REVITALIZING NEW TOWNS IN SINGAPORE

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Abstract

This dissertation uses Singapore as an example to identify factors that are responsible for the internal migration and decay of its older new towns. Four major causes of new town obsolescence have been identified: Rapid pace and massive scale of new town development; unique demographics and social development trends; economic progress and rising standards of living; and inadequate new town improvements. These causes are determined by a survey of the history of new town developments, and by a diagnosis of the physical, social and economic changes that took place in Singapore during the past 28 years.

Six major revitalization issues are selected and analyzed to help explore possible approaches to new town revitalization. These issues are: Politics, economics, social questions, physical planning, design, and infrastructure. Based on the causes of new town obsolescence, relevant results from the analysis of these six major revitalization issues are chosen and refined into a recommended new town revitalization model.

The proposed new town revitalization model includes the following:
1) Financing Revitalization : recommending source of finance for new town revitalization;
2) Planning and Design Guidelines : recommending macro planning guidelines and micro design guidelines for revitalization;
3) Program Implementation : recommending programs for resettlement, demolition/conversion , provision of facilities, and attracting new residents to the revitalized new towns.

The proposed model is finally applied and evaluated utilizing a sample of new town developed at each phase of development to demonstrate the applicability and constraints of the recommended model.

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PREFACE

CONTEXT AND RELEVANCE :

This study is based on the context of Singapore's 28 years experience in public housing and new town development (see Figure I). The idea for undertaking this study initiated basically from the author's nine years of working experience in dealing with the issues and problems of new town developments while working with the Housing & Development Board (HDB) in Singapore(see Figure II). In particular, the author witnessed many of the problems and changes associated with the decline of new towns over time and felt an urgent need to carry out a comprehensive study on the emerging issues before these new towns deteriorate beyond recovery . As far as publications on public housing and new town development in Singapore can be ascertained, no such work on new town revitalization has been previously attempted, except for occasional fragments of commentary that appeared from time to time in the Housing and Development Board of Singapore's annual reports. As such, this study may be the first attempt to give an in-depth study on the subject of new town revitalization in Singapore. It is hoped thereby that a synoptic view of the needs identified by this study will demonstrate the benefits of renovating existing declining towns rather than demolishing them to build new ones.

FIGURE I : ISLAND MAP OF SINGAPORE SHOWING LOCATIONS OF NEW TOWNS

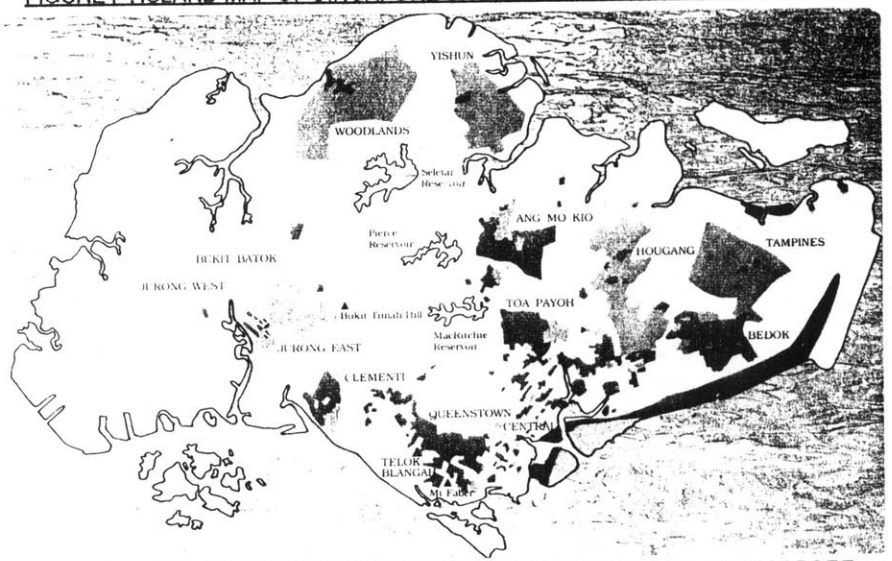
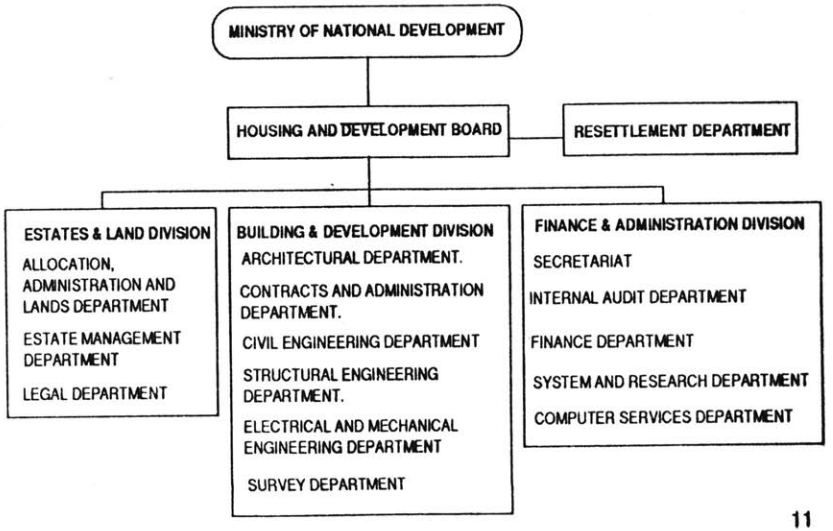


FIGURE II-- ORGANIZATION OF HOUSING AND DEVELOPMENT BOARD SINGAPORE

The HDB is the largest statutory board in Singapore that is reponsible for public housing and new town development.

