population range in 1970 was 237,000 and this disparity increased to 375,000 in 1980. By 1980, the district of Johor Bahru has predominated as the most populated district in the State as well as in terms of the average annual growth rates between 1970 and 1980. Not withstanding the fact that the Kota Tinggi district had been growing very fast at an average growth rate of 5.9 per cent per annum in the last decade, its population base in 1970 had been relatively small as compared to other.

Table 2.2 : Population Distribution by Districts in Johor State 1970 -1980

Administrative Districts	Population Size ('000)		Average annual growth rates
	1970[1]	1980[2]	1970 - 1980[3]
Johor Bahru	272	417	4.4
Batu Pahat	250	278	1.1
Kluang	135	185	3.2
Kota Tinggi	62	110	5.9 (low base)
Mersing	35	42	1.8
Muar	279	293	0.5 (high base)
Pontian	118	122	0.3
Segamat	128	154	1.7
Johor State	1,279	1,601	2.3

Sources : (1) Department of Statistics, 'Population Census 1970'.

(2) Ibid, 'Preliminary Fieldcount Summary of 1980 Population and Housng Censis of Malaysia.

(3) By Urban Transport Study Team 1981.

In terms of town size population, only one town viz. Johor Bahru had a population exceeding 100,000 in the Study Area in 1970, all other towns have population less than 65,000. Infact, Johor Bahru classified as the metropolitan Urban[6] with a population size of 135, 936 in 1970 was slightly more than twice the next populous town in the State viz. Muar which has a population of 61,203. Indeed, Johor Bahru was exhibiting a primate city character and at 4.6 per cent, it has exceeded the growth rate of Kuala Lumpur's 3.1 per cent for the same period (See Table 2.3). It was envisaged that at current pace of development, the gap between Johor Bahru and the other towns would widened if the spread of economic development is not properly monitored.

Table 2.3 : Population distribution and growth rates in major towns, Johor State, 1975 - 70

Major Towns	Population ('000)		Average annual growth rate 1957 - 70
	1957	1970	
Johor Bahru	57	135	4.6
Muar	39	64	3.8
Batu Pahat	40	55	2.5
Kluang	31	45	3.0
Segamat	19	19	0

Source : Department of statistics, 'Population Censuses 1957 and 1970'.

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6. According to the Department of statistics classification :-
   (a) Metropolitan Urban for 75,000 and above population.
   (b) Urban Large for 10,000 to 74,999 people.
   (c) Urban small for 1,000 to 9,999 people.
   (c) Rural for 999 or less population.

In spatial terms, population tend to be concentrated along the major transportation routes viz. the railway line and Federal Route One (See Fig. 2.5).

2.2.3 Study Area

As mentioned earlier, there existed disparities in population distribution even within the Study Area in that the population in the Primary Area surpassed that the Secondary Area (See Sec. 2.1). Indeed, even in terms of gross densities, it was higher in the Primary Area as compared to the Secondary Area. Primary Area's gross densities of 1.25 persons per hectare in 1970 and 1.87 persons per hectare in 1980 were very much higher than the figures of 0.62 and 0.72 persons per hectare in the Secondary Area in 1970 and 1980 respectively (See Table 2.4).

Table 2.4 : Population Density in Study Area, 1970 and 1980

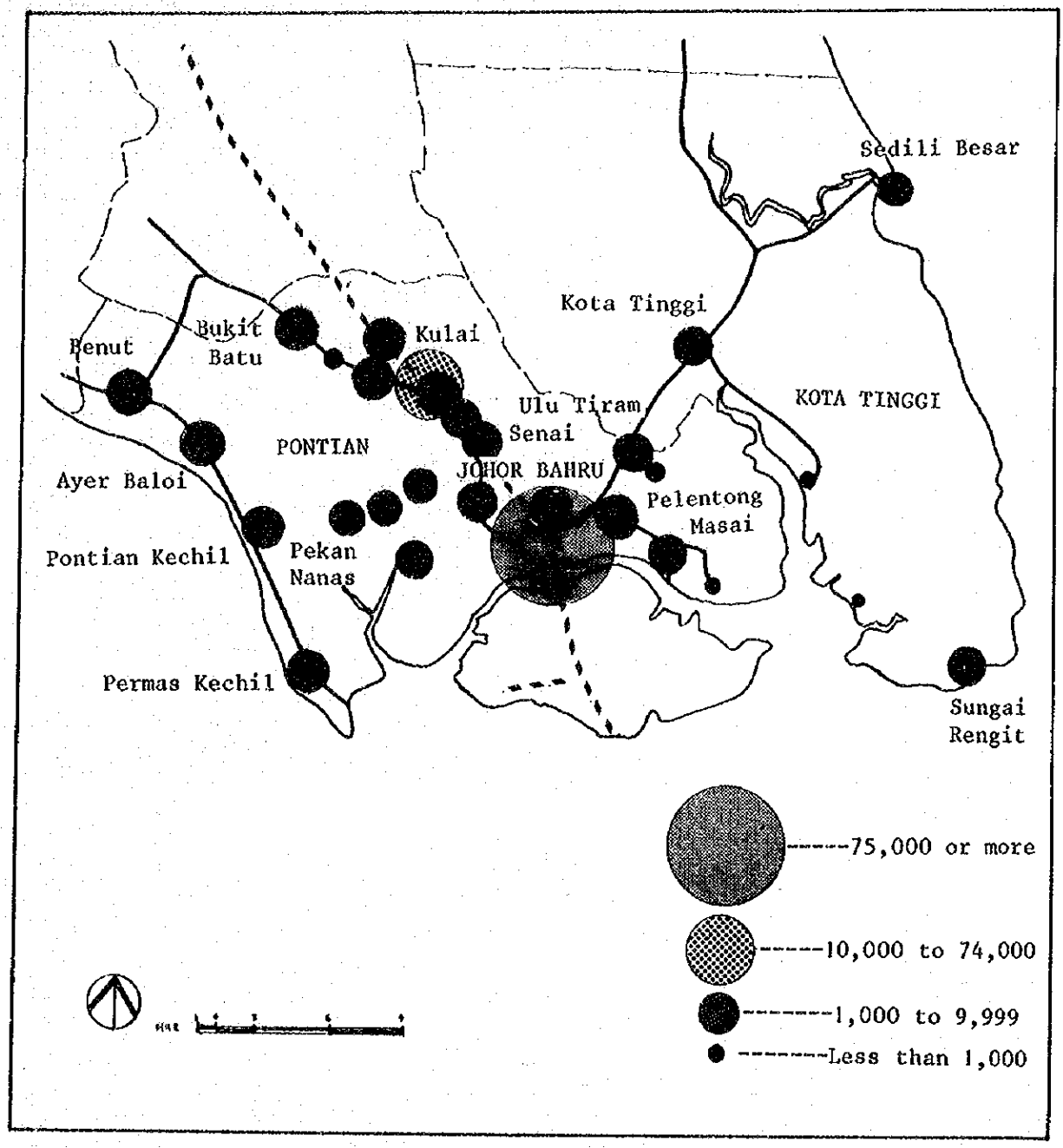
Region	Land Area[1] ha (ac)	Population Size[2] ('000)		Population Density persons/ha (persons/ac)	
		1970	1980	1970	1980
Peninsular Malaysia	13,193,545 (32,601,249)	8,810	11,138	0.67 (0.27)	0.84 (0.34)
Johor State	1,914,435 (4,730,569)	1,277	1,602	0.67 (0.27)	0.84 (0.34)
Study Area	467,660 (1,155,566)	444	620	0.95(0.38)	1.33 (0.54)
Primary Area	245,310 (606,155)	307	459	1.25(0.51)	1.87 (0.76)
Secondary Area	222,350 (549,411)	137	161	0.62(0.25)	0.72 (0.29)
Metropolitan Johor Bahru	112,760 (278,630)	245	378	2.17 (0.88)	3.35 (1.36)
MPJB	11,940 (29,504)[3]	151	247	12.65 (5.12)	20.69 (8.37)

Sources : (1) I.F.T. Wong, 'Present Landuse of Peninsular Malaysia, 1974.

(2) Department of statistics, 'Population Census 1970 and Preliminary Fieldcount Summary of 1980'Population and Housing Census'.

(3) Refers to new MPJB boundary, the land area of MPJB has increase from 6,734 ha to 11,940 ha (or 26 to 46 Sq. miles).

Fig. 2.5 : Population Distribution in the Study Area, 1970.



Source: Department of Statistics, "Basic Population Tables, Johor" Vol 1, 1970.

There existed not only uneven population distribution by town sizes but also by Mukims. There was a marked concentration of population in 1970 and 1980 in Mukims of Johor Bahru, Senai - Kulai, Rimba Terjun, Pontian, Kota Tinggi, Plentong, Sedenak, Benut and Tebrau (See Table 2.5).

Table 2.5 : Population Distribution By Mukims, Study Area 1970 and 1980

	DISTRICT	MUKIM	1970[1]		1980[2]		AVERAGE ANNUAL GROWTH % 1970 - 80
Primary Area	JOHOR BAHRU	MPJB	150,800	275,531	247,000	417,434[4]	5.1
		Jelutong/ Pulai	19,835		23,691		1.8
		Plentong	22,148		37,705		5.5
		Sedenak	18,059		22,608		2.3
		Senai/Kulai	36,332		52,115		3.7
		Sg. Tiram	8,275		9,066		0.6
		Tg. Kupang	4,472		4,727		0.6
		Tebrau	15,610		17,642		1.2
	KOTA TINGGI	Kota Tinggi	23,211	50,621	30,776	80,517	2.9
		Ulu Sg. Johor	8,425		10,696		2.4
		Sub-Total	307,167		458,906		4.1
Secondary Area	KOTA TINGGI	Johor Lama	4,351		7,332		5.4
		Pantai Timur	5,124		5,386		0.5
		Pengerang	7,190		6,648		-0.8
		Sedili Kechil	399		502		2.3
		Tg. Surat	1,971		19,177		25.5
	PONTIAN	Api-api	12,341	117,729	12,280	121,643	-0.1
		Air Baloi	11,980		11,620		-0.3
		Air Masin	5,154		5,171		0.03
		Benut	16,048		15,721		-0.2
		Jeram Batu	12,775		15,385		1.6
		Pengkalan Raja	377				
		Pontian	15,997		25,516		4.8
		Rimba Terjun	24,915		19,770		-2.3
		Serkat	7,630		7,102		-0.7
		Sg. Karang	2,952		2,006		-3.8
		Sg. Pinggan	7,560		7,076		-0.7
		Sub-Total	136,764		160,688		1.6
Total Study Area			443,931		619,594		3.4
Metropolitan[3] Johor Bahru			244,725		378,153		4.4

Sources :
1. Department of statictis, 'Population Census 1970'. (adjusted for new administrative boundaries).
2. Ibid, 'Preliminary Fieldcount Summary of Housing and Population Census 1980'.
3. Includes Mukims of Senai-Kulai, Tebrau, Pulai, Johor Bahru and Plentong.
4. Population breakdown by Mukims do not add up to this figure because according to Department of Statistics, approximately 2,880 people in MPJB are Navy Personnel from Woodlands, Singapore.

2.3 Age, Sex and Ethnic Composition

The profile and characteristics of the population structure in terms of sex, age and ethnicity in a large way, determine the crude birth and death rates which in turn affect the rate of natural increase. Analysis should focus therefore on the extent of the highly susceptible age and sex groups and the proportion in which they made up the the entire population. Age, sex analysis in relation to natural increase and educational needs can be examined from four major age groups viz. future-to-be mothers (females aged 5 - 14 years), potentially high-fetility mothers (female aged 20 - 39 years)[7]s the high mortality population (aged less than 5 and more than 55 years) and potentially education receipients (aged 7 - 17 years)[8]

From 1947 to 1957, the potential mothers in the highest fertility age groups as a proportion of the total population in the Peninsula decreased from 13.1 to 12.7 per cent but increased slightly to 12.9 per cent in 1970 (See Table 2.6). Therefore, between 1957 - 70, this implied an increase in birth rates if the fertility rates that remained unchanged. Besides, the potential population having high-mortality risks (ie. the very young and very old) dropped from 20.2 to 23.1 per cent between 1947 - 70, thereby lowering the crude death rates. Notwithstanding these age structure trends which tended towards

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7. The childbearing age groups are actually found in the age range of 15 - 49 years but in Malaysia, especially in more recent years, the large majority of births (88 per cent in 1976) are produced by mothers aged 20 - 39 years.

8. This age group range 7 - 17 refers to an education starting from Primary Standard One to Form Five which are the basic education which the potential population in recent times should receive.

Table 2.6 : Proportion of Peninsular Malaysia Population in Key Age - Sex Groups (%)

Year	Future-to-be mothers (Females 5 - 14)	Potentially High-Fertility Mothers (Females 20 - 39)	High mortality population			Potentially Education receipients (Population aged 7 - 17 years)
			Children aged 5 years	Population aged 55 years	Total	
Peninsular Malaysia						
1947	14.1	13.1	13.0	7.2	20.2	--
1957	13.1	12.7	18.7	7.1	25.8	-
1970	14.3	12.9	15.6	7.5	23.1	29.9
1980[1]	15.1	12.1	14.4	7.9	22.3	-
1990[1]	16.3	11.5	13.2	8.1	21.3	-
Johor State						
1970	15.3	12.4	16.3	7.1	23.4	28.9

Sources : (1) Projected by Departement of statistics (1974). Projection D.
Note that as these projections tend to understate the decline in fertility which has actually occured, therefore, this implied that the proportion of the population in the younger age groups are overstated.

favouring higher rates of natural increase, there was actually a decline in rates of natural increase from over 3 per cent to 2.5 per cent. There are of course, other determinants influencing fertility levels and patterns such as the changing marital status[9] of the population as well as impacts of higher literacy levels and family planning programs. Improvements in medical sciences and the level and extent of health facilities do affect the mortality rates and in turn, the rate of natural increase.

At the state level, there were comparatively slightly lower proportion of potential mothers in the highest fertility age-group but slightly higher proportion of the population potentially exposed to death risk in Johor State relative to the Peninsula in 1970. In the same year, there was a very slight edge in the proportion of potential population requiring education in the Peninsula of 29.9 per cent over that of the Johor State's 29.8 per cent.

The age structure profile in the Study Area in 1970 resembled that of the Johor State and the Peninsula, in that, firstly almost half the population were under 15 years and secondly, there was a slightly greater proportion of males over females (See Tables 2.7 and 2.8).

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9. Refers to both the age at which people marry and the extent to which their marriages broke up by divorce or widowhood whilst the wives are still at their reproductive ages.

Table 2.7 : Age Composition in Study Area 1970

Age Group	Study Area No.	%	MPJB No.	%	Johor State No.	%	Peninsular Malaysia No.	%
0 - 14	199,420	44.9	59,110	39.2	602,740	47.2	3,929,260	44.6
15 - 44	185,420	41.8	73,890	49.0	504,420	39.5	3,612,100	41.0
45 - 64	44,945	10.1	14,330	9.5	131,530	10.3	995,530	11.3
65+	14,145	3.2	3,470	2.3	38,310	3.0	273,110	3.1
Total	443,930	100	150,800	100	1,277,000	100	8,810,000	100

Table 2.8 : Sex Composition in Study Area 1970

Sex.	Study Area No.	%	Johor State No.	%	Peninsular Malaysia No.	%
Male	225,280	50.7	641,000	50.2	4,458,000	50.6
Female	218,650	49.3	636,000	49.8	4,352,000	49.6
Total	443,930	100.0	1,277,000	100.0	8,810,000	100.0

Ethnic distribution in the Peninsula over the years have been tied to the history of colonialisation and urbanization, of the extraction of natural resources, notably tin-mining and of the cultivation of cash crops such as rubber, etc. Analysis across the States showed that by 1970, the Chinese ethnic groups formed the majority in the two states of Selangor and Penang whilst other states like Perlis, Kelantan, Trengganu and Kedah are predominantly Malay populated. (See Table 2.9). Indeed, this uneven ethnic distribution had implicithy called for the ultimate need for population re-distribution in the Peninsula - as echoed in the Third and Fourth Malaysia Development Plans. The ultimate goal as outlined in the NEP is to achieve an ethnically more balanced population distribution as well as in employment. Ethnic imbalance in the State of Johor in 1970 was not so acute as compared to other states.

There were higher proportions of Chinese and Malay but relatively less of Indians as compared to the Peninsula.