ORGANIZATION OF THE HOUSING & DEVELOPMENT BOARD

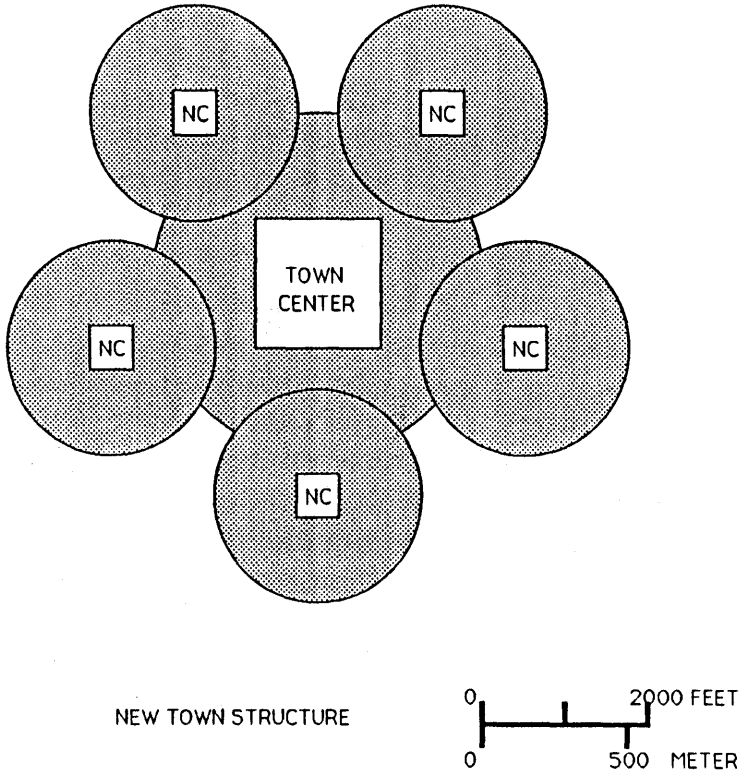


OBJECTIVES:

The post-war era witnessed the emergence of new towns in Singapore as a means to solve the nation's housing problems. The term 'New town' was first used in Singapore by the newly independent government in the early 1960's to describe new and planned self-contained communities (see Figure III). New towns in Singapore are almost exclusively high-rise, high density public housing developments. Each has a large population of around 150,000 to 200,000 persons and many of them were fully developed within a time span of 5 to 10 years. They enjoy a certain degree of self-sufficiency in terms of daily social and recreational needs. The original reason for building new towns in Singapore was to provide low-cost public housing for the people and to reduce the concentration of people in a congested city center. Over the short period of 28 years since independence, many of these early new towns have become dated, both in the quality of housing and the provision of facilities. It is no longer appropriate to consider many of these developments as new towns since they reflect housing standards and planning concepts which no longer fit the needs or expectations of Singapore's population.

While there may be several possible scenarios and attitudes of mind to take on the issue of the "revitalization" of new towns, the author wishes to search for answers applicable to the Singapore situation, which are practical to implement them, and which may be tested under actual conditions. This thesis will not attempt to propose a theory of community development or to criticize the fundamental concept of a new town development.

FIGURE III: CONCEPTUALIZED STRUCTURE OF NEW TOWN IN SINGAPORE



This study therefore has as its objectives: firstly, the identification, analysis and appraisal of factors that contribute to the obsolescence and decline of new towns; secondarily, the recommendation of specific actions to revitalize declining towns; and lastly, to test some proposed solutions that utilize specific case examples of new towns . It should be emphasized that the purpose of this paper is not primarily to produce the best single course of action . It is rather intended to shed light on the many problems that may be anticipated in dealing with older new towns and to produce appropriate and imaginative approaches to revitalization that will meet these needs. It is hoped therefore that these findings may help in the launching of successful revitalization programs in Singapore and other countries with similar new town development patterns.

METHOD OF APPROACH:

This paper deals with intrinsic architectural and planning issues, together with changes in Singaporean society, which have brought about the obsolescence of the older new towns. The aim is to develop these planning and design solutions for various aspects of new town revitalization. (see Figure IV).

The contents of this study is divided into four chapters:

Chapter One - An Overview Of New Town Developments And Their Shortfalls:

To identify the basic criterion of needs upon which the different phases of HDB new towns were first established. Attention is focussed on the influences of physical, social, political and economic factors that molded the developments of these new towns and the causes of new town obsolescence.

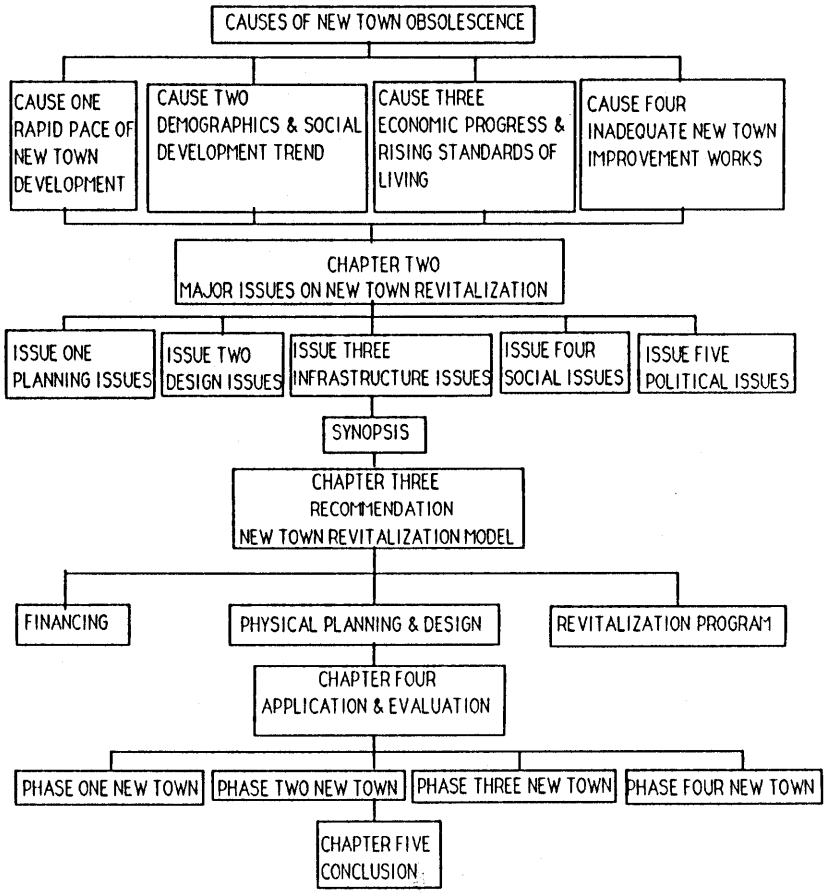
Chapter Two - Major Issues Of New Town Revitalization:

To appraise these original motives against contemporary expectations of social, economic and political well being, this chapter will also highlight its shortcomings or intrinsic advantages of current planning and design guidelines, if any.

Chapter Three - Proposed Revitalization Model(s):

To propose revitalization models which reflect contempo-

FIGURE IV: STRUCTURE OF THESIS



rary financial, architectural, social and political implications.

Chapter Four - Application And Evaluation Of Revitalization Model(s):

To apply and evaluate the models utilizing sample of new towns developed at different phases. One new town for each phase of development is selected to demonstrate the applicability and constraints of the proposed models.

CHAPTER ONE - AN OVERVIEW

Since the close of World War Two, many developing countries have been confronted with the problem of providing adequate housing for their population. The housing need has been especially acute in cities. The nature of housing problems has varied rather markedly from one country to another, but countries with similar geographic, demographic, and economic conditions have tended to take similar approaches to the commitment to provide low-cost housing. Singapore, Hong Kong, Korea and Japan are typical examples that have undergone a relatively high degree of urbanization with severe housing shortages and comparatively low incomes. Over the past forty years, these countries have formulated policies and programs, created agencies, and devoted considerable resources to housing (see Table 1.1). Peculiar historical and political processes have demanded new town developments with relatively high population densities in these countries.[3] To build these large scale projects, these countries have also pursued housing construction systems characterized by modern technology, use of imported materials, and complex managerial and financial organization. In all these four countries, the governments have successfully provided , directly or indirectly most of the low cost housing supply to their entire population.

Despite a long history of involvement in public housing, to date none of these countries has made any comprehensive assessment of the changes that have taken place in the early towns constructed in the 1960's.

TABLE 1.1 KEY HOUSING INDICATORS IN THREE NEWLY INDUSTRIALIZED COUNTRIES

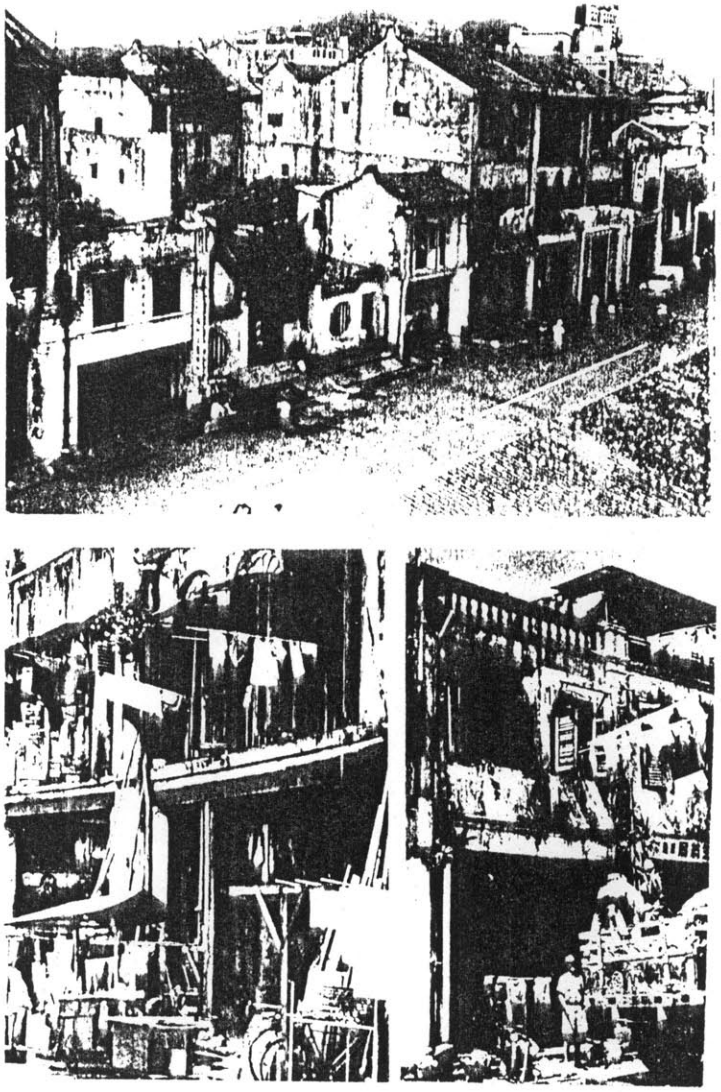
HOUSING INDICATORS	HONG KONG	JAPAN	SINGAPORE
PER CAPITAL GNP 1982 (US.$)	5300	9600	6300
AV. HOUSEHOLD SIZE (1983/84)	4	3.2	4.4
PROPORTION OF POP. IN PUBLIC HOUSING (1984)	45%	5.50%	81%
PUBLIC HOUSING STATUS (1984)			
A) RENTAL FLATS	94%	56%	26%
B) SOLD FLATS	6%	44%	74%
UNIT SIZES (SQ.M.)			
A) RENTAL UNITS	23-40	NA	23-75
B) SOLD UNITS	45-65	27-118	33-155
FLOOR SPACE 1980 (SQ.M. PER PERSON)	2.2-5.7	8.0-36.0	7.7-50.0
SELLING PRICES 1985 (US.$/SQ.M.)	325-700	1450-1550	200-325