Table 2.9 : Population by Ethnic Groups in Peninsular Malaysia 1911 - 76

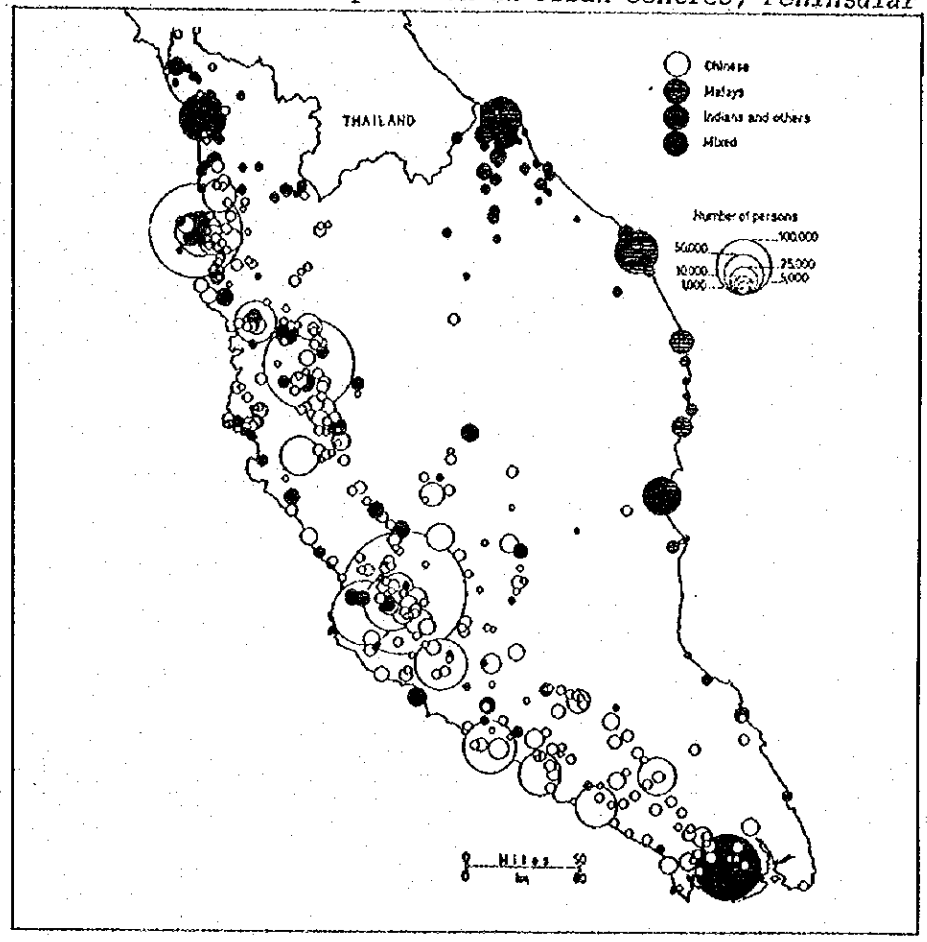
Year / State	Community	In Percent 1911	1911	1921	1947	1957	1970
Peninsula	Malays	57.3	54.0	49.2	49.3	49.8	53.2
	Chinese	29.0	29.4	33.9	38.4	37.2	35.4
	Indians	10.0	15.1	15.1	10.8	11.3	10.6
	All Races	100.0	100.0	100.0	100.0	100.0	100.0
Johore	Malays	60.9	55.9	46.4	43.8	48.0	53.4
	Chinese	35.1	34.5	41.4	48.1	42.4	39.4
	Indians	3.1	8.5	10.1	7.5	7.7	6.7
Kedah	Malays	79.5	70.0	66.6	68.0	67.7	70.0
	Chinese	13.7	17.5	18.2	20.9	20.5	19.3
	Indians	2.4	9.7	11.8	9.3	9.7	8.4
Negeri Sembilan	Malays	53.5	43.4	37.3	41.3	41.5	45.4
	Chinese	31.3	36.5	39.5	42.7	41.2	38.1
	Indians	14.0	18.8	21.4	14.2	15.1	16.1
Pahang	Malays	73.3	69.7	54.2	57.2	61.2	
	Chinese	20.4	23.2	29.0	38.9	34.6	31.2
	Indians	5.5	5.9	8.2	5.9	7.0	7.3
Penang	Malays	41.1	36.3	32.7	30.5	28.8	30.7
	Chinese	40.2	44.5	49.8	55.4	57.2	56.1
	Indians	16.7	17.5	16.1	12.8	12.2	11.5
Perak	Malays	40.2	39.1	35.7	37.8	39.7	43.1
	Chinese	43.9	36.8	42.3	46.6	44.2	42.5
	Indians	14.8	21.7	20.7	14.7	14.9	14.2
Perlis	Malays	90.0	85.2	80.9	78.3	78.4	79.4
	Chinese	4.9	9.0	13.2	16.7	17.4	16.2
	Indians	0.3	2.0	1.9	2.4	1.8	2.0
Selangor	Malays	22.0	22.9	23.1	26.4	28.8	34.6
	Chinese	51.3	42.6	45.3	51.0	48.2	46.3
	Indians	25.1	33.0	29.2	20.4	20.1	18.1
Trengganu	Malays	97.0	94.6	91.5	92.0	92.1	93.9
	Chinese	2.7	4.7	7.4	7.0	6.6	5.4
	Indians	0.04	0.1	0.7	0.8	1.1	0.6

Note : Percentages for Malays, Chinese and Indians normally do not add to 100 because the total population included a small group of 'other races'.

Source : Census Reports 1911 - 1970.

In 1970, the Chinese still dominated 68.4 per cent of the 411 towns in the Peninsula whereas Malay dominance was 21 per cent of the urban centres, an increase from the original 16.4 per cent in 1957. Malay dominance were prevalent in several centres particularly in the states of Kelantan and Trengganu. (See Fig. 2.6). The percentage of 'mixed towns'[10] had declined marginally from 10.2 per cent in 1957 to 10 per cent in 1970.

Fig. 2.6 : Ethnic Composition in Urban Centres, Peninsular Malaysia 1970



The shading indicates the predominant racial element (50 per cent or more) The mixed symbol is used where no community exceeds 50 per cent of the total.

10. Refers to towns where none of the three ethnic groups formed more than 50 per cent of the town's population.

Ethnic composition in the Study Area in 1970 did not differ very much from that of the Johor State in having predominantly Malay population over other the Chinese and Indians (See Table 2.10).

Table 2.10 : Ethnic Composition in the Study Area 1970

Ethnicity	Study Area No.	%	MPJB No.	%	Johor State No.	%	Peninsular Malaysia No.	%
Malay	226,479	51.0	76,150	50.5	682,525	53.4	4,685,838	53.2
Chinese	174,170	39.2	57,760	38.3	502,978	39.4	3,122,350	35.4
Indian	38,627	8.7	13,570	9.0	85,262	6.7	932,629	10.6
Other	4,657	1.1	3,320	2.2	6,235	0.5	69,183	0.8
Total	443,390	100	150,800	100	1,277,000	100	8,810,000	100

2.4 Household Struture

Between 1970 - 80, the average household size in the Peninsula has declined from 5.5 in 1970 to 5.2 in 1980. The trend for the average number of households per living quarter has dropped very marginally and may be considered relatively stable in all the States. (See Table 2.11). The average household sizes in the State of Johor were among the highest, declining from 5.9 to 5.5 in 1970 and 1980 respectively. Apart from Kelantan, all States showed declining average household size and number of households per living quarter and these could be attributed to changing family structure viz. from extended to more nuclear-type families, declining fertility rates, higher literacy levels and promotion of family planning programs.

Table 2.11 : Household Structure in Study Area and Peninsular Malaysia, 1970 and 1980

	1970[1]		1980[2]	
	Average Household Size	No. of Households per LQ	Average Households Size	No. of Households per LQ
Peninsular Malaysia	5.5	1.00	5.2	0.97
Johor	5.9	1.00	5.5	0.95
Kedah	5.2	0.95	5.0	0.93
Kelantan	4.7	0.97	4.9	0.97
Melaka	5.9	1.00	5.5	0.95
Negeri Sembilan	5.6	0.95	5.2	0.86
Pahang	5.1	0.97	5.1	0.93
Penang	5.8	1.11	5.6	1.04
Perak	5.6	0.97	5.3	0.97
Perlis	4.8	0.97	4.5	0.97
Selangor[3]	5.8	1.04	5.1	1.03
Trengganu	4.7	0.94	5.0	0.92
MPJB	5.7	1.15	5.0	1.25
Study Area	5.8	1.10	5.3	1.05

Sources : (1) Department of statistics, 'Population and Housing Census 1970'.

(2) Ibid, 'Preliminary Fieldcount Summary of 1980 Population and Housing Census'.

(3) Includes Federal Territory.

Comparatively, MPJB and the Study Area have had average household sizes larger than that in the Peninsula in 1970 but in 1980, MPJB's household size was lower than that in Peninsular Malaysia. The average number of households residing in a living quarter in either the Study Area or MPJB were always higher than that in the Peninsula.

2.5 Population Mobility

2.5.1 Immigration to Peninsular Malaysia

At the very outset, the birthplace data do provide useful information for identifying major migration streams into the Peninsula. Uptill 1947,

immigration was the major component in the population growth of Peninsular Malaysia but thereafter, this decreased appreciably (See Table 2.12).

Table 2.12 : Percentage of Total Population born in Peninsular Malaysia 1921 - 70

Ethnicity	1921	1931	1947	1957	1970
Malay	87.6	90.6	96.0	97.4	
Chinese	20.3	29.1	62.5	74.4	83.4
Indian	12.1	21.4	51.6	64.7	81.7
Total	56.4	58.9	78.3	84.2	91.1

Source : Department of statistics,'Census reports 1921, 1931, 1947, 1957 and 1970'.

Indeed, given such a trend, future emigration from 1980s onwards, if there are,will only be negligible and the Peninsula is envisaged to reach some degree of stability in terms of net-migration pattern; the population growth in the Peninsula in future years will be predominantly due to natural increase.

2.5.2 Inter-State Migration

Related largely to the rapid process of modernization, the proportion of inter-state life time migrants to the total Peninsula population had increased from 4.7 to 10.9 percent from 1947 to 1970 respectively[11]. There were several major migratory streams of interstate lifetime migrants. In particular, Selangor in 1970 received the most net-migrants from other states and this was followed by Pahang; each receiving 200,000 and 65,000 respectively, (See Table 2.13). In the case of Johor State, there

11. Source : Hirschman C. and H. Singh, 'Urbanisation and Net Migration to Urban and Rural areas, Peninsular Malaysia,' 1975.

was infact a net-outflow of 5,000 migrants.

Table 2.13 : Net-Interstate Migration Pattern, 1970 ('000)

	Inmigrants	Outmigrants	Net Gain/Loss
Johor	82	87	- 5
Kedah	79	104	- 25
Kelantan	20	67	- 47
Melaka	48	88	- 40
Negeri Sembilan	75	97	- 22
Pahang	107	41	+ 66
Penang	91	111	- 20
Perak	106	220	-114
Perlis	16	13	+ 3
Selangor	294	94	+200
Trengganu	37	31	+ 6

Note : Figures have been rounded to nearest thousand

Source : Department of statistics, 'Population Census 1970'.

With the exception of Selangor, Pahang, Trengganu and Perlis, all other states experienced net-loss through inter-state migration. The locational advantages coupled with its rapid economic and industrial development and agglomeration of economies concentrated within the Klang Valley, the centralization of Federal Government functions within Kuala Lumpur - all played a role towards attracting the bulk of the migrants. In Pahang, massive land development for agricultural and rural urbanisation (such as Pahang Tenggara and other FELDA schemes) are the contributory factors towards drawing in-migrants to the State.

2.5.3 Intra-State Migration

Generally between 1957 - 70, the share of out-migration from the Johor State to other states have been relatively small as compared to intra-state migration.[12] There were as many as 127,184 inter-district migrants and 135,499 intra-district migrants in the State of Johor for the year 1970. Inter-district migration in Johor made up approximately 10 per cent of the State's population in the same year. For intra-district migration, there was as much 11 per cent of the total population in the State.

2.5.4 Study Area Migration

Given the rate of natural increase of 2.4 per cent between 1970 -80, the extent of net-migration in the Study Area was estimated to be 56,900 in 1980. This constituted approximately 8 per cent of the total Study Area's population. This share of migration in the Study Area was comparatively smaller as compared to intra-state migration given that the extent of the latter do not vary significantly by 1980.

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12. This includes both inter-district as well as intra-district movements.

FUTURE PROJECTIONS

3.0 DEMOGRAPHIC PROJECTIONS

The following are the basic assumptions used for projecting the likely trends of the population in the future, thereby deriving estimates for Peninsular Malaysia, the State of Johor and the Study Area[1].

(a) Population growth rates over the years 1957 - 80 have been declining and envisaged to continue to decline as a result of greater impact of declining fertility and birth rates over declining mortality rates - largely the results of family planning programs and higher literacy levels.

(b) The future population estimates and characteristics are to concur with the Fourth Malaysia Plan projections; and

(c) Past social and economic conditions influencing the trends in population for the period 1957 - 70 are unlikely to recur. In particular, population growth in the Study Area during the period 1957 - 70 had been influenced by the free association with Singapore and by the presence of the British armed forces and indeed, such conditions will not exist in future but rather other over-riding factors viz. future development projects like the Johor Tenggara Land Settlement Project and the Drainage Scheme and industrial development at Pasir Gudang, the many upcoming housing development schemes and other projects will influence the future population in the Study Area.

The overall methodology of the demographic projections is as depicted in Fig. 3.1 (See also Appendix 3.1). The population of the Peninsula will act as control total over the population in the State

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1. Forecasting the population in the Study Area is from two approaches viz. basing on the likely demographic trends by which the population will grow and also from the economic perspective ie. the capacity of the future employment to sustain the increase of workforce, in turn determining the optimum population size.

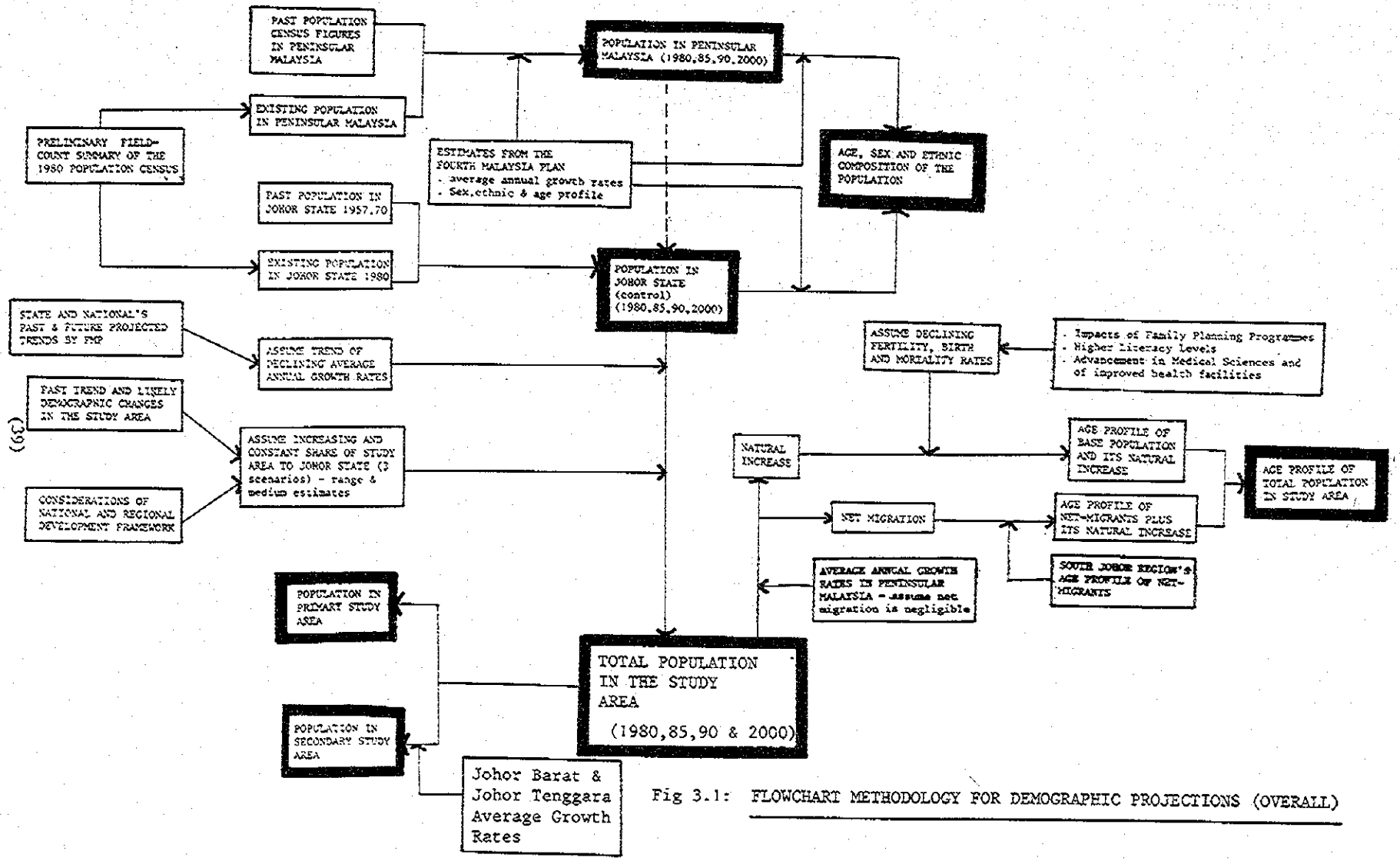

Fig 3.1: FLOWCHART METHODOLOGY FOR DEMOGRAPHIC PROJECTIONS (OVERALL)

of Johor. Future trends of the population for the Peninsula, State of Johor and the Study Area are as shown in Fig. 3.2.

3.1. Peninsular Malaysia

Demographic projections in Peninsular Malaysia are largely carried out within the framework as laid out in the Fourth Malaysia Plan[2]. Such reasoning is mainly attributed to :-

(a) the expressed need to ensure that our projected demographic figures would also be able to accomodate the realisation of national goals and objectives, particularly with regard to the New Economic Policy; and

(b) secondly, the estimates in the FMP and in this study would not differ very much, basing in part on (a) as well as the extent of reliability of the FMP figures.

Slight adjustments were made to the FMP estimates as the latter had envisaged a faster growth in population than what is actually occuring[3] in 1980 as shown in the recently released Preliminary Fieldcount Summary of the 1980 Population and Housing Census by the Department of statistics.