SOURCE : HONG KONG HOUSING AUTHORITY ANNUAL REPORTS
JAPAN STATISTICAL YEAR BOOKS
SINGAPORE HOUSING & DEVELOPMENT BOARD ANNUAL REPORTS

This chapter thus focusses on identifying the factors that have contributed to the obsolescence of earlier new towns in Singapore. Singapore, like many other third world countries coming into independence in the post war years of the late 1950's, was saddled with the problem of creating adequate housing facilities for its masses, especially its urban poor (see Figure 1.1). At a time characterized by an infirm political, economic and social infrastructure, the first priority of the newly appointed self-government was to create sufficient low cost housing for the people.

The initial overall objective of the government housing policy in Singapore was to ensure that every family would eventually have a permanent, self-contained home within reach of employment and other facilities, at a rent that it could afford. The initial priority was set to build many small units in as short a time as possible within its new towns. The rapid economic growth of Singapore from the 1960s to the 1980s has improved the overall income levels of its population and this has resulted in the demand for a better standard of public housing with larger floor space, better designs and, as well better facilities than could be found in the new towns . A sustained rate of economic growth has not led to a substantial improvement in housing conditions in these old towns. Presently these developments are losing their appeal since they offer what many feel is minimum floor space and inadequate facilities. .Beginning in the the early 1980's, residents of early towns began to migrate to a new set of new towns being constructed by the government to offer more space and greater amenities. The housing situations in the old towns started to deteriorate with more vacant housing units and commercial premises.

FIGURE 1. 1: EARLY URBAN SQUATTERS IN SINGAPORE
The early urban poor in Singapore lived in cubicles within these very congested housing, with no proper sanitation and utilities.



1.1 THE CAUSES OF NEW TOWN OBSOLESCENCE :

Why do residents migrate ? What has caused these old towns' obsolescence ?

This chapter traces the background factors that are responsible for the internal migration and attempts to determine the causes of old town obsolescence (see Figure 1.3). Some basic underlying hypotheses for revitalization have evolved from analyzing these causes.

Broadly, there are the following four major causes :

1. The rapid pace and massive scale of new town development which offers residents a wide choice of easily available public housing and providing an alternative to older new towns;

2. The unique demographics and social development trends in Singapore for the past twenty eight years with almost zero population growth rate and decreasing household sizes (see Figure 1.4), and higher household incomes have enabled the average Singaporean to upgrade his living environment;

3. The strong economic progress which has raised not only the standards of living but also the expectations of every Singaporean for a better living environment;

4. The current old town improvement projects which now being implemented by the government are inadequate to meet the expectations of the residents.

FIGURE 1.3 : OLD HOUSING ESTATES IN SINGAPORE
The old housing estates in Singapore were first constructed to meet the acute housing shortage in Singapore. They were poorly planned with very small housing units and inadequate facilities.

FIGURE 1.4 : AVERAGE HOUSEHOLD SIZE AND INCOME IN SINGAPORE

	1965	1975	1985	1995(PROJECTED)
AVERAGE HOUSEHOLD SIZE (PERSON)	6.5	5.5	4.4	3.5
AVERAGE HOUSEHOLD INCOME (SINGAPORE$)	318	681	1363	2000

SOURCE : HDB STATISTICS.

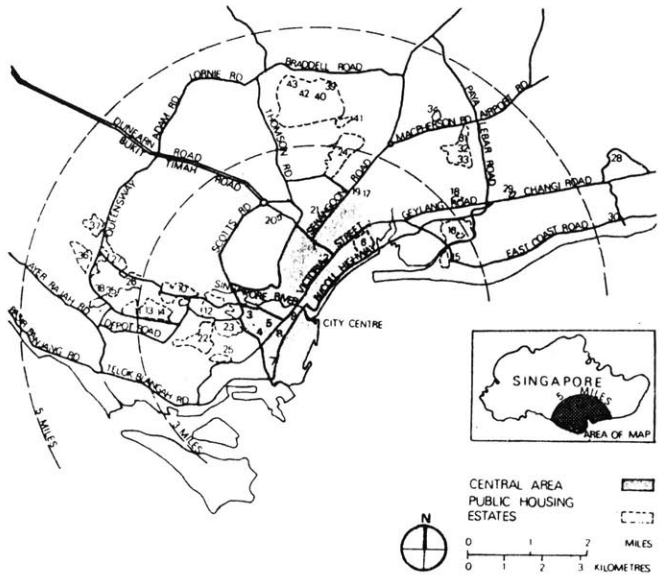
CAUSE ONE — PACE OF NEW TOWN DEVELOPMENT:

New town planning and design in Singapore has changed rapidly within the last two decades and each subsequent new town model has seen the introduction of new ideas and improvements. From the planning perspective, new town developments in Singapore can be broadly classified into four phases of development.