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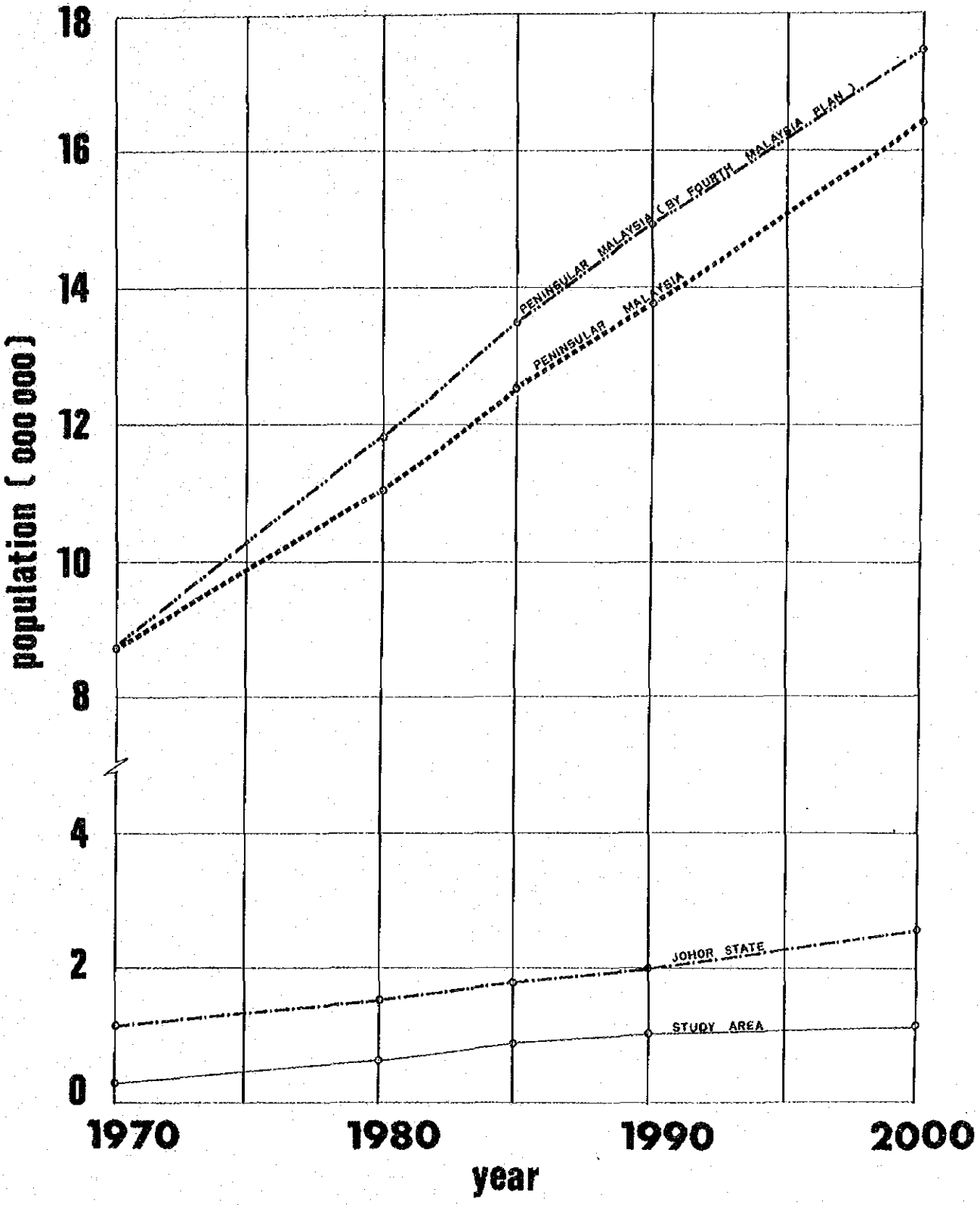
2. In this regard, future population profile by sex, age and community/ethnic proportional composition in this study should reflect that as projected in the FMP.

3. Using the Preliminary Fieldcount Summary of the 1980 Population Census, the average growth rate for 1970 - 80 was 2.4 per cent per annum and is actually lower than what was estimated by in the FMP of 2.6 per cent per annum.

Fig. 3.2. : **PROJECTED POPULATION, PENINSULAR MALAYSIA, JOHOR STATE AND THE STUDY AREA, 1970-2000**



SOURCE : PROJECTED BY URBAN TRANSPORT STUDY TEAM

3.1.1 Future Population Size and Age Structure

Basing on declining growth rates and considerations of the nation's growing economy in the past and the future, the population in the Peninsula is predicted to grow from a base population of 11 million in 1980 to about 12.5 million in 1985, 13.9 million in 1990 and finally reaching a total population size of approximately 16.5 million by the year 2000. (See Table 3.1). In terms of average growth rates, they are envisaged to decline from 2.4 per cent per annum in 1970 - 85 to 2.1 per cent in 1985 - 90 and finally tapering off at 1.7 per cent from 1990 - 2000.

In terms of age composition, over the years those in the 0 - 14 age group will decline whereas the 15 - 64 age group population are expected to increase substantially. The proportion of population in the 0 - 14 age group will decline from 38.6 per cent in 1980 to 35.6 per cent in 1990 and finally to 30.5 per cent by the year 2000 (See Table 3.1). On the other hand, the proportion of population will increase from 57.5 per cent in 1980 to 60.3 per cent in 1990 and reaching 65 per cent in the year 2000. This implied greater employment needs and requirements for educational facilites, social amenities, services, housing, etc.

3.1.2 Sex and Ethnic Composition

Generally, the proportion of the Malay will increase from 53.9 to 54.7 per cent during the period 1980 - 90 (See Table 3.2). By the year 2000, the Malay population will reach 56.9 per cent of the total population in that year. The proportion of the Chinese population will decline from 34.9 in 1980 to 33.1 per cent by the year 2000. The proportion of Indian population decline marginally from 10.5 per cent in 1980 to 9.5 per cent in 2000.

Table 3.1 ; PENINSULAR MALAYSIA - PROJECTED POPULATION SIZE AND AGE COMPOSITION, 1970-2000

AGE GROUP	1970[1] ('000)	%	1980[2] ('000)	%	1980[3] ('000)	%	1985[2] ('000)	%	1985[3] ('000)	%	1990[2] ('000)	%	1990[3] ('000)	%	2000[2] ('000)	%	2000[3] ('000)	%	AVERAGE ANNUAL GROWTH RATES (%) 1970-80[5]	1980-85	1985-90	1990-2000[2]
0-14	3,926	44.6	4,578	38.6	4,299	38.6	5,005	37.5	4703	37.5	5278	35.6	4953	35.6	5337	30.5	5023	30.5	1.0	1.8	1.0	0.1
15-64	4,604	52.3	6,811	57.5	6,404	57.5	7,812	58.5	7336	58.5	8934	60.3	8390	60.3	11374	65.0	10704	65.0	3.4	2.8	2.7	2.5
65+	280	3.1	460	3.9	435	3.9	540	4.0	501	4.0	608	4.1	570	4.1	786	4.5	741	4.5	4.5	2.9	2.6	2.7
TOTAL	8,810	100	11,849	100	11,138[4]	100	13,357	100	12540	100	14820	100	13,913	100	17497	100	16468	100	2.4[6]	2.4[7]	2.1[7]	1.7[7]

1. Based on Population Census 1970
2. Based on Projection by Fourth Malaysia Plan 1981 - 85
3. Adjusted Projections by Team
4. Based on Preliminary Fieldcount Summary of the 1980 Population and Housing Census of Malaysia
5. Based on 1970[1], 1980[3] and 4
6. In the absence of the 1980 Population Census figures, the Fourth Malaysia Plan gave an average growth rate of 2.6% p.a.
7. Based on the average growth rates of the Fourth Malaysia Plan

Table 3.2: Peninsular Malaysia - Population Projections by ethnicity and sex, 1970-2000

Ethnicity/ Sex	1970[1]		1980[2]		1985[2]		1990[2]		2000[2]		AVERAGE ANNUAL GROWTH RATE		
	('000)	(%)	('000)	(%)	('000)	(%)	('000)	(%)	('000)	(%)	1970 - 1980 (%)	1980 - 1990 (%)	1990 - 2000 (%)
MALAY													
Male	2,313	49.8	3,001	50.0	3,437	50.1	3,820	50.2	4712	50.3	2.6	2.4	2.1
Female	2,332	50.2	3,002	50.0	3,424	49.9	3,790	49.8	4656	49.7	2.5	2.3	2.1
	4,645	100.0	6,003	100.0	6,861	100.0	7,610	100.0	9368	100.0	2.6	2.4	2.1
CHINESE													
Male	1,599	50.7	1,955	50.3	2,161	50.2	2,421	50.0	2715	49.8	2.0	2.1	1.2
Female	1,544	49.3	1,932	49.7	2,144	49.8	2,421	50.0	2736	50.2	2.2	2.2	1.2
	3,153	100.0	3,887	100.0	4,305	100.0	4,822	100.0	5451	100.0	2.1	2.1	1.2
INDIANS													
Male	505	53.6	612	52.3	672	52.0	724	51.8	803	51.4	1.9	1.7	1.0
Female	437	46.4	558	47.7	620	48.0	674	48.2	760	48.6	2.4	1.9	1.2
	942	100.0	1,170	100.0	1,292	100.0	1,398	100.0	1,563	100.0	2.2	1.8	1.1
OTHER													
Male	37	52.5	40	51.8	42	51.6	43	51.3	43	49.9	0.8	0.7	0.1
Female	33	47.5	38	48.2	40	48.4	40	48.7	43	50.1	1.4	0.5	0.7
	70	100.0	78	100.0	82	100.0	83	100.0	86	100.0	1.1	0.6	0.4
TOTAL													
Male	4,458	50.6	5,614	50.4	6312	50.3	7008	50.3	8273,	50.3	2.3	2.2	1.7
Female	4,352	49.4	5,524	49.6	6228	49.7	6925	49.7	8195	49.7	2.4	2.2	1.7
	8,810	100.0	11,138	100.0	12,540	100.0	13,913	100.0	16468	100.0	2.4	2.3	1.7

1. Based on Population and Housing Census, 1970
2. Based on EPU's projections for the Fourth Malaysia Plan 1981-85 but adjusted accordingly by Team

On the whole, there still exist a slightly higher proportion of males over females but over the years, the latter's proportion had increased to some extent whilst the proportion of males decrease accordingly. For the Chinese distribution, initially the males slightly outnumbered the females but by the year 2000, this is reversed.

3.2 Johor State

3.2.1 Future Population size and Age Structure

Population forecasting for the state was made similar to that carried out for Peninsular Malaysia. Again, the average annual growth rate for 1970 - 80 was computed based on the Preliminary Fieldcount Summary of the 1980 Population Census and the growth rate so computed is actually lower than the figure in the FMP.

Basing on the average growth rate of 2.3 per cent for the period 1970 - 80, the state was growing at a slower pace than in the Peninsula. Nevertheless, basing on FMP estimates and the fact that the state is receiving a substantial amount of public funds under the FMP for its development as well as its present expanding economic situation, the growth rate is expected to increase particularly from the period 1980 - 85.

Taking 2.5 and 2.0 per cent per annum growth rates for the period between 1980 - 85 and 1985 - 90 respectively, the population in the state is expected to grow from 1.6 million in 1980 to 1.8 million by 1985 and reaching approximately 2 million by 1990. The state population is predicted to reach approximately 2.4 million in the year 2000 at an average annual growth of 1.7 per cent (See Table 3.3).

Table 3.3: PROJECTED POPULATION SIZE AND AGE STRUCTURE FOR JOHOR STATE (1970 - 2000)

AGE GROUP	1970[1]		1980[2]		1980[3]		1985[4]		1990[4]		2000		AVERAGE ANNUAL GROWTH RATES			
	('000)	%	('000)	%	('000)	%	('000)	%	('000)	%	('000)	%	1970-80	1980-85	1985-90	1990-2000
0 - 14	602	47.1	709	41.9	671	41.9	723	39.9	779	38.9	801	33.8	1.1	1.5	1.5	0.3
15 - 64	637	49.9	927	54.8	878	54.8	1028	56.7	1153	57.6	1477	62.3	3.3	3.2	2.3	2.5
65 +	38	3.0	55	3.3	53	3.3	62	3.4	70	3.5	92	3.9	3.4	3.2	2.5	2.8
TOTAL	1,277	100.0	1691	100.0	1602	100.0	1813	100.0	2002	100.0	2370	100.0	2.3[5]	2.5[6]	2.0[6]	1.7[6]

1. Source : Dept. of Stats, ' Age Distributions : 1970 Population and Housing Census of Malaysia,' pp. 153

2. Source : Dept. of Stats, ' Population Projections, Malaysia 1970 - 1980,' 1974, pp. 25

3. Adjusted Figures based on Preliminary Field Count Summary of 1980 Population and Housing Census of Malaysia.

4. Projected by the Team.

5. Computed based on 1970 Population Census and the Preliminary Fieldcount Summary of the 1980 Population Census figures.

6. Based on the average growth rates of the Fourth Malaysia Plan.

Similar to the Peninsula's trend, the proportion of population in the 0 - 14 age group will decline whilst those in the 15 - 64 age group will increase.

3.2.2 Sex and Ethnic Composition

Future population composition in the state by ethnicity shows a similar trend towards increasing proportion of the Malay population at approximately 3 per cent for the two decades beginning from 1980; for the Chinese, they will decrease at about the same proportion as in the Peninsula (See Table 3.4).

There is again a predominance of the male over the female population. For the Chinese population, there are slightly more females than males.

3.3 The Study Area

3.3.1 General Projection Methodology

The methodology used for estimating the future population in the Study Area is based on two basic approaches ie. firstly, to determine future population based on changing demography over the years (trend method) and secondly, to determine the population size sustainable by future employment opportunities in the Study Area (economic based method). In brief, this is as summarised in Fig. 3.3.

Table 3.4: JOHOR STATE POPULATION PROJECTIONS BY ETHNICITY AND SEX 1970-2000

Ethnicity/Sex	1970[1]		1980[2]		1985		1990		2000		AVERAGE ANNUAL GROWTH RATE		
	('000)	(%)	('000)	(%)	('000)	(%)	('000)	(%)	('000)	(%)	1970-1980 (%)	1980-1990 (%)	1990-2000 (%)
MALAY													
Male	337	49.5	433	50.0	494	50.1	555	50.2	679	50.3	2.5	2.5	2.0
Female	344	50.5	433	50.0	493	49.9	551	49.8	671	49.7	2.3	2.4	2.0
	681	100.0	866	100.0	987	100.0	1106	100.0	1350	100.0	2.4	2.5	2.0
CHINESE													
Male	255	50.6	313	50.3	352	50.2	382	50.0	438	49.8	2.1	2.0	1.4
Female	249	49.4	309	49.7	350	49.8	383	50.0	441	50.2	2.2	2.2	1.4
	504	100.0	622	100.0	702	100.0	765	100.0	879	100.0	2.1	2.1	1.4
INDIAN													
Male	46	53.5	56	52.3	61	52.0	64	51.8	69	51.6	2.0	1.3	0.8
Female	40	46.5	51	47.7	56	48.0	60	48.2	65	48.4	2.4	1.6	0.8
	86	100.0	107	100.0	117	100.0	124	100.0	134	100.0	2.2	1.5	0.8
OTHER													
Male	3	50.0	4	51.8	4	51.6	4	51.3	3	49.1	2.9	-	-
Female	3	50.0	3	48.2	3	48.4	3	48.7	4	50.9	-	-	2.9
	6	100.0	7	100.0	7	100.0	7	100.0	7	100.0	1.1	0.6	0.5
TOTAL													
Male	641	50.2	807	50.4	911	50.3	1005	50.2	1189	50.2	2.3	2.22	1.7
Female	636	49.8	795	49.6	902	49.7	997	49.8	1181	49.8	2.3	2.29	1.7
	1277	100.0	1602	100.0	1813	100.0	2002	100.0	2370	100.0	2.3	2.26	1.7

1. Based on Population and Housing Census 1970

2. Adjusted Figures based on the Preliminary Fieldcount Summary of the 1980 Population and Housing Census of Malaysia.

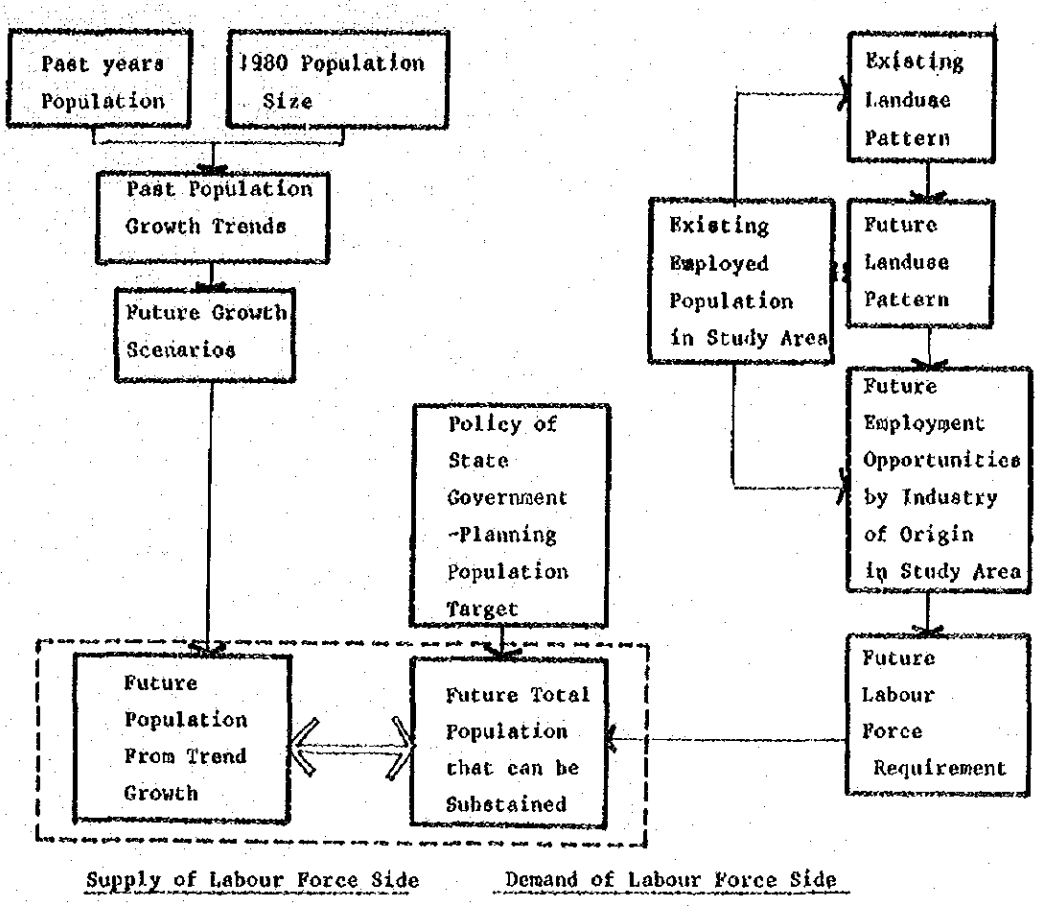


Fig. 3.3 : Schematic Flowchart for Estimating Future Population in the Study Area.