During the first phase, shortly before Singapore became independent and the Housing and Development Board (HDB) was formed in 1960, isolated public housing estates at or near the fringe of the City Center were built (see Figure 1.5).Typical public housing developments of this phase were Bukit Ho Swee, Bukit Merah, Redhill, and Queenstown, consisting mainly of 6 to 20 storey slab blocks with 1 and 2-room flats.In this first phase of public housing development, urgency to find quick solutions to the housing shortage prompted the government to plan in an ad hoc and piecemeal manner.

The second phase of new town development, from 1960 to 1969, witnessed the introduction of a new town structure with a target population, a town center and a range of complementary facilities. The first such development was Toa Payoh New Town (see Figure 1.5), where an experimental self-contained planning concept of neighborhoods, which included commercial and industrial facilities within a new town was first introduced. However, during this period the HDB was still preoccupied with providing cheap and small 1 and 2-room flats.

FIGURE 1.5 :PUBLIC HOUSING ESTATES IN THE CENTRAL AREA Of SINGAPORE



ESTATE CODES

Centra Area
1 Stamford Estate, etc
2 Queen Street, etc
3 York Hill, etc
4 Outram Road (Redevelopment)
5 Park Road, South 1
6 Palembang Road, Precinct North 1
7 Cantonment Road
8 Upper Pickering Street
9 New Bridge

Inner City
10 Alexandra (North)
11 Alexandra Hill
12 Bukit Ho Swee
13 Bukit Merah
14 Redhill
15 Tanjong Rhu/Mountbatten
16 Guillemard, etc.
17 Kallang Basin, M.2
18 Kallang Basin, Sims Av.
19 Kallang Basin, N.1
20 Kampong Java
21 Windstedt Court
22 Kampong Tiong Bahru
23 Tiong Bahru, etc.
24 St. Michael's
25 Kampong Silat

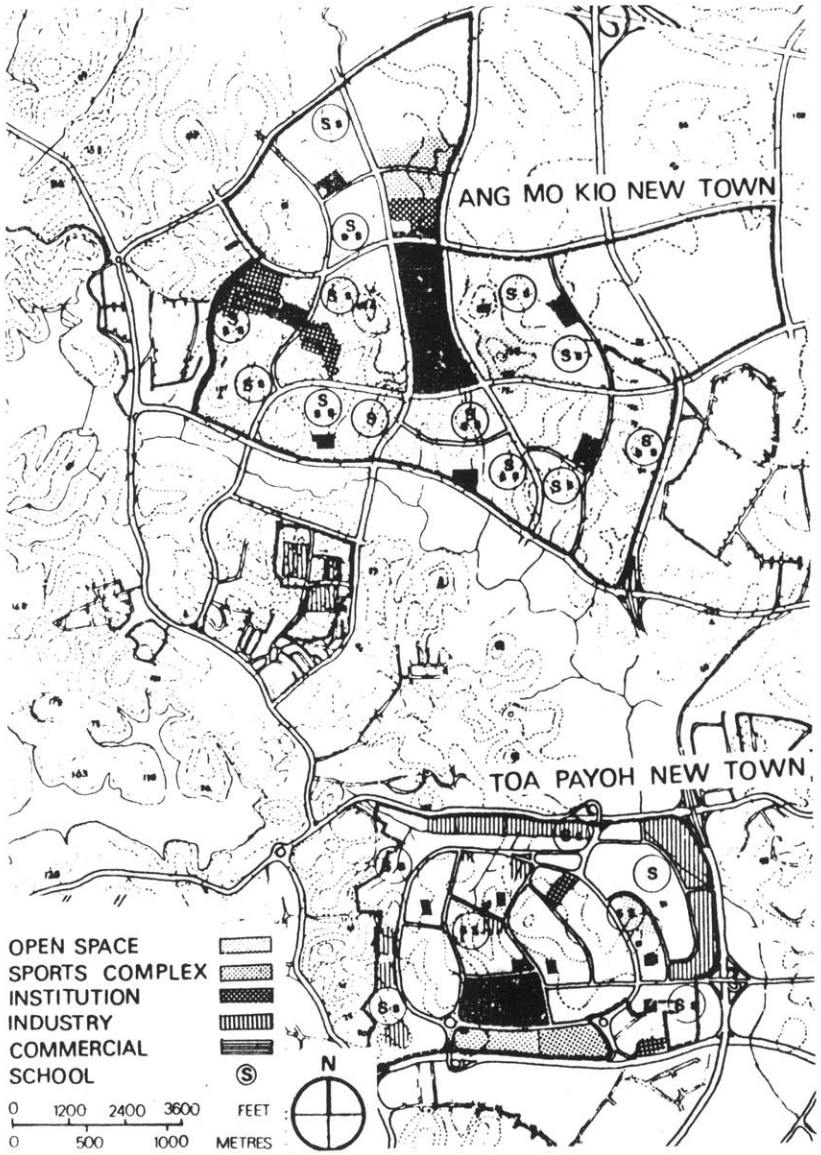
Outer City
26 Princess
27 Duchess
28 Upper Changi Road
29 Geylang Serai
30 Siglap Fire Site
31 Macpherson (S) Ext.
32 Macpherson (S) Balance
33 Macpherson Road
34 Upper Aljunied Road
35 Queenstown, N.6
36 Queenstown, N.4
37 Queenstown, N.3
38 Queenstown, N.5
39 Toa Payoh, N.1
40 Toa Payoh, N.2
41 Temple
42 Toa Payoh, N.4
43 Toa Payoh, N.3

The third phase of new town development, from1970 to 1979, was undertaken in a more systematic way, as reflected in Ang Mo Kio New Town (see Figure 1.6). New Town planning during this phase benefitted largely by the Long Range Concept Plan, prepared by the State and City Planning Office under the advice of a team of United Nation development experts. The hierarchy and distribution of each activity within a new town such as a town center, neighborhood center, and a full range of commercial, recreational, religious and community facilities were included. This third phase of development also marked the increased demand for the larger 3 and 4-room flats and the decreased demand for the smaller 1 and 2-room flats.