3.3.2 Share of Study Area Population to Johor State

The population in the Study Area had been growing at a very rapid pace in the last two decades and in 1970, it constituted 34.7 per cent of the State's Population and this has increased substantially to a share of 38.7 per cent in 1980. Basing on this trend, the future population in the Study Area can be determined based on the criteria of Maximum-Minimum range and a medium estimate (See Fig. 3.4).

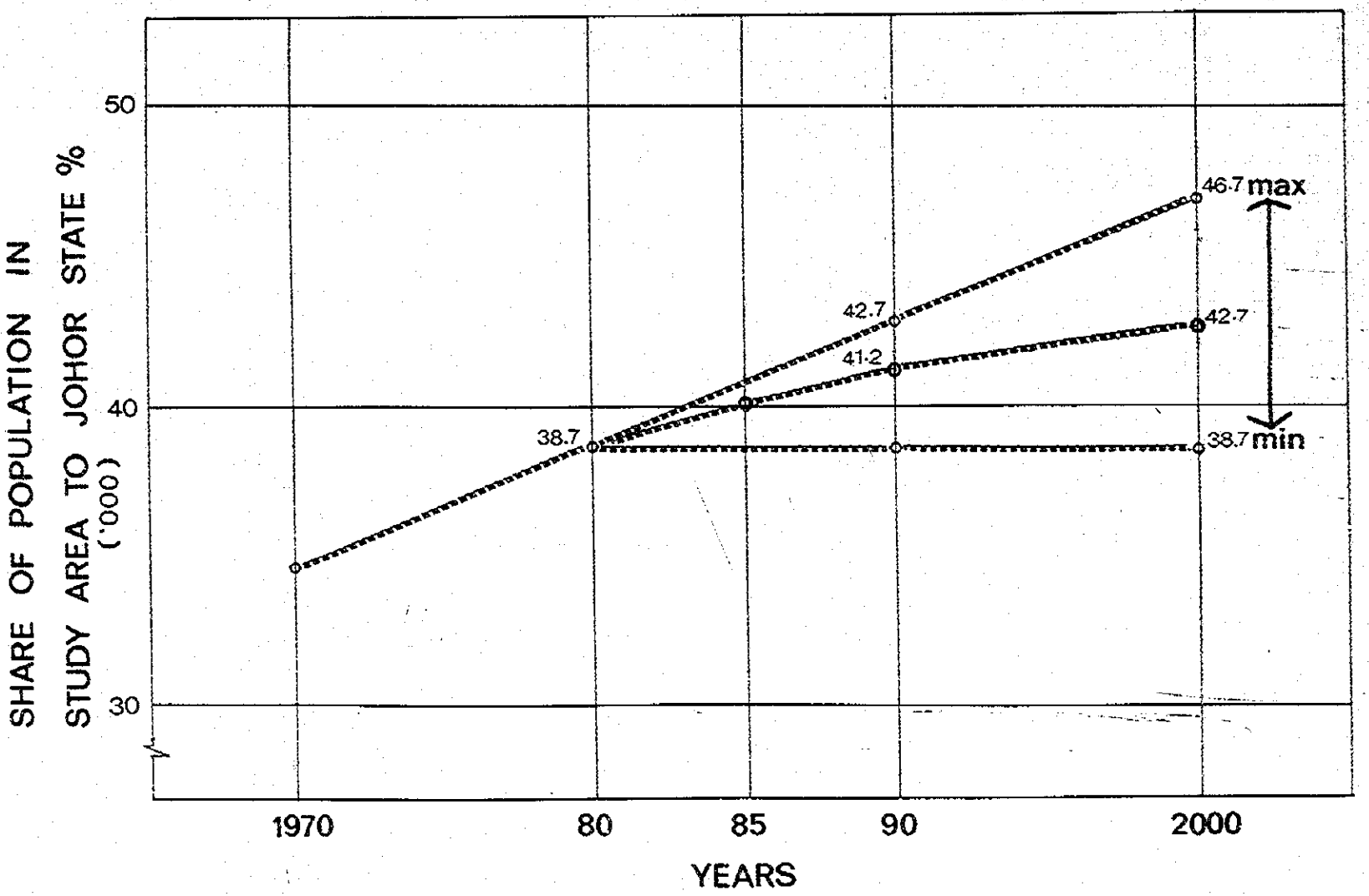


Fig. 3.4 : POPULATION FORECASTS FOR THE STUDY AREA BASING ON THE SHARE OF ITS POPULATION TO THAT OF THE JOHOR STATE (THREE SCENARIOS) 1970-2000.

The maximum population estimate in the Study Area is assumed given the continuing trend of present annual growth rate between 1970 and 1980. This scenario represents the case where net in-migration will reach a high peak due to the developments of approved housing schemes, particularly in the Primary Area. The minimum estimate is taken based on constant 1980 share of the Study Area's to that of the Johor State. Essentially, this assumption implied that the Study Area is at its equilibrium, only gaining population growth through the factor of births and deaths ie. by its natural increase. The medium estimate envisage some degree of net in-migration due to increased economic development in the Study Area.

With the determination of percentage share of the total population in the Study Area to the State, the future population size in the Study Area can be established. In this relation, the population ranges from 774,200 - 1106,800 by the year 2000. (See Table 3.5).

Table 3.5 : Population Estimates in the Study Area, 1970 - 2000

	1970[1]	1980[2]	1985	1990	2000	Av. Annual Growth Rate % '70-'80	'80-'85	'85-'90	'90-2000	Estimates
Population Size in '000			737.9 (40.7)	854.9 (42.7)	1,106.8 (46.7)		3.6	3.0	2.6	Maximum
	443.9 (34.7)	619.6 (38.7)	729.0 (40.2)	825.0 (41.2)	1,012.0 (42.7)	3.4	3.3	2.5	2.1	Medium
(Per Cent share of population in Study Area to Johor State)			701.6 (38.7)	774.8 (38.7)	917.2 (38.7)		2.5	2.0	1.7	Minimum

Source : (1) Department of Statistics, 'Population Census 1970'.
(2) Ibid, 'Preliminary Fieldcount Summary of 1980 Population Census'.

3.3.3 Share of Primary and Secondary Area Population to the Study Area

In 1970, the Primary Area constituted approximately 69 per cent of the total population in the Study Area whilst, the Secondary Area made up the rest of 31 per cent. In 1980, the share of the Primary Area has increased to 74 per cent and the Secondary Area, 26 per cent of the State's population. Evidently, the Primary Area, is rapidly increasing its share of the Study Area whereas for the Secondary, its share was decreasing. This trend is expected to continue at least for another two decades in view of the rapid pace of development in the Primary Area which will outpass that in the Secondary Area. However, the changing share of the Primary and Secondary Areas will continue at a gradual pace as committed agricultural and drainage projects in the latter will ameliorate the gap of population share. Based on this criteria, the future proportional share of the Primary and Secondary Areas can be determined by a maximum-minimum range and a medium estimate (See Fig. 3.5).

In this respect, the share of the population in the Primary Area to the total Study Area population is expected to increase from 74.0 per cent in 1980 to a maximum of 80 per cent and a minimum of 74.4 per cent of the Study Area's share in 2000. The share of the population in the Secondary Area is envisaged to decline accordingly. (See Table 3.6).

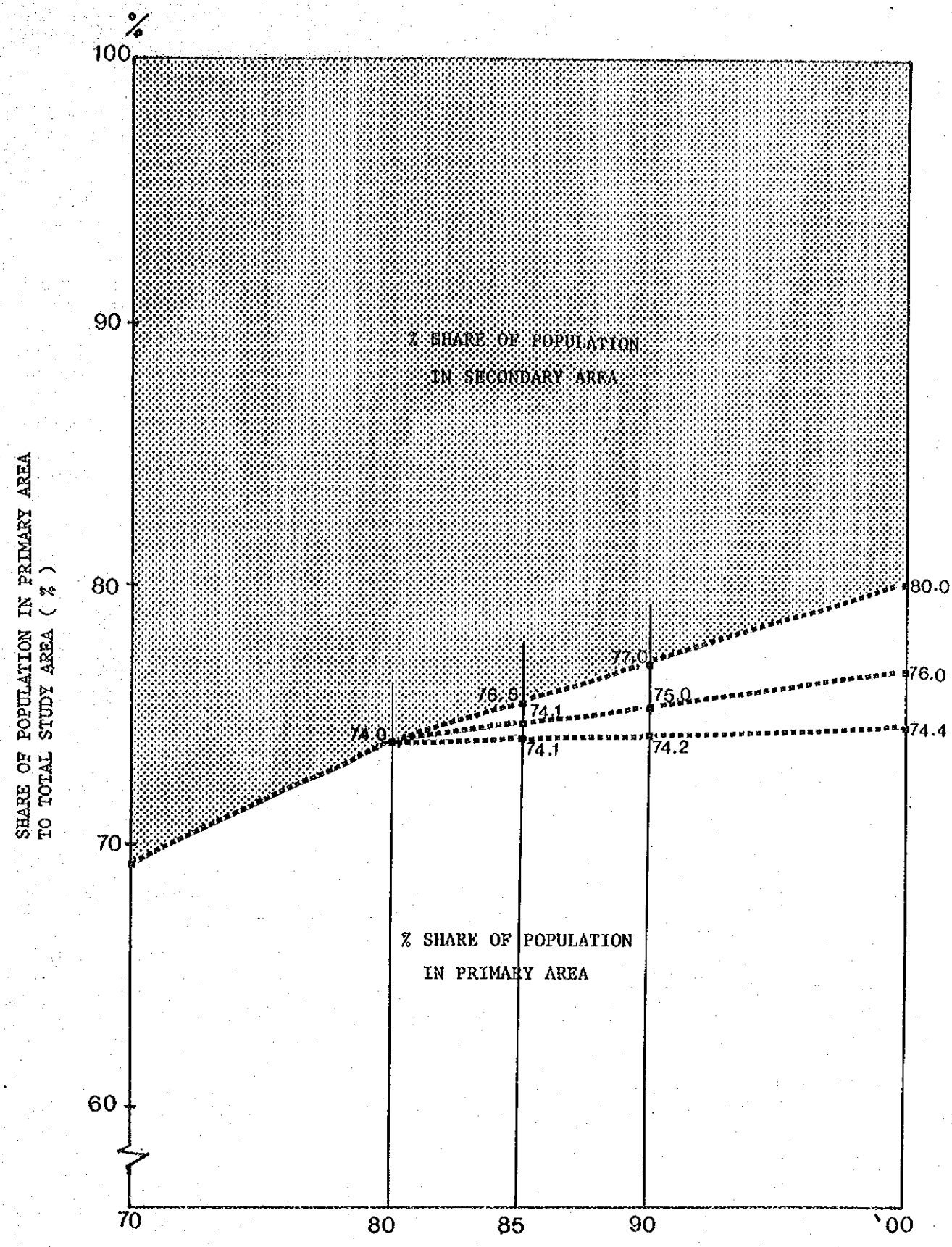


Fig. 3.5 : PROJECTED SHARE OF POPULATION IN THE PRIMARY AND SECONDARY AREAS TO TOTAL STUDY AREA 1970-2000

Table 3.6 : Share of Primary and Secondary to total population in Study Area (%)

Areas	Estimates	1970	1980	1985	1990	2000
Primary	Maximum increase	69.2	74.0	75.5	77.0	80.0
	Medium			74.5	75.0	76.0
	Minimum increase			74.1	74.2	74.4
Secondary	Maximum decrease	30.8	26.0	24.5	23.0	20.0
	Medium			25.5	25.0	24.0
	Minimum decrease			25.9	25.8	25.6

Source : Urban Transport Study Team Estimates 1981.

The Study Area population breakdown into Primary and Secondary Areas are as shown in Table 3.7. The population sizes in 2000 for the Primary and Secondary Areas are 682,397 - 885,440 and 483,440 - 283,341 respectively (See Table 3.8).

Table 3.7 : POPULATION FORECASTS IN STUDY AREA BY PRIMARY AND SECONDARY AREAS, 1985 - 2000

	1985			1990		2000	
ESTIMATES	TOTAL STUDY AREA POPULATION	BREAKDOWN		BREAKDOWN		BREAKDOWN	
MAXIMUM	737,900	PRIMARY	(%)	PRIMARY	(%)	PRIMARY	(%)
		557,115	75.5	658,273	77.0	885,440	80.0
		549,736	74.5	641,175	75.0	841,168	76.0
		546,784	74.1	634,336	74.2	823,459	74.4
		SECONDARY	(%)	SECONDARY	(%)	SECONDARY	(%)
		180,785	24.5	196,627	77.0	221,360	20.0
		188,164	25.5	213,725	23.0	265,632	24.0
		191,116	25.9	220,564	25.8	283,341	25.6
MEDIUM	729,000	PRIMARY	(%)	PRIMARY	(%)	PRIMARY	(%)
		550,395	75.5	635,250	77.0	809,600	80.0
		543,105	74.5	618,750	75.5	769,120	76.0
		540,189	74.1	612,150	74.2	752,928	74.4
		SECONDARY	(%)	SECONDARY	(%)	SECONDARY	(%)
		178,605	24.5	189,750	23.0	202,400	20.0
		185,895	25.5	206,250	25.0	242,880	24.0
		188,811	25.9	212,850	25.8	259,072	25.6
MINIMUM	701,600	PRIMARY	(%)	PRIMARY	(%)	PRIMARY	(%)
		529,708	75.5	596,506	77.0	733,760	80.0
		522,692	74.5	581,100	75.0	697,072	76.0
		519,886	74.1	574,902	74.2	682,397	25.6
		SECONDARY	(%)	SECONDARY	(%)	SECONDARY	(%)
		171,892	24.5	178,204	23.0	183,440	20.0
		178,908	25.5	193,700	25.0	220,128	24.0
		181,714	25.9	199,898	25.8	234,803	25.6

Source : Projected by the Study Team, 1981

Table 3.8: Maximum and Minimum Population estimates of Primary and Secondary Areas 1985-2000

Areas	Estimates	1985	1990	2000
Primary	Maximum	557,115	658,273	885,440
	Minimum	519,886	574,902	682,397
Secondary	Maximum	191,116	220,564	283,341
	Minimum	171,892	178,204	183,440

Source: Urban Transport Study Team Estimates, 1981.

The Medium estimates of population projections are based on anticipation of some degree of in-migration to the Study Area as well as the fact that the Primary Area will have a much larger share of the population, concentrated in particular within Johor Bahru district (see Table 3.9). It is also assumed that Johor Barat and Johor Tenggara projects in the Secondary Area will take-off, thereby increasing the average growth rate from 1.6 percent from 1970-80 to 3.0 percent in 1980-85[4]. The growth of the Primary Area is largely focussed in areas like Pasir Gudang New Town and industrial developments and large scale residential developments

4. Such future growth rates are based on Johor Barat and Johor Tenggara Studies.

Table 3.9 : Population Forecasts, Study Area (Medium Estimates) 1970-2000

Areas	1970[1]	1980[2]	1985[4]	1990[4]	2000[4]	Average Annual Growth %			
						1970[3] -80	1980 -85	1985 -90	1990 -2000
Primary (% share to total)	307167 (69.2)	458902 (74.0)	543135 (74.5)	618750 (75.0)	769120 (76.0)	4.1	3.4	2.6	2.2
Secondary (% share to total)	136764 (30.8)	160688 (26.0)	185905 (25.5)	206250 (25.0)	242880 (24.0)	1.6[5]	3.0[5]	2.1[5]	1.7
Total Study Area	443931 (100.0)	619590 (100.0)	729040 (100.0)	825000 (100.0)	1012000 (100.0)	3.4	3.3	2.5	2.0
Metropolitan Johor Bahru (% share to total)	241123 (54.3)	425305 (66.0)	522443 (68.0)	617507 (69.7)	798207 (71.1)	5.8	4.2	3.4	2.6

Sources:
1. Based on the 1970 Population Census figures.
2. From Preliminary Fieldcount Summary of the 1980 Population Census figures.
3. Computed based on 1970 and 1980 Population Census figures.
4. Projected by the Study Team, 1981.
5. Based on the average growth rates of the Johor Barat and Johor Tenggara Studies.

3.3.4 Population by Natural Increase and Net Migration

The extent of migration in absolute terms can be approximately assessed by firstly, forecasting the population by natural increase in the Study Area and then subtracting it from the projected total population in the Study Area[5] (see Appendix 3.2).

Depending on the estimates adopted, the natural increase in the Study Area is computed to be approximately 56,900 in 1980 and decreasing to range 4,000 to 40,300 in 1985 and from 16,200 to 36,200 in 1990 and from 35,500 to 94,900 in the year 2000 (see Table 3.10). The minimum assumption also showed a net-outmigration of 3,600 people from the Study Area in 1990 and attaining stability with negligible net-migration in the year 2000.

5. For instance, the net-migration between 1970 and 1980 can be determined by basing it on the difference between the total population census figures in the Study Area in 1980 and the population size in 1980 due to natural increase; the latter being obtained by applying natural average growth rates for the period between 1970-1980 to the population in 1970.

Table 3.10 : PROJECTED NATURAL INCREASE AND NET-MIGRATION, STUDY AREA 1970 - 2000

	1970[1]	GROWTH RATE % 1970-80	1980	GROWTH RATE % 1980-85	1985	GROWTH RATE % 1985-90	1990	GROWTH RATE % 1990-2000	2000
NATURAL[3] INCREASE	443.9	2.4	562.7	2.4	697.6	2.1	818.7[A)] 808.8[B)] 778.4[C)]	1.7	1011.9[A)] 976.5[B)] 917.2[C)]
NET-MIGRATION (AND ITS NATURAL INCREASE)			+56.9		+40.3[A)] +31.4[B)] + 4.0[C)]		+36.2[A)] +16.2[B)] -3.6[C)]		+94.9[A)] 35.5[B)] 0[C)]
TOTAL POPULATION	443.9		619.6[2]		737.9[A)] 729[B)] 701.6[C)]		854.9[A)] 825[B)] 774.8[C)]		1106.8[A)] 1012[B)] 917.2[C)]

Note: + net in-migration
- net out-migration

A) High estimates
B) Medium estimates
C) Low estimates

Sources : 1. Department of Statistics, 'Population Census 1970'.

2. Ibid, 'Preliminary Fieldcount Summary of the 1980 Population Census'.

3. Average growth rates are based on that of Peninsular Malaysia ie. assuming that net-migration in the latter is negligible.

3.3.5 Population Profile by Age Composition

Three different scenarios based on different population estimates in the Study Area were used as the basis for generating the future population profile by age composition. The total population by age composition is determined by summing up the profiles of the base population and plus its natural increase and that of the net-migrants (see Table 3.11).

The characteristics age composition of the net-migrants is determined basing on the net-migrant profile of the South Johor Region. It was found that a greater proportion of the age distribution of the net-migrants tend to be concentrated around the economically-active population (15-64 age group) than other age-groups.

Table 3.11 : AGE PROFILE OF POPULATION IN STUDY AREA 1980 - 2000

SCENARIO 1 ASSUMPTION (MAXIMUM ESTIMATES)

MAX. EST. Scenario 1	BASE POPULATION AND NATURAL INCREASE			NET-MIGRANT			TOTAL POPULATION		
	1980	1990	2000	1980	1990	2000	1980	1990	2000
0-14	226,768	304,968	322,559	22,756	13,358	30,178	249,524 (40.3)	318,326 (37.2)	352,737 (31.9)
15-64	318,488	487,051	652,872	32,427	21,720	61,685	350,915 (56.6)	508,771 (59.5)	714,557 (64.5)
65+	17,444	26,681	36,469	1,707	1,122	3,037	19,151 (3.1)	27,803 (3.3)	39,506 (3.6)
TOTAL	562,700	818,700	1,011,900	+56,890	+36,200	+94,900	619,590	854,900	1,106,800
MIN. EST. Scenario 3									
0-14	226,768	282,159	286,242	22,756	-1,328	-	249,524 (40.3)	280,831 (36.2)	286,242 (31.2)
15-64	318,488	470,873	597,902	32,427	-2,160	-	350,915 (56.6)	468,713 (60.5)	597,902 (65.2)
65+	17,444	25,368	33,056	1,707	-112	-	19,151 (3.1)	25,256 (3.2)	33,056 (3.6)
TOTAL	562,700	778,400	917,200	+56,890	-3,600	0	619,590	774,800	917,200

Note : + = net in-migration into Study Area

- = net out-migration from Study Area

Source :- Study Team Estimates, 1981

4.0 FUTURE POPULATION SIZES AND DISTRIBUTION

4.1 An Overview

The population growth estimated by the Study Team for the years 1990 and 2000 are as summarised in Table 4.1. Note that Johor Bahru district is anticipated to grow from a base population of 417,434 in 1980 to as high as approximately 811,000-850,000 in the year 2000. Comparing these estimates with other past and on-going studies, the estimates by different Study Teams do not differ very much from each other. The entire Study Area is expected to have a population of 753,000-879,000 in 1990 and 865,000-1,168,000 in the year 2000.

Table 4.1 : ALTERNATIVE POPULATION ESTIMATES, STUDY AREA 1980 - 2000 (IN '000)

District	1980	THE LIKELY POPULATION		TARGET POPULATION
		1990	2000	2000
Johor Bahru	417	593 - 620 [498[2]] [622[3]] [636[4]]	811 - 850 [812[2]] [847[3]] [821[4]]	1,000[5]
Parts of Kota Tinggi	42	38 - 65	35 - 74	74
Primary Area	459	575 - 658	682 -885	1,074
Secondary Area	161	178 - 221	183 - 283	280
Total Study Area	620	753 - 879	865 - 1,168	1,354

Note : Estimates, other than specified are by Urban Transport Study Team
Population figures rounded to nearest thousands

Sources : (1) Department of statistics, 'preliminary Fieldcount Summary of 1980 Population Census'.
(2) Johor Bahru Sewerage and Drainage Study.
(3) Unit Pelan Struktur Study - based on employment
(4) Ibid - based on demography.
(5) Determined by the Technical committee of the Unit Pelan Struktur Study.

However, as similarly acknowledged in the Unit Pelan Struktur Study, the population estimates based on existing, under construction and approved developments in the Johor Bahru district alone totalled approximately 984,600 (See Table 4.2 and Fig. 4.1). The detail housing commitments are as shown in Tables 4.3 and 4.4. Indeed, this figure due to committed developments has far exceeded even the maximum estimate of the likely population, which is 850,000 in the year 2000. It was in due regard for this, that the population target of 1 million is to be planned for the district of Johor Bahru. Therefore, taking the maximum likely population estimates[2], the whole Study Area can be targetted at a population size of approximately 1.36 million by the year 2000.

Table 4.2: Existing and Committed Developments in Johor Bahru District (in '000)

	MPJB	Johor Bahru/P.G Corridor[2]	Johor Bahru/ Kulai Corridor	Total
Existing	247.0	25.5	54.6	327.1
Under-construction	149.4	225.0	137.2	511.6
Approved	26.2	29.6	90.1	145.6
Sub-total	422.6	280.1	281.9	984.3
Pending Approval	31.4	415.0	66.2	512.6
Grand Total	454.0	695.1	348.1	1,496.9

Note: (1) Refers to Majlis Perbandaran Johor Bahru.

(2) Stretch of region from Johor Bahru to Pasir Gudang.

1. This was the decision from the technical committee of the Unit Pelan Struktur Study.

2. Note that other than in Pontian with a committed development of 8,000, there are practically no development commitments. In this relation, the likely population estimates in the secondary area exceeds the population due to committed developments.

Table 4.3 : ESTIMATED POPULATION GROWTH IN MPJB
BY DEVELOPMENT PROJECTS (AS AT 1981)

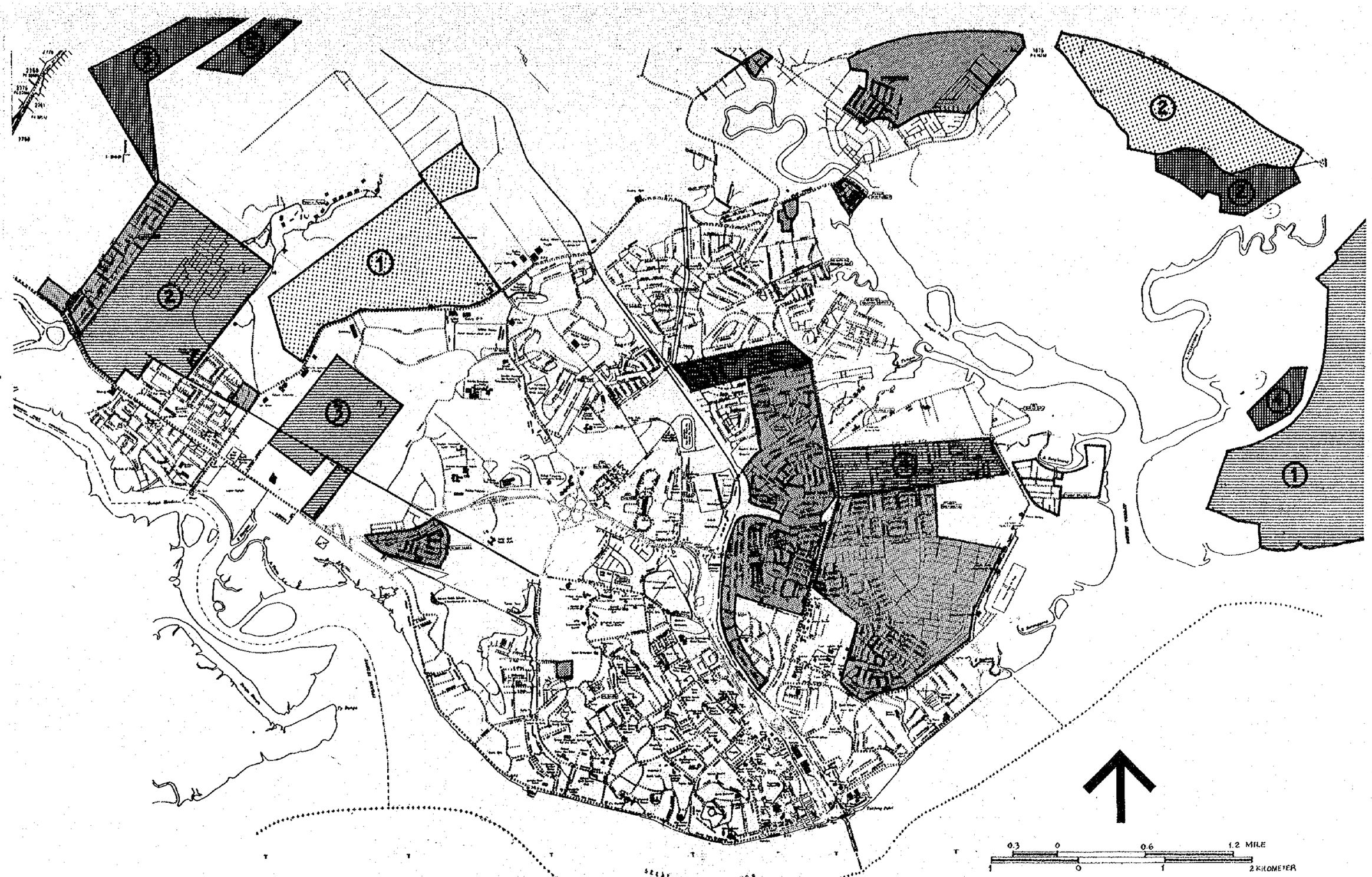
MAJOR PROJECTS	ZONE	ESTIMATED POPULATION	HOUSING UNITS	YEAR APPROVED
(A) EXISTING				
1. Taman Nong Chik	223	640	128	1975
2. Taman Immigresen	225	-	-	-
3. Taman Tasek	232	3,710	742	1973
4. Taman Century	242	9,055	1,811	1967
5. Taman Kelam Teh	243	6,910	1,382	-
6. Taman Melodies	243	1,160	232	1980
7. Taman Serene	252	2,810	562	1974
8. Taman Maju Jaya	261	930	186	1975
9. Taman Sri Tebrau	262	7,310	1,462	1973
10. Taman Tebrau Jaya	265	-	-	-
11. Rancangan Rumah Murah Kerajaan Tempatan	312	2,960	592	1974
12. Taman Majidee	331	1,170	234	1966
13. Taman Puncuan	333	2,760	522	"
14. Taman Sri Amar	342	7,715	1,543	"
15. Taman Sri Pandan	342	1,555	311	1980
16. Taman Penggawa Timur	351	2,130	426	"
17. Taman Istimewa	351	1,540	308	"
18. Taman Rose	351	-	-	-
19. Taman Bentara Luar	352	11,070	2,214	1978
	Sub-total	247,000		
(B) UNDER-CONSTRUCTION				
1. Taman Santosa	263,264	9,135	1,827	1974
2. Taman Pelangi	252,261,265	21,480	4,296	1978
3. Taman Iskandar	281	7,345	1,496	-
4. UDA Phase 1	311,312	4,355	871	1981
Phase 2		14,275	2,855	"
Phase 3		-	-	"
5. SEDC	322	29,460	5,892	1980
6. Taman Johor	325	4,495	899	1979
7. Taman Penggawa Barat	325	1,615	323	1979
8. Taman Permas Jaya	354	57,200	11,400	1974
	Sub-total	149,360		
(C) APPROVED FOR CONSTRUCTION				
1. Taman Intan	323,324	14,820	2,964	-
2. Taman Tai Hong	354	11,395	2,297	1981
	Sub-t tal	26,215		
(D) PENDING APPROVAL				
1. Taman Desa Jadah	325	10,655	2,131	-
2. Sykt Hamidi Sdn Bhd	325	4,700	940	-
3. Perumahan KK Tempatan	331	6,060	1,212	-
4. Taman Sanjana	353	3,815	763	-
5. Taman Dr. Sabanthan	354	4,220	844	-
6. Cahaya Terang Realty Sdn. Bhd.	325	1,925	385	-
	Sub-total	31,375		

Sources: (1) Town and Country Planning Department
(2) Unit Pelan Structure Study 1981

Table 4.4 : ESTIMATED POPULATION GROWTH OUTSIDE MPJB BY DEVELOPMENT PROJECTS (as at 1981)

MAJOR PROJECTS	MUKIM	ZONE	ESTIMATED POPULATION	HOUSING UNITS	YEAR APPROVED
(A) UNDER CONSTRUCTION					
1. Pasir Gudang	Plentong	362,363,364	235,500	-	-
2. Taman Tun Aminah	Pulai	413	120,000	-	1980
3. Taman Skudai	Pulai	414	14,160	2,829	-
4. Taman Dawani	Senai/Kulai	421	1,380	276	-
5. Taman Aman	Senai/Kulai	421	1,690	338	-
		Sub-total	372,730		
(B) APPROVED FOR CONSTRUTION					
1. Gunung Hijau	Plentong	361	29,580	5,666	1980
2. Kemajuan Besi Jaya S.B	Senai/Kulai	421	10,235	2,047	1981
3. Yondaz Green Sdn Bhd	Senai/Kulai	422	36,950	7,390	1981
4. Gabungan Putra	Tebrau	443	35,700	4,761	-
5. Purling Estate	Pulai	413	64,000	10,000	-
6. Sim Hup S.B. & Trade Credit	Pontian		7,225	1,445	1980
		Sub-total	183,690		
(C) PENDING APPROVAL					
1. Taman Sri Alam	Plentong	373	235,000	8,813	-
2. Taman Kota Putri	Plentong	361	75,820	15,164	
3. Eastern Realty	Plentong	361	7,745	1,549	-
4. Daiman	Plentong	371	45,165	9,033	
5. Faber Union	Plentong	371	4,000	800	-
6. Taman Sri Amar	Plentong	361	7,715	1,543	1981
7. Teamco Sdn Bhd	Plentong	364	39,600	6,591	1981
8. Realty Sdn Bhd	Pulai	414	40,000	8,876	-
9. Eastern Enterprise	Pulai	361	27,870	5,574	-
10. Taman Rimzab	Pulai	413	15,245	3,049	-
11. -	Pulai	413	17,500	3,500	-
12. Keck Seng Estate	Tebrau	443	45,000	13,000	-
13. Saujana Jaya Sdn Bhd	Senai/Kulai	424	23,065	4,613	-
		Sub-total	583,725		

Sources: (1) Town and Country Planning Department
(2) Unit Pelan Struktur Study 1981.



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

LEGEND:

- Existing Housing
- Approved for Construction
- Under Construction
- Under consideration

TITLE:

HOUSING DEVELOPMENT WITHIN MPJB

MAP NO.

Fig. 4.1a

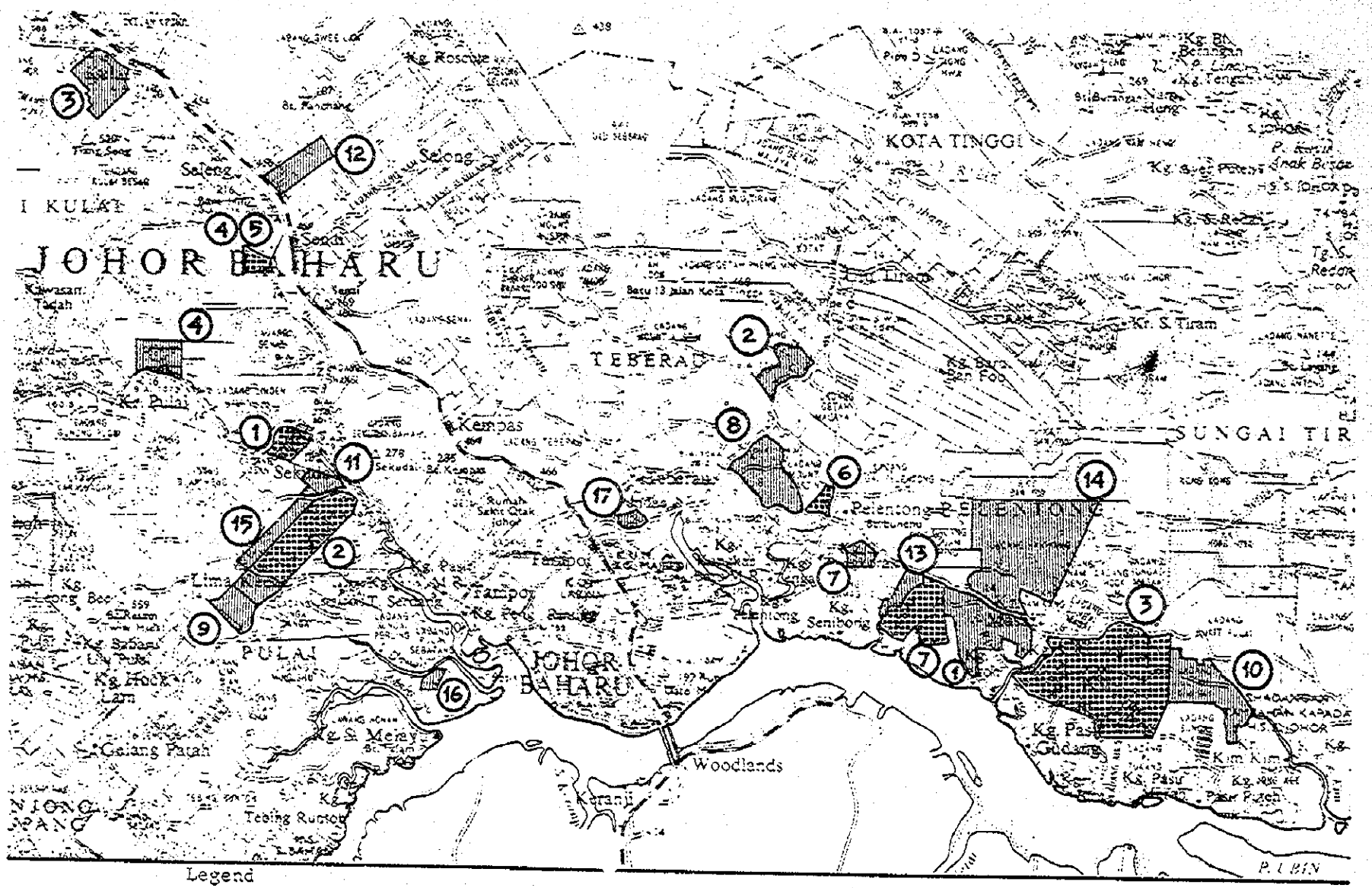


Fig. 4.1b HOUSING SCHEMES OUTSIDE OF MPJB

4.2 Relationship Between Future Population and Employment Growth in Year 2000

Table 4.5 shows the relationships between future population and the corresponding growth of employment.