The fourth phase of new town development began in the early 1980's with the consecutive construction of six new towns, namely Yishun, Hougang, Jurong East and West, Bukit Batok New Towns, and Tampines (see Figure1.7). This phase marked the introduction of the precinct concept. Each neighborhood was divided into eight to ten precincts of 600 to 800 dwelling units each to facilitatean individual design character for each precinct and at the same time also to foster community development.

While more progressive ideas and improvements were added to the newer new towns over the years, the earlier and older new towns fell well below par compared to the newer new towns. Owing to the continuous pressure and pace to plan and construct more new towns to meet the increasing demand for flats, minimum efforts were undertaken by the authority to go back and upgrade the earlier new towns. The disparity in quality among new

FIGURE 1.6 : LAND USE PLANS OF TOA PAYOH NEW TOWN AND ANG MO KIO NEW TOWN



towns constructed at different phases has therefore gradually widened.

In earlier new towns such as Queenstown and Toa Payoh, 1-room and 2-room small units[5] constitute more than 63 percent of the total supply of public housing. This was due to affordability and popular demand at that time (see Table 1.2). Over a short span of 20 years , this demand for small units has dropped to only 0.3 percent[6] . Most Singaporean snow choose to stay in bigger 3-room and 4-room units which they can now afford. Many have moved out from the smaller units of public housing in the older new towns and only a few have applied to move in, leaving these new towns in a state of permanentvacancy.

FIGURE 1.7 : LAND USE PLAN OF TAMPINES NEW TOWN

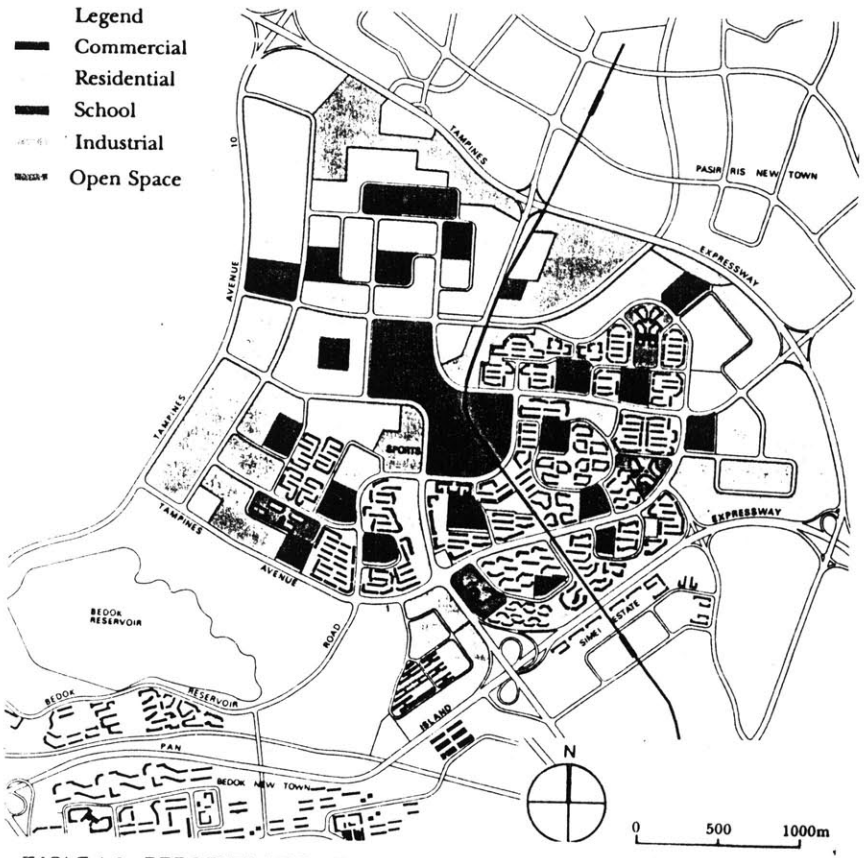


TABLE 1.2 - PERCENTAGE DISTRIBUTION OF FLATS IN HDB NEW TOWNS

PERIOD	1-RM.	2-RM.	3-RM.	4-RM.	5-RM.	EXEC.	MID.INC.	ToTal
1960-65	34	29	36.4	0.4	0	0	0	100
1966-70	45	19	34.3	1.7	0	0	0	100
1971-75	27	6.5	45.4	14.6	6.8	0	0.2	100
1976-80	3.2	7.7	52.6	25.6	9.9	0	1	100
1981-85	0.1	0.2	36.2	44.5	12.8	3.7	2.5	100

SOURCE : HDB BUILDING AND DIVISION STATISTICS

CAUSE TWO — DEMOGRAPHICS AND SOCIAL DEVELOPMENT TRENDS:

The physical structure of these earlier new towns were also made obsolete by the fast changing demographic profile of the Singaporean population and the new household sizes (see Table 1.3).Partly by the changing profile of the population[7] and the easy availability of affordable public housing[8] , this has brought about a smaller household size[9]. The reduction of involuntary doubling up, due to the easy availability of affordable housing and the breaking up of the traditional extended Three generation family units[1], caused partly by the HDB housing policy for allocation of flats, are but two of the major causes of this trend. The proportion of extended nuclear families[11] and multi-families has shown a gradual decline. Extended families have declined from 14.8 percent of the total in public housing in 1968 to 12.5 percent in 1981, and multi-family group had also declined, from 13.6 % in 1968 to 5.8 percent in 1981. While nuclear family and no family households had increased from 0.8 percent in 1968 to 2.5 percent in 1981, the average household size had declined from 6.5 persons in 1960 to 4.4 persons in 1985 and 4.0 persons in 1987[12] . These figures indicate a trend towards more single elderly persons households or smaller household families each occupying an individual flat.

TABLE 1.3 - - DEMOGRAPHICS OF NEW TOWNS IN SINGAPORE

	PHASE 1 BEFORE 1960	PHASE 2 1960-69	PHASE 3 1970-79	PHASE 4 1980-89
AV.NO. OF HOUSEHOLD PER UNIT	1.01	1.02	1.00	1.00
AV.NO. OF ROOM PER HOUSEHOLD	2.17	1.92	3.50	4.00
AV. HOUSEHOLD SIZE	6.50	5.50	4.40	4.00
AV.NO. OF PERSON PER UNIT	6.49	5.64	4.40	4.00
AV.NO. OF ROOM PER UNIT	2.15	1.96	3.50	4.00
AV. NO. OF PERSONS PER ROOM	3.02	2.88	1.30	1.00
FAMILY STRUCTURE				
NUCLEAR FAMILY	5.00%	70.80%	72.40%	79.20%
EXTENDED FAMILY	)	14.80%	14.30%	12.50%
MULTI-FAMILY	)90.00%	13.60%	11.90%	5.80%
NON-NUCLEUR	5.00%	0.80%	1.50%	2.50%
AV. MONTHLY INCOME (S$)	< 200	318	445	1113

SOURCE: HDB SAMPLE HOUSEHOLD SURVEYS

CAUSE THREE — ECONOMIC PROGRESS AND RISING STANDARDS OF LIVING :

Rapid economic growth in Singapore for the past fifteen years has raised the standards of living and expectations of every Singaporean. The demands for 1-room and 2-room flats have decreased significantly due to the affordability of the HDB residents to purchase larger flats (see Table 1.4). Many tenants vacated their small flats after purchasing larger one in the newer new towns. This trend results in an abundance of vacant small flats in older new towns. Annually, an estimate of 10,000 to 12,000 HDB tenants and lessees vacate their present smaller flats[13] in the older new towns leaving a vacancy of around 10,000 flats per year for the past several years. Currently, these vacant flats constitute about 20 to 30 per cents of the total number of flats in the older new towns.

Sustained economic progress in Singapore throughout the last twenty years with an average GNP growth rate of 5% [14] has increased the household incomes , the standards of living, and the corresponding increase in aspirations of the entire population.This trend is expected to continue into the next decade [15] and provides an indication of the increased expectation of a better standard of living and the acquisition of luxury consumer goods as a result of economic success (see Table 1.5).

TABLE 1.4 -- HDB HOUSEHOLD INCOME 1968 - 1985 IN S$

YEAR	1-RM.	2-RM.	3-RM.	4-RM.	5-RM.	EXEC.	MID.INC.	OVERALL
1968	180	294	447	677	677	NA	NA	318
1973	267	400	605	900	900	NA	NA	445
1977	398	617	795	1043	1485	NA	NA	681
1981	623	842	1113	1522	2168	NA	NA	1113
1985	693	934	1323	1837	2482	2693	3981	1363

SOURCE : HDB SYSTEMS & RESEARCH DEPARTMENTS - SAMPLE HOUSEHOLD SURVEYS

TABLE 1.5 - AVERAGE NUMBER OF HOUSEHOLDS PER SELECTED ITEM OF CONSUMER GOODS

ITEM	1968	1973	1977	1981
RADIO	1.9	1.5	1.9	1.0
TELEVISION	2.5	1.4	1.2	1.1
TELEPHONE	11.2	5.1	2.7	1.2
REFRIGERATOR	2.0	1.4	1.2	1.1
AIR-CONDITIONER	N.A.	N.A.	66.7	31.3
CAR/VAN	8.4	5.8	5.0	4.0
SCOOTER/MOTORCYCLE	6.9	8.1	6.5	N.A.

SOURCE: HDB SYSTEMS & RESEARCH DEPARTMENT.- SAMPLE HOUSEHOLD SURVEYS .

CAUSE FOUR — INADEQUATE OLD TOWN IMPROVEMENT WORKS :

In the past 28 years, the HDB has principally confined its efforts to the planning and construction of new projects. Very little effort has been made to improve and upgrade these new towns once they have been developed. (see Table 1.7) .

Improvements to existing estates and new towns carried out by the HDB take the form of repairs and redecorating [16], such as the painting of the external walls of building blocks at five year intervals and repairing damaged facilities and building defects (see Table 1.7). It was only in late 1978 that the HDB started its first conscious effort to improve the older new towns by demolishing 34 blocks of one-room emergency flats under its Phase One Demolition Program.[17] By March 1983, another 15 blocks were demolished under Phase Two of the same Program (see Table 1.7). However, this demolition program was carried out in the usual pragmatic approach without consideration for other alternatives. All the high-rise structures that housed these flats are less than 30 years old, structurally sound and could have easily been remodelled into larger flats.