Alternative I depicts the Study Team estimates for the likely growth of population and employment in the year 2000. The population in the year 2000 is envisaged to be approximately 1.1 million and from the supply side of employment (viz. the future employment requirement due to growth of workforce over the years) the estimated employment is 433,000. It is estimated too that from the demand side of employment (depending on the future holding capacity of the landuse and sectoral analysis), a total of 463,000 employment opportunities can be generated. Therefore, the future growth in workforce and hence, employment needs can be more than sufficiently sustained by future employment opportunities; in fact, there is a surplus capacity of approximately 30,000 jobs available by the year 2000.

Alternative II depicts a target population of approximately 1.36 million planned for the Study Area in the year 2000. Preliminary estimates on the growth of workforce show the need for approximately 477,000-518,000 jobs whilst from the demand side, only 463,000 jobs are actually available. This implies that unless there is more concerted efforts on the part of the government to increase the number of job opportunities, there will be a shortage of approximately 14,000-55,000 jobs by the year 2000[3].

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3. Based on average activity rates of 35 to 36 percent applied to the total targetted population of 1,364,000 million by 2000. Unit Pelan Struktur has projected a need for 11,000 jobs in Johor Bahru district alone in the year 2000.

Table 4.5 : Relationship Between Future Population and Employment Growth in the year 2000

	Alternative I[1]	Alternative II[2]
Population in 2000 (in '000)		
1. Primary	841.0 (76%)	1,078.5 (79%)
2. Secondary	265.0 (24%)	285.5 (21%)
Total Study Area	1,106.0 (100%)	1,364.0 (100%)
Employment (in '000)		
1. Supply side	433	477-518
2. Demand side	463	463

Note: (1) Study Team Estimates 1981
(2) Planning Target Population (Unit Pelan Struktur Study)

4.3 Future Population Distribution by Mukims

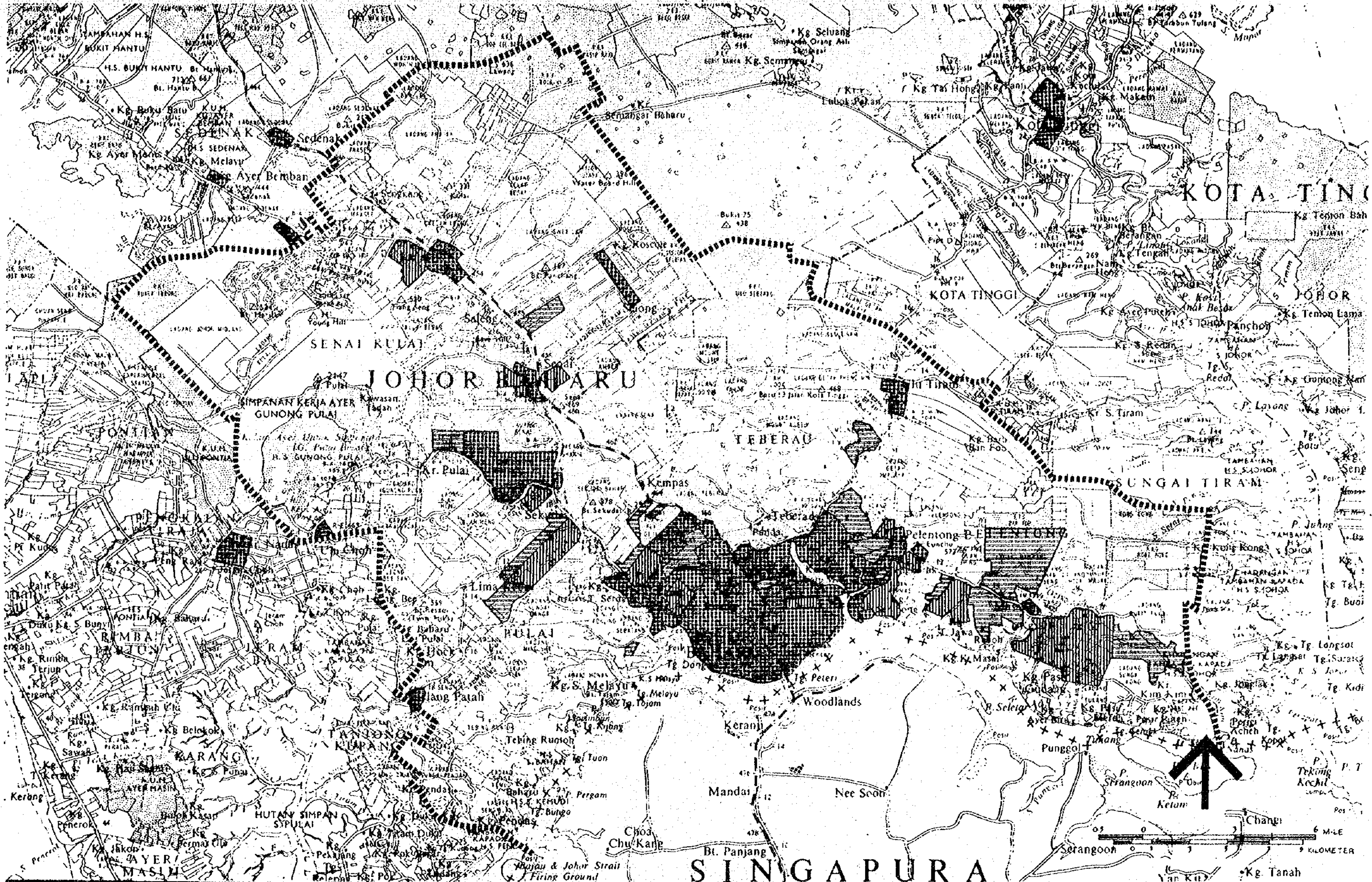
4.3.1 Spatial Distribution of Population

The future pattern of urbanisation and of population distribution in spatial terms are, to a large extent, being shaped by the forces of large-scale committed residential developments in the Study Area. In particular, to the east of the Study Area lies the Pasir Gudang New Town and Industrial Complex developments where a total population target of approximately 250,000[4] is expected to be achieved by the year 2000. Another major concentration of population due to residential commitments lies to the north-west of MPJB viz. the Senai/Kulai-Johor Bahru corridor where approximately 230,000[5] population is estimated to be located. With the establishment of this broad population distribution framework, the population of MPJB in 2000 can be determined to be approximately 500,000 given the target population of 1 million to be planned for the entire Johor Bahru district (See Fig. 4.2)

4. Pasir Gudang developed by the SEDC (State Economic Development Corporation), is expected to contian about 235,000 population and another 20,000 population to be accomodated in the Gunung Hijau Residential Scheme and various other housing schemes.

5. Approximately 120,000 population to reside in Taman Tun Aminah, 60,000 in Purling Estate, 30,000 in Yondaz Green and another 20,000 in smaller schemes like Kemajuan Besi Jaya, Taman Skudai, Dawani and Aman.

Fig. 4.2 : Major Population Concentration in the Study Area in 2000



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

LEGEND:

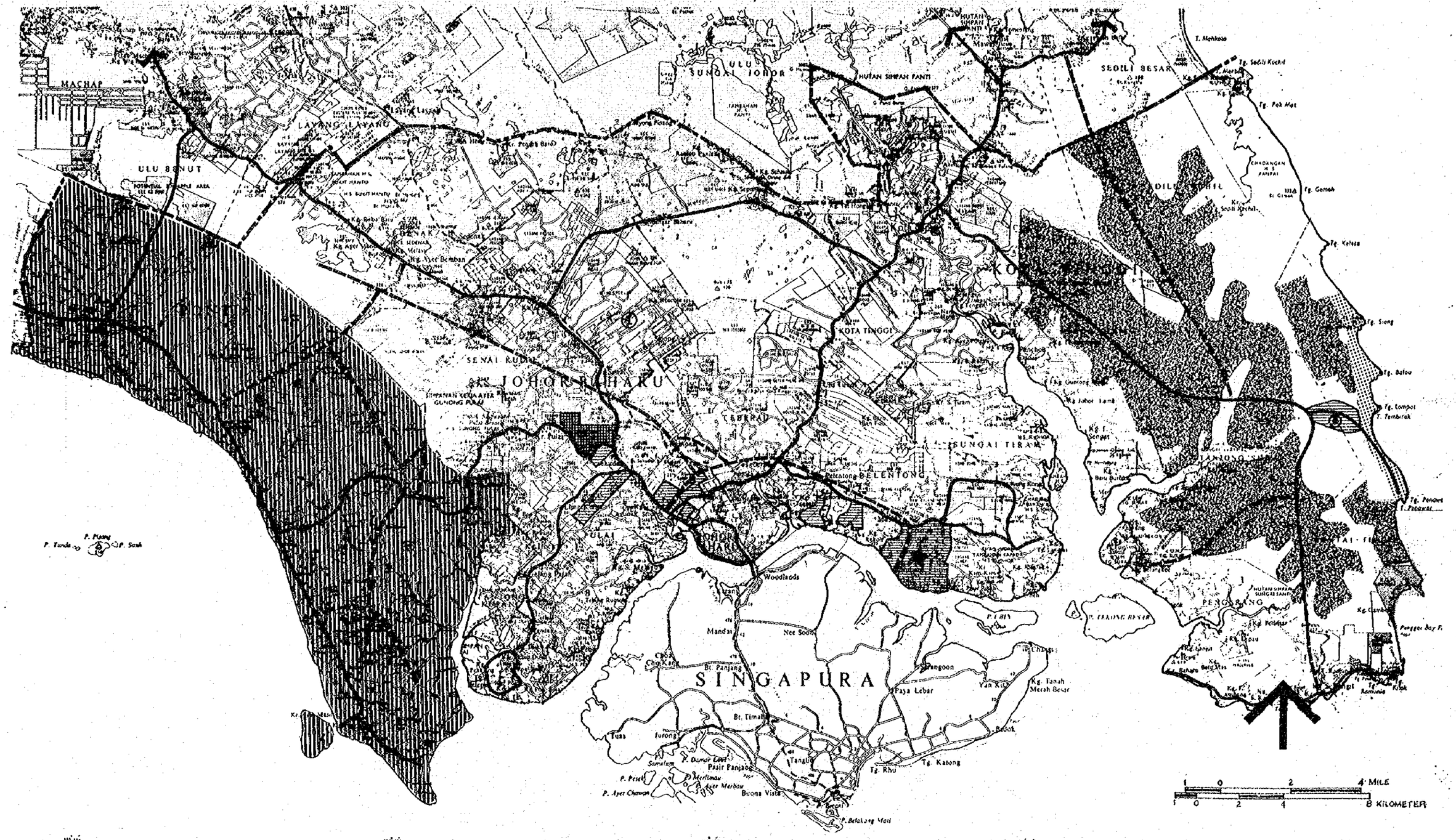
- EXISTING URBAN AREAS
- COMMITTED PROJECTS
- APPLIED PROJECTS UNDER CONSIDERATION

TITLE:

URBANISATION TREND

MAP NO.

Fig. 4.3a



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

LEGEND:

- Housing under construction / Approved for construction
- Committed industrial site
- UTM Campus
- Pasir Gudang Complex (Housing, town centre, industries, port)
- Bandar Penawar New Town (Housing, town centre, industry) — Johor Tenggara Development Scheme
- Agricultural schemes (Underway) — Johor Tenggara Development Scheme
- Tourist complex
- Johor Barat Drainage Scheme
- Road projects

Fig. 4.3b : COMMITTED DEVELOPMENTS

By this approach, the future population in the Mukims of MPJB and Plentong is expected to be 520,000 and 250,000 by 2000. The population distribution in the other mukims is similarly obtained by the consideration of committed residential developments within the mukim in question.

It must be reckoned that the major determinant in population growth in the Study Area is viz. residential developments which incidently are also largely privately-vested enterprises[6]. Notwithstanding the fact that these developments are committed and can 'take-off', there is still the strong manipulative forces of the market mechanisms at play that may alter slightly the future pattern of urbanisation. It is not surprising if not all committed schemes will immediately take-off, far lest of full-scale developments because of such interwining factors like location of scheme, quality of construction, prices of houses in relation to the effective housing demand by potential owners, availability of credit/loan facilities, etc

6. With the exception of Pasir Gudang Development by SEDC and various other housing schemes by UDA (Urban Development Authority), government low-cost housing schemes, etc.

4.3.2 Estimation Procedure for Future Population by Mukims

Figs. 4.4 and 4.5 summarises the general and detailed procedures undertaken for the future population distribution by Mukim/Traffic Zonal levels
The steps are:-

(1) Preparation of Mukim/Zonal Population in Study Area in 1970 and 1980 from Census data.

(2) Calculation of the average annual growth rate during the period by mukims/zones and estimate preliminary future population size by applying the growth rates.

(3) Identification of existing and potential housing development schemes (approved, under construction and pending approval ones) - their location and scale of development. From this, estimate the incremental population by each plan by mukims and subsequently breaking down into the zonal level. (to a large extent, influenced by the Future Landuse Pattern in the year 1990 and 2000)

(4) The Incremental population due to each development plan will be added to the preliminary estimates obtained in (2) (P^*)

(5) Summation of zonal population will give the total population in the Study Area. $\sum_{i=1}^{n} P^*_i$

(6) Obtaining Adjustment Factor, $\propto = \frac{P_T}{\sum_{i=1}^{n} P^*_i}$
where P_T is the total population in the Study Area for 1990 and the year 2000.

(7) The future population in each zone will be estimated by $P^*_i \times \propto$ where P^*_i is the population in zone i. (zonal population is controlled by the Mukim estimates)

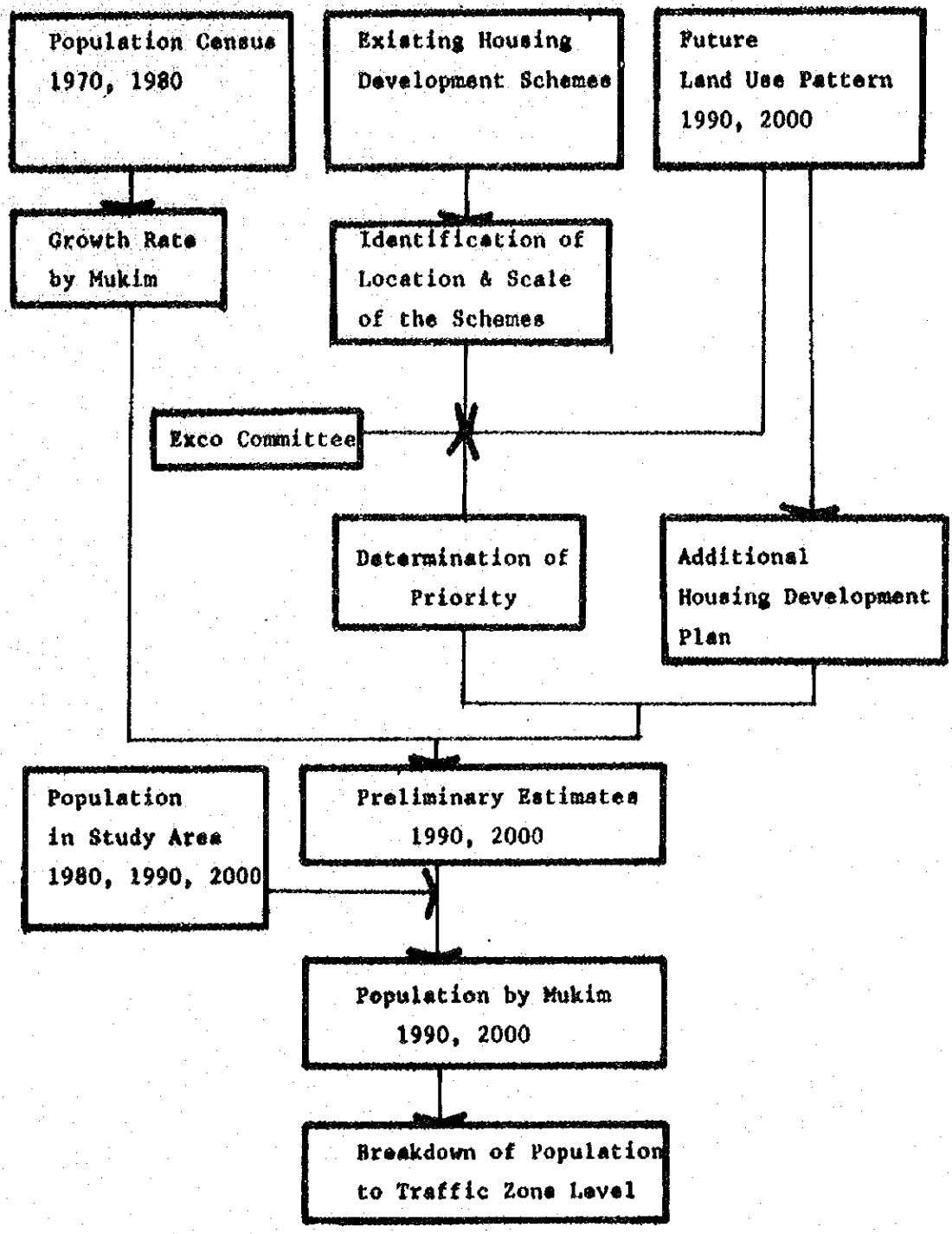


Fig. 4.4 : General Estimation Procedure for Future Population Distribution by Mukim/Traffic Zone Level.

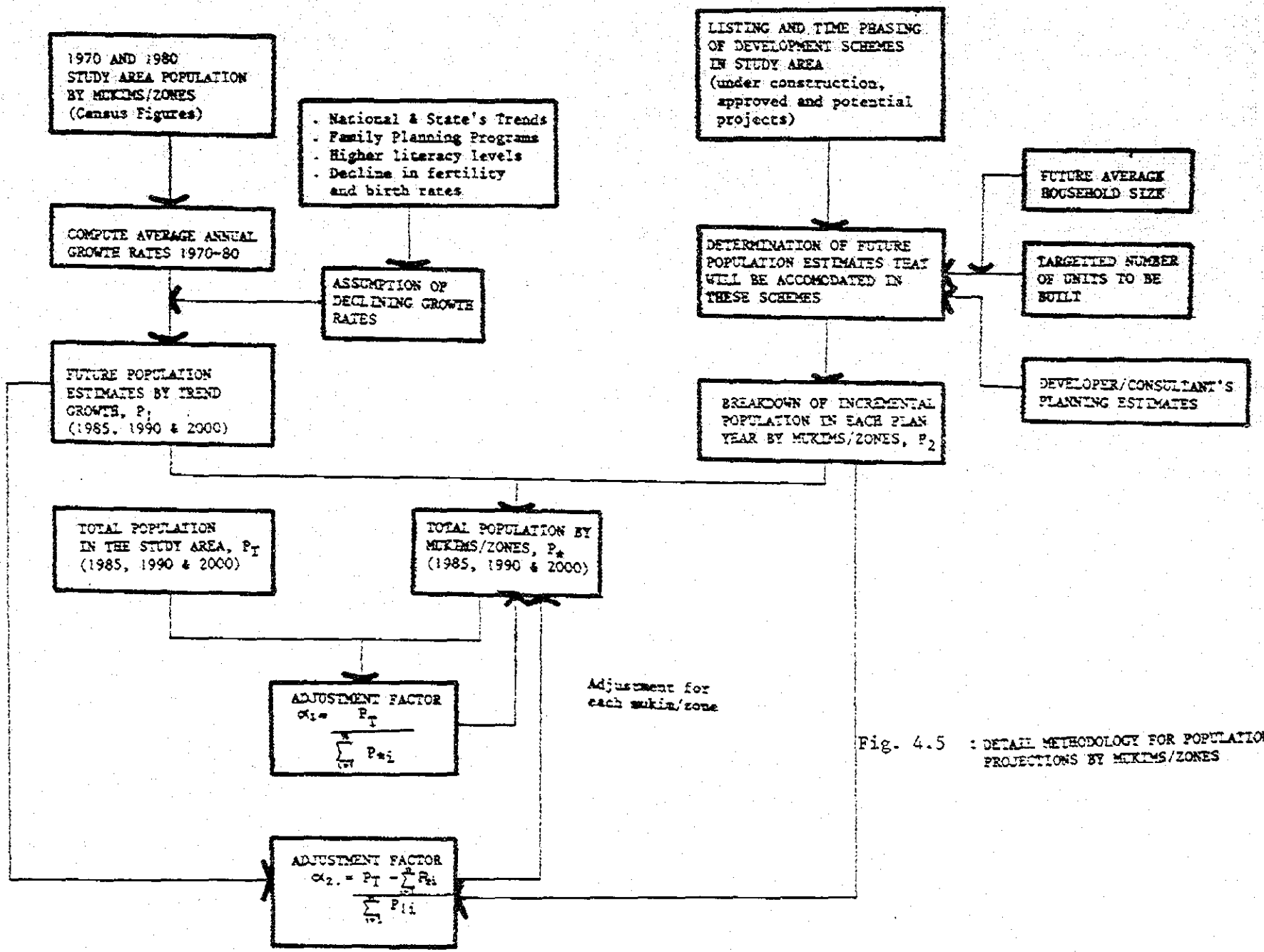


Fig. 4.5 : DETAIL METHODOLOGY FOR POPULATION PROJECTIONS BY MUKIMS/ZONES

4.3.3 Mukim and Zonal Population Distribution

The future spatial population by Mukims in the Study Area is as depicted in Table 4.6. Major concentrations of population are in Mukims of MPJB, Plentong, Jelutong/Pulai, Senai/Kulai and Kota Tinggi in the Primary Area. In the Secondary Area, the outstanding mukims with population concentration are Pontian, Tanjong Surat, Rimba Terjun and Jeram Batu/Pengkalan Raja (See Fig. 4.5).

Having determined the spatial distribution of population by mukims, the latter will act as control for their respective population breakdown by zones. The methodology adopted is similar to the one at mukim level and the final pattern of zonal population is as shown in Table 4.7.

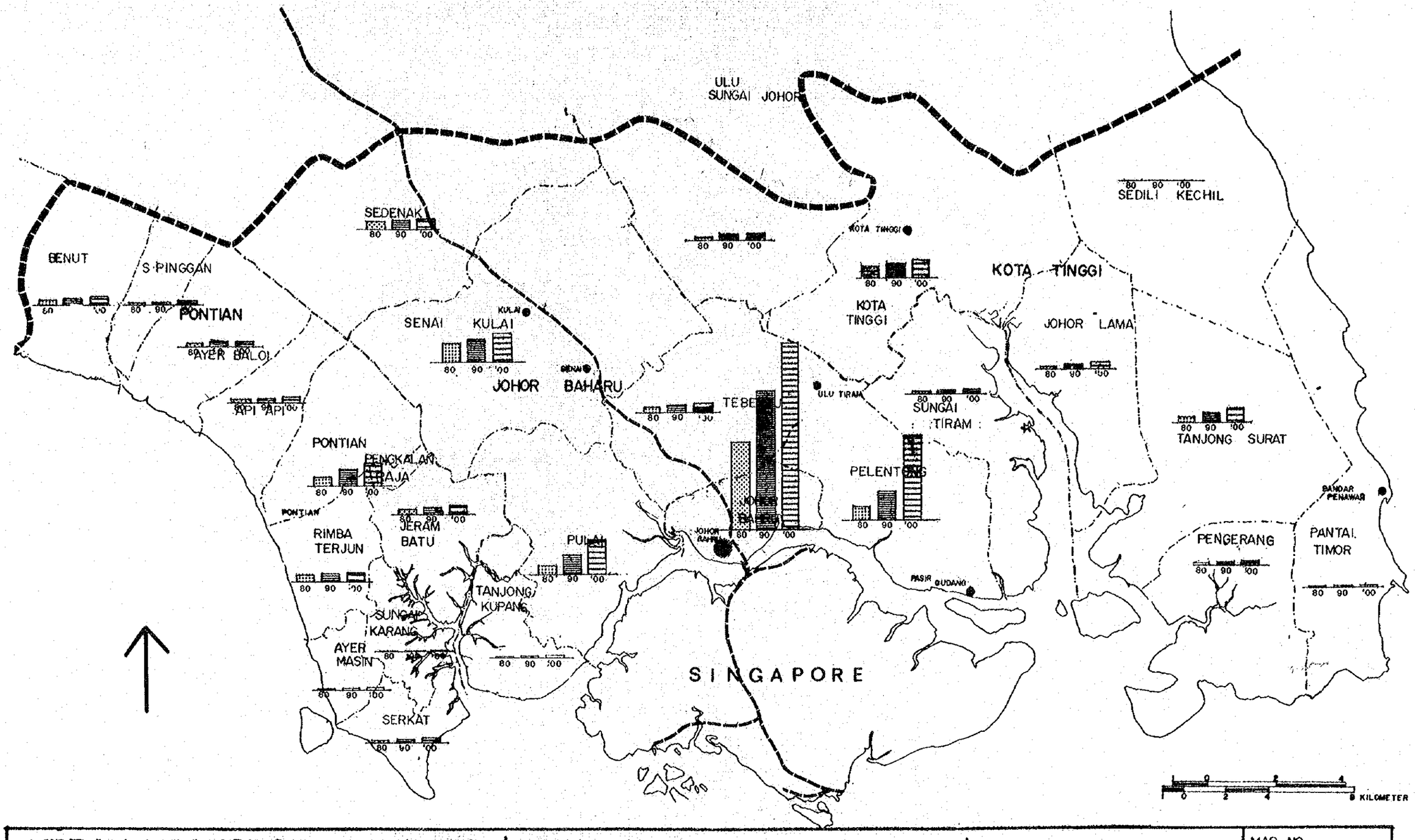
Table 4.6 : FUTURE POPULATION DISTRIBUTION BY MUKIMS IN THE STUDY AREA, 1970-2000 (IN '000)

DISTRICT	MUKIM	1970		1980		1990		2000	
JOHOR BAHRU	MPJB	150.8	275.5	247.0	417.4[2]	398.5	654.8	520.0	1000.0
	Jelutong/Pulai	19.8		23.7		51.7		94.7	
	Pelentong	22.1		37.7		81.6		235.0	
	Sedenak	18.1		22.6		24.4		28.9	
	Senai/Kulai	36.3		52.1		62.0		79.9	
	Sg. Tiram	8.3		9.1		10.2		11.4	
	Tg. Kupang	4.5		4.7		5.1		5.6	
	Tebrau	15.6		17.6		21.3		24.5	
KOTA TINGGI	Kota Tinggi	23.2	50.6	30.8	80.5	39.8	109.1	50.5	148.5
	Ulu Sg. Johor	8.4		10.7		13.4		16.4	
	Primary Area	307.1		458.9		708.0		1,066.9	
	Johor Lama	4.3		7.3		12.7		22.4	
	Pantai Timur	5.1		5.4		6.1		7.1	
	Pengerang	7.2		6.6		8.4		10.7	
	Sedili Kechil	0.4		0.5		0.7		0.9	
	Tg. Surat	2.0		19.2		28.0		40.5	
PONTIAN	Api-Api	12.3	117.8	12.3	121.7	14.7	164.7	17.7	201.9
	Ayer Baloi	12.0		11.6		13.7		16.1	
	Ayer Masin	5.2		5.2		5.9		6.7	
	Benut	16.0		15.7		18.1		21.3	
	Jeram Batu /P. Raja	13.2		15.4		19.4		25.2	
	Pontian	16.0		25.5		48.9		62.3	
	Rimba Terjun	24.9		19.8		23.7		28.2	
	Serkat	7.6		7.1		9.0		11.0	
	Sg. Karang	3.0		2.0		2.4		2.8	
	Sg. Pinggan	7.6		7.1		8.9		10.6	
	Secondary Area	136.8		160.7		220.6		283.5	
	TOTAL STUDY AREA	443.9		619.6		928.6		1.350.4	

Note: (1) Targets estimated by Unit Pelan Struktur 1981

(2) Population by mukims do not add up to that by district due to 2,880 navy personnel from Woodlands, Singapore.

Source: Urban Transport Study Team Estimates 1981.

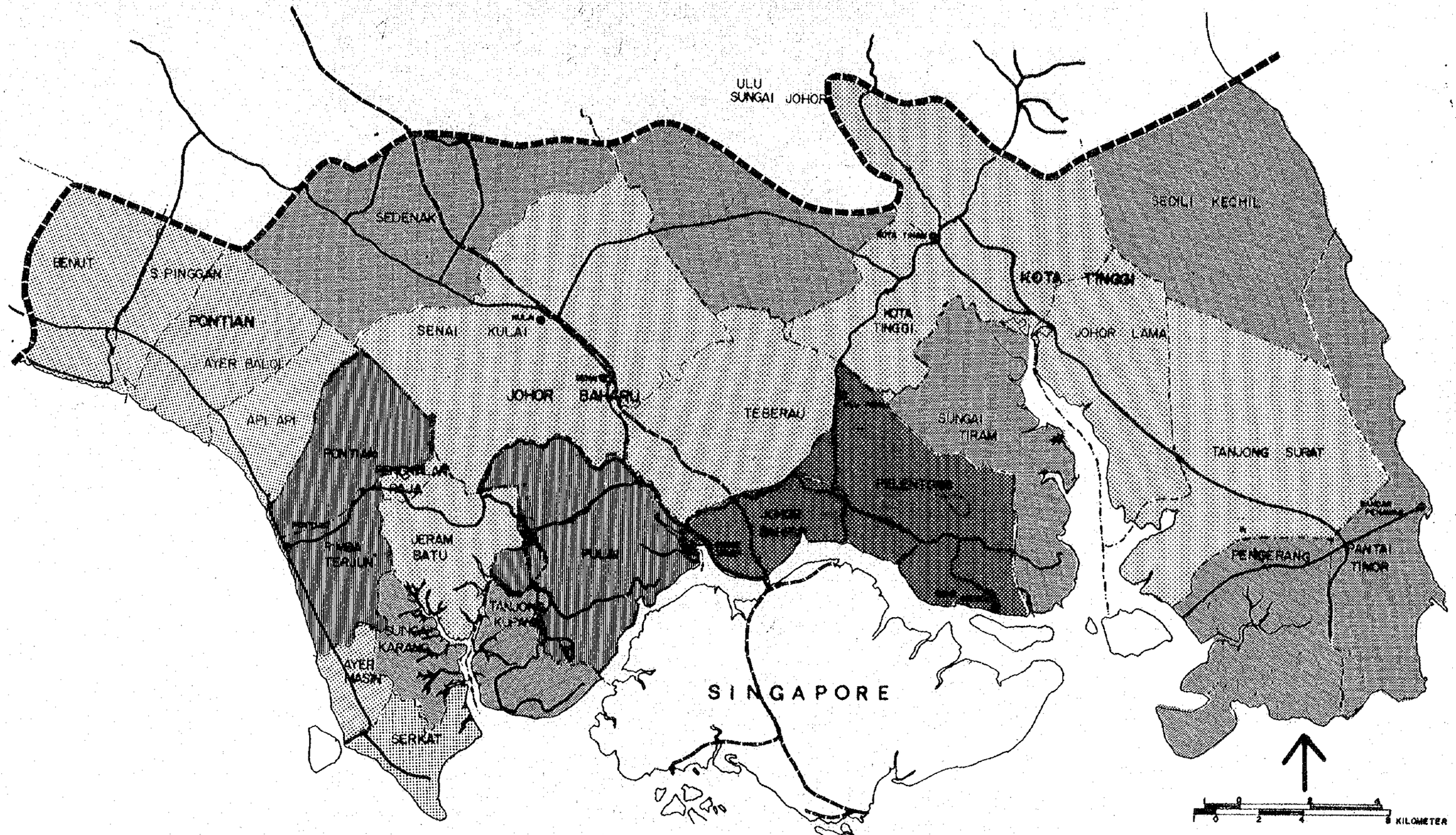


URBAN TRANSPORT MASTER PLAN STUDY FOR THE JOHOR BAHRU CONURBATION, MALAYSIA.

LEGEND :
- DISTRICT BOUNDARY
- MUKIM BOUNDARY
- MAJOR ROAD
- RAILWAY
- TOWN

TITLE:
POPULATION DISTRIBUTION BY MUKIMS 1980 - 2000
(IN '000)

MAP NO.
Fig. 4.6



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

LEGEND:
- DISTRICT BOUNDARY
- MUKIM BOUNDARY
- MAJOR ROAD
- RAILWAY
- TOWN

0 < 1
1 < 3
3 < 5
5 < 8
> 8

TITLE:
GROSS POPULATION DENSITY IN 2000

MAP NO.

Fig. 4.7

Table 4.7 : FUTURE GROSS POPULATION DENSITY BY MUKIMS IN THE STUDY AREA, 1970-2000. PERSONS/HECTARE

DISTRICT	MUKIM	1970		1980		1990		2000	
JOHOR BAHRU	MPJB	12.63	1.55	20.69	2.34	33.38	3.67	52.33	5.61
	JELUTONG/PULAI	0.93		1.12		2.44		4.42	
	PELENTONG	1.09		1.86		4.02		11.59	
	SEDENAK	0.57		0.72		0.77		0.91	
	SENAI/KULAI	0.84		1.20		1.43		1.85	
	SG. TIRAM	0.34		0.38		0.42		0.47	
	TG. KUPANG	0.55		0.58		0.63		0.68	
	TEBRAU	0.89		1.00		1.21		1.38	
KOTA TINGGI	KOTA TINGGI	0.59	0.26	0.79	0.41	1.02	0.56	1.29	0.76
	ULU SG. JOHOR	0.27		0.34		0.43		0.53	
	PRIMARY AREA	1.24		1.85		2.85		4.29	
	JOHOR LAMA	0.22		0.37		0.65		1.14	
	PANTAI TIMUR	0.22		0.23		0.26		0.31	
	PENGERANG	0.39		0.36		0.46		0.59	
	SEDELI KECHIL	0.01		0.02		0.02		0.03	
	TG. SURAT	0.06		0.60		0.87		1.26	
PONTIAN	API-API	1.40	1.21	1.40	1.25	1.67	1.70	2.01	2.08
	AYER BALDI	0.80		0.77		0.92		1.08	
	AYER MASIN	1.40		1.40		1.59		1.80	
	BENUT	1.11		1.09		1.25		1.48	
	JERAM BATU/P. RAJA	1.17		1.37		1.72		2.24	
	PONTIAN	1.25		2.00		3.83		4.88	
	RIMBA TERJUN	2.67		2.12		2.54		3.03	
	SERKAT	1.25		1.17		1.48		1.81	
	SG. KARANG	0.46		0.31		0.37		0.43	
	SG. PINGGAN	1.06		0.99		1.24		1.48	
	SECONDARY AREA	0.62		0.73		1.00		1.28	
	TOTAL STUDY AREA	0.94		1.32		1.97		2.87	

4.3.4 Population Density

Alongside, rapid housing developments and increase of population, future population tend to be concentrated within MPJB as can be seen by the increase of the gross density from 20.7 persons per hectare in 1980 to 52.3 persons per hectare (See Table 4.7). According to SPU'S standard classification*, MPJB can be considered to develop from a low density area to a medium density region. All other mukims can be considered to remain as low-density areas even by 2000.

In terms of net residential density, MPJB has on existing density of 97.3 persons per hectare and this increases to approximately 127.4 persons per hectare in 2000.

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* Low Density: 27-40 persons/ha
Medium Density: 45-67 persons/ha
Medium High Density: 72-148 persons/ha
High Density: 151 persons/ha

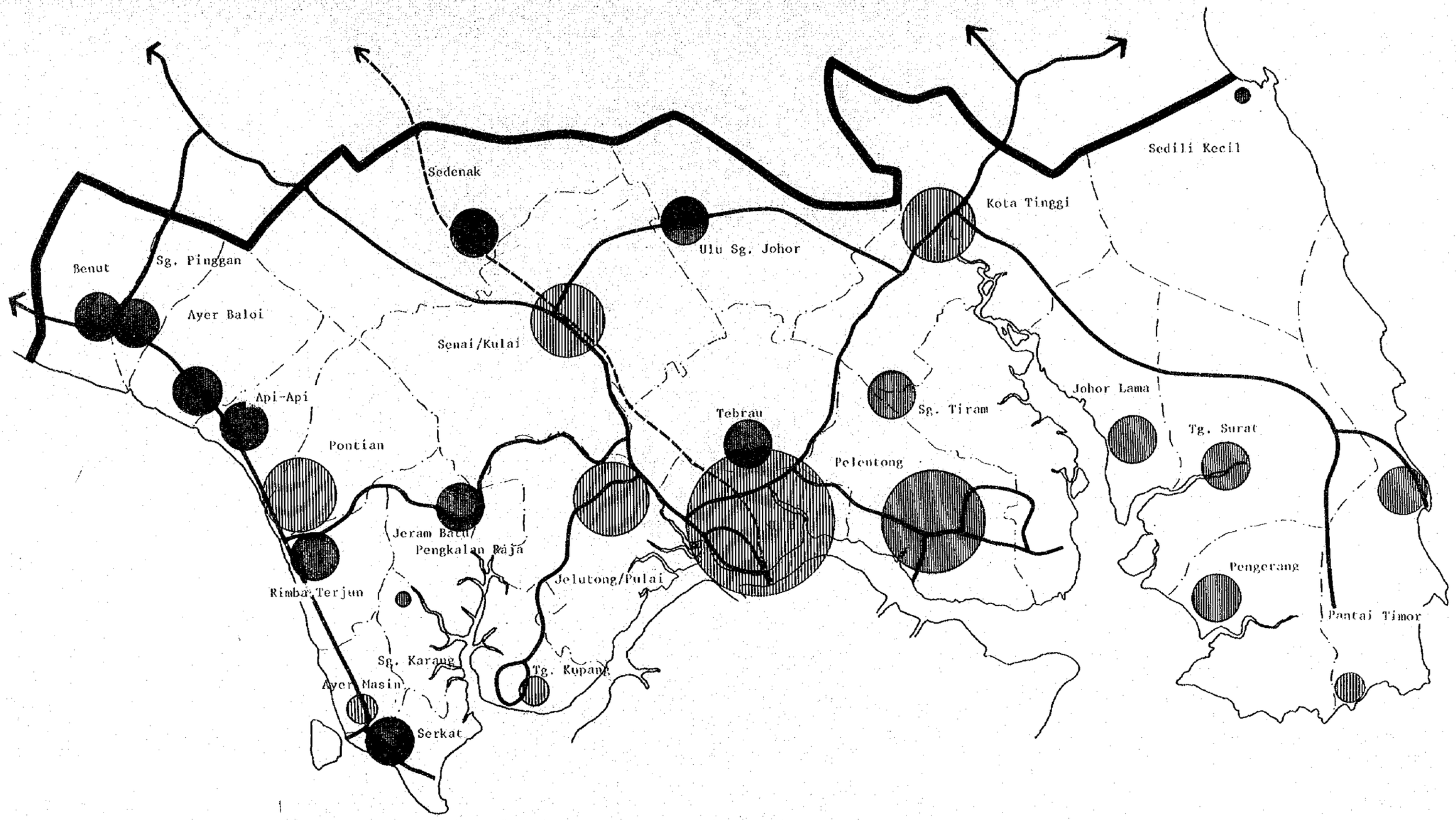
URBAN TRANSPORT MASTER PLAN STUDY FOR THE JOHOR BAHRU CONURBATION, MALAYSIA.

TITLE:

POPULATION DENSITY IN 1980

MAP NO.

Fig. 4.8



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

LEGEND:

- More than 500,000 persons
- 100,000-500,000 persons
- 50,000-100,000 persons
- 10,000-50,000 persons
- 5,000-10,000 persons
- less than 5,000 persons

TITLE:

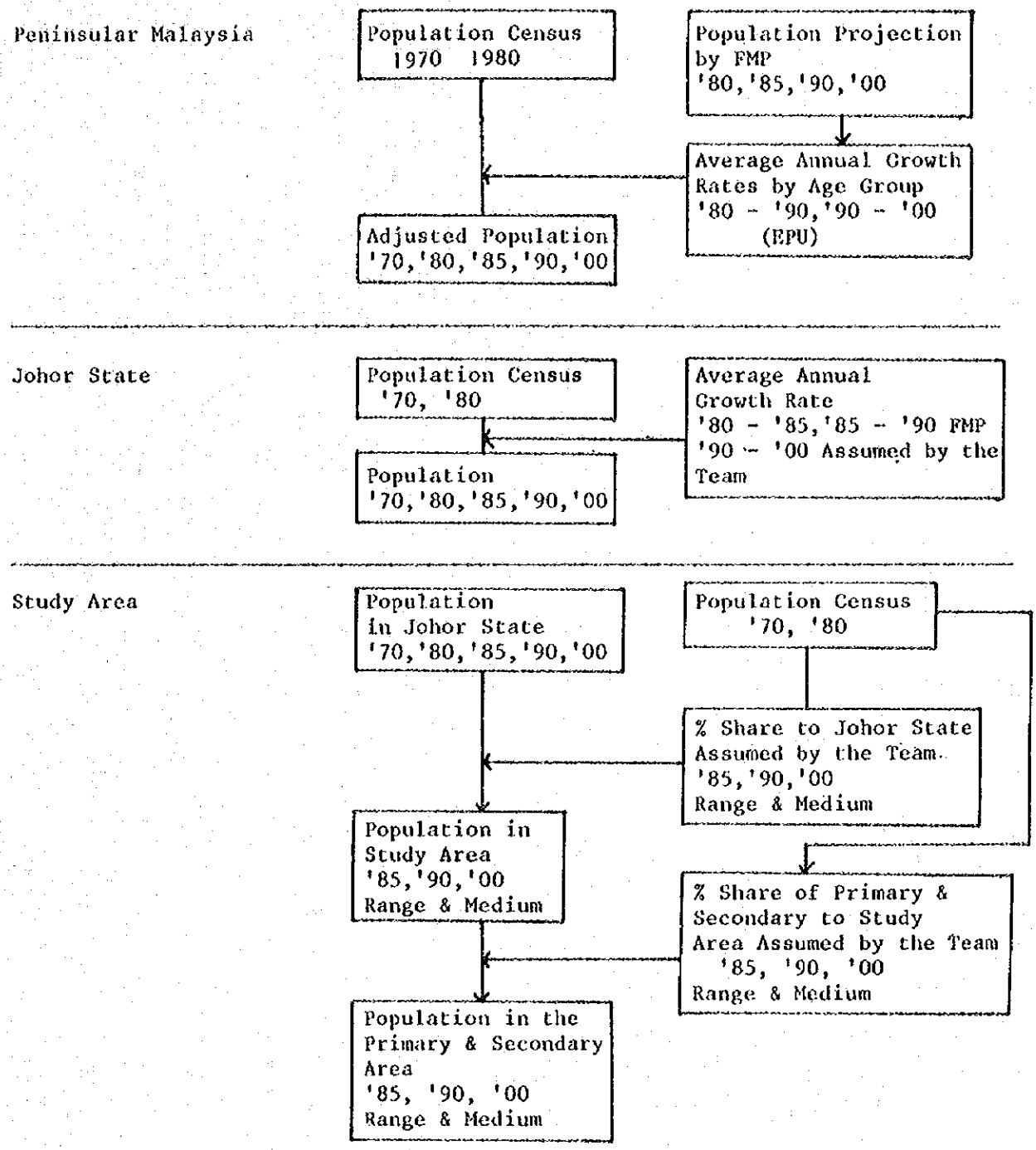
POPULATION HIERARCHY BY MUKIMS 2000

MAP NO.

Fig. 4.9

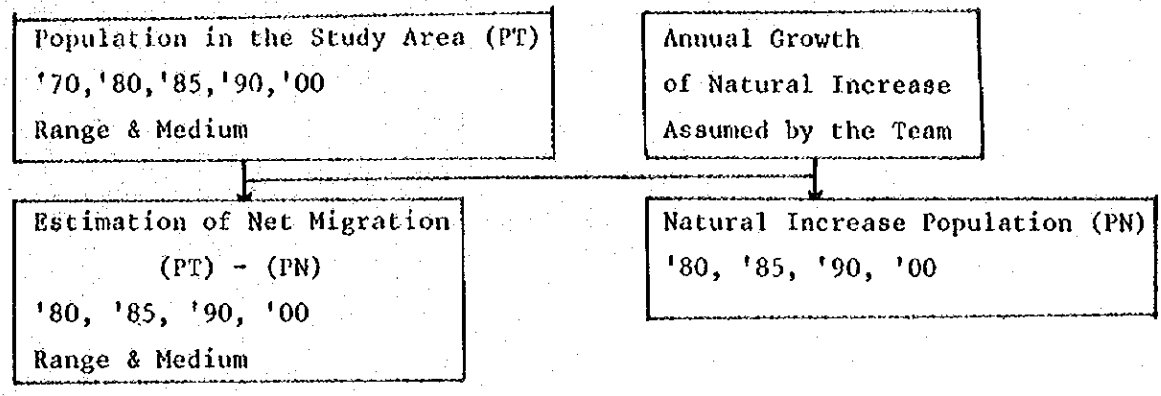
APPENDIX 1

Procedure for Population Projections

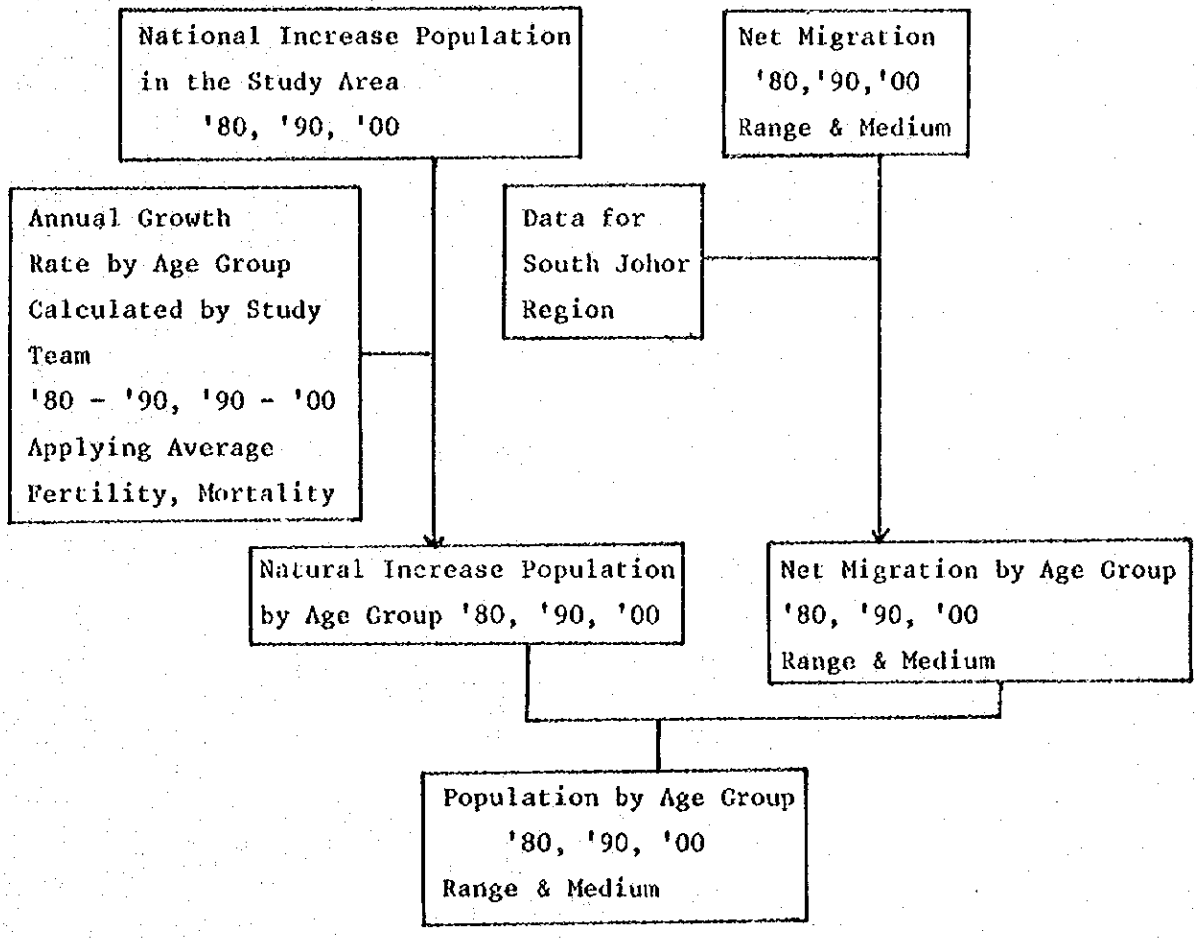


APPENDIX 2 : Population by Natural Increase and Net-Migration

Study Area



Population by Age Group in the Study Area



APPENDIX 3 Population by Traffic Zone

Mukim	Zone #	1970	1980
MPJB	111	2,222	1,283
	112	593	519
	113	4,038	2,691
	114	3,780	2,040
	121	6,385	4,485
	122	3,942	3,070
	123	1,542	1,090
	211	704	647
	212	2,727	1,759
	213	1,700	1,436
	221	2,634	4,080
	222	4,556	4,204
	223	950	1,470
	224	836	780
	225	145	898
	231	2,682	2,845
	232	774	3,644
	241	6,622	6,219
	242	7,206	11,437
	243	1,839	6,271
	251	8,077	10,286
	252	3.798	5,684
	261	164	4,023
	262	164	9,309
	263	306	3,759
	264	359	260
	265	163	3,723
	271	3,788	2,757
	272	3,222	5,195
	281	2,801	5,580
	311	5,815	7,077
	312	860	930
	313	1,975	4,073
	314	6,864	10,831
	315	8,410	9,593
	321	11,008	11,576
	322	194	13,387
	323	3,760	7,646

Mukim	Zone #	1970	1980
	324	1,065	2,093
	325	886	3,838
	331	3,721	5,327
	332	10,835	17,338
	333	1,776	6,116
	341	4,054	10,212
	342	6,132	9,269
	351	1,940	11,385
	352	1,066	2,991
	353	1,066	808
	354	654	1,066
		150,800	247,000
Pelentong	361	4,440	8,591
	362	1,639	1,928
	363	-	-
	364	1,415	7,496
	371	1,205	3,467
	372	7,217	9,889
	373	892	1,851
	374	5,340	4,483
		22,148	37,705
Jelutong/	412	2,715	2,432
Pulai	413	4,808	6,439
	414	12,312	14,820
		19,835	23,691
Tebrau	441	1,862	2,748
	442	1,099	1,064
	443	5,711	5,084
	444	6,938	8,746
		15,610	17,642
Sg. Tiram	461	4,928	5,324
	462	3,347	3,742
		8,275	9,066
Tg. Kupang	411	4,472	4,727

Mukim	Zone #	1970	1980
Kulai - Senai	421		13,692
	422		27,009
	423		7,983
	424		3,431
		36,332	52,115
Sedenak	431		18,629
	432		3,979
		18,059	22,608
Kota Tinggi	452		9,776
	453		21,000
		23,211	30,776
Ulu Sg. Johor	451	8,425	10,696
Johor Lama Pantai Timur Pengerang Sedeli Kechil Tg. Surat	521	19,035	39,045
Air Masin Serkat Sg. Karang	511	15,736	14,279
Api-api Jeram Batu P. Raja Pontian Rimba Terjun	512	66,405	72,951
Air Balai Benut Sg. Pinggan	513	35,588	34,413
Total Study Area		443,931	619,594

Sources of Data

1. South Johore Regional Planning and Development Study.
2. 1980 Housing and Population Census (to be confirmed)
3. Senai-Kulai Structure Plan
4. Johore Barat Regional Study
5. Johore Tenggara Regional Reports
6. Johore Timor Project Brief
7. Johore Bahru Sewerage and Drainage