It was not until March 1985 that the HDB took on the alternative of converting, instead of demolishing, 4,795 units of smaller flats into 1,623 units of 3-room and 4-room larger flats in the older estates of Tiong Bahru, Henderson and Queensway. However, a more comprehensive study of what to do with the remaining 106,000 units of 1-room and 2-room old flats spread over 72 older estates and new towns

TABLE 1.6 - HDB REPAIRS & REDECORATION, DEMOLITION AND REDEVELOPMENT PROGRAMS

TYPE OF BUILDING ACTIVITY	81/82	82/83	83/84	84/85	85/86
REPAIRS & REDECORATION (BLOCK)	0	0	939	863	922
DEMOLITION COMPLETED (BLOCK)	34	15	25	5	0
REDEVELOPMENT COMPLETED (BLOCK)	0	0	0	4	1
REDEVELOPMENT IN PROGRESS (BLOCK)	0	10	16	11	16
UPGRADING OF EXISTING ESTATES					
A) IMPROVEMENT TO WATER DISTRIBUTION SYS.(BLK>)	1950	1950	939	23	2428
B) IMPROVEMENT TO EXIST.DUSTBIN COMPOUNDS(NO.)	148	154	154	0	0
C) PROVISION OF ADD. CASEMENT WINDOWS(NO.)	48287	47976	181232	0	0
D) PROVISION OF LOW-LOSS BALLAST IN LIGHTING (NO.)	0	299000	0	0	0
E) LAYING OF AERATION SLABS IN PARKING LOTS(LOT)	13500	1342	40	0	0
F) SLABBING OF OPEN DRAINS (KM.)	0	42	30	4	17
G) BUILDING OF BUS SHELTERS (NO.)	117	32	16	19	69
H) BUILDING OF PEDESTRIAN OVERHEAD BRIDGE (NO.)	11	7	5	1	4
I) PROVISION OF CATV (BLOCK)	0	0	3500	0	0
J) PROVISION OF BOOSTER PUMPS	0	0	0	490	0
K) ADDITIONAL LIFTS TO OLD BLOCKS (UNIT)	0	0	7	7426	10466
L) REWIRING TO OLD BLOCKS (BLOCK)	7830	0	0	265	629

SOURCE : HDB ANNUAL REPORTS 1981 TO 1986

is required[18] . The disparity in quality among buildings created under different phases of new town development could be minimized through a continuous, comprehensive redevelopment and upgrading program . For the small island of Singapore as a whole, there is a real and urgent need to minimize this disparity and produce a consistent, coherent and upgraded environment that reflects the aspirations of high economic performance and social development in a city of excellence.

CHAPTER TWO - MAJOR ISSUES OF NEW TOWN REVITALIZATION

When Singapore launched its first national housing program in 1960, priority was set to build a maximum number of housing units in the fastest and most economical way in order to alleviate the acute housing shortage and poor housing conditions rampant in the country [19]. In land-scarce Singapore, high-rise, high-density housing development was seen as the only choice. In those early years, smaller flats of 1 to 2-room types were the main models built to accommodate the poor population (see Table 2.1). Blocks of apartments were generally planned with a central corridor serving units on both sides. Each of these high-rise blocks was served by only one lift[20]. They were usually regimentally arranged with minimum design concerns for privacy.

On the economic front, the rapid industrialization which took place in the1960s had began to bear fruit. There was full employment, with a real gross domestic product growing by an average annual rate of 9 per cent[21]. The standard of living rose rapidly, but affluence and better income brought about new problems to these old towns and housing estates. The average families in Singapore having had their basic housing needs satisfied , had a desire to move to a higher hierarchy of needs. Greater expectations had been demanded of the quantity and quality of housing amenities and services provided in their living environments. The HDB had to keep pace with these expectations and improved its new town developments. There are several important issues that arose out of these developments.

TABLE 2.1 - THE DEVELOPMENT OF NEW TOWNS IN SINGAPORE COMPARISON OF CHARACTERISTICS AND EMPHASIS

	PHASE 1 BEFORE 1960	PHASE 2 1960-1969	PHASE 3 1970-1979	PHASE 4 1980 -1989
PLANNING MODEL	AD-HO	NEW TOWN	N'HOOD	PRECINCT
GROSS NEW TOWN DENSITY(DU/HA)	200-550	99	69	64
POPULATION (MILLIONS)	0.14	0.45	1.00	2.09
HOME OWNERS (MILLIONS)	0.00	0.02	0.44	1.59
LEASERS (MILLIONS)	0.14	0.43	0.61	0.50
TYPES OF HOUSING				
1-ROOM FLAT	20.00%	34.30%	26.50%	0.10%
2-R00M FLAT	80.00%	28.90%	6.50%	0.20%
3-ROOM FLAT	0.00%	36.40%	45.40%	36.20%
4-ROOM FLAT	0.00%	0.40%	14.60%	44.50%
5-ROOM FLAT	0.00%	0.00%	6.80%	12.80%
MIDDLE-INCOME FLAT	0.00%	0.00%	0.20%	6.20%
AVERAGE FLAT SIZE (SQ.M.)	28.00	45.00	48.00	72.60
AV. HOUSEHOLD SIZE (PERSONS)	7.0	6.5	5.5	4.4
AV.FLR.AREA PER PERSON (SQ.M.)	4.0	6.9	8.7	16.5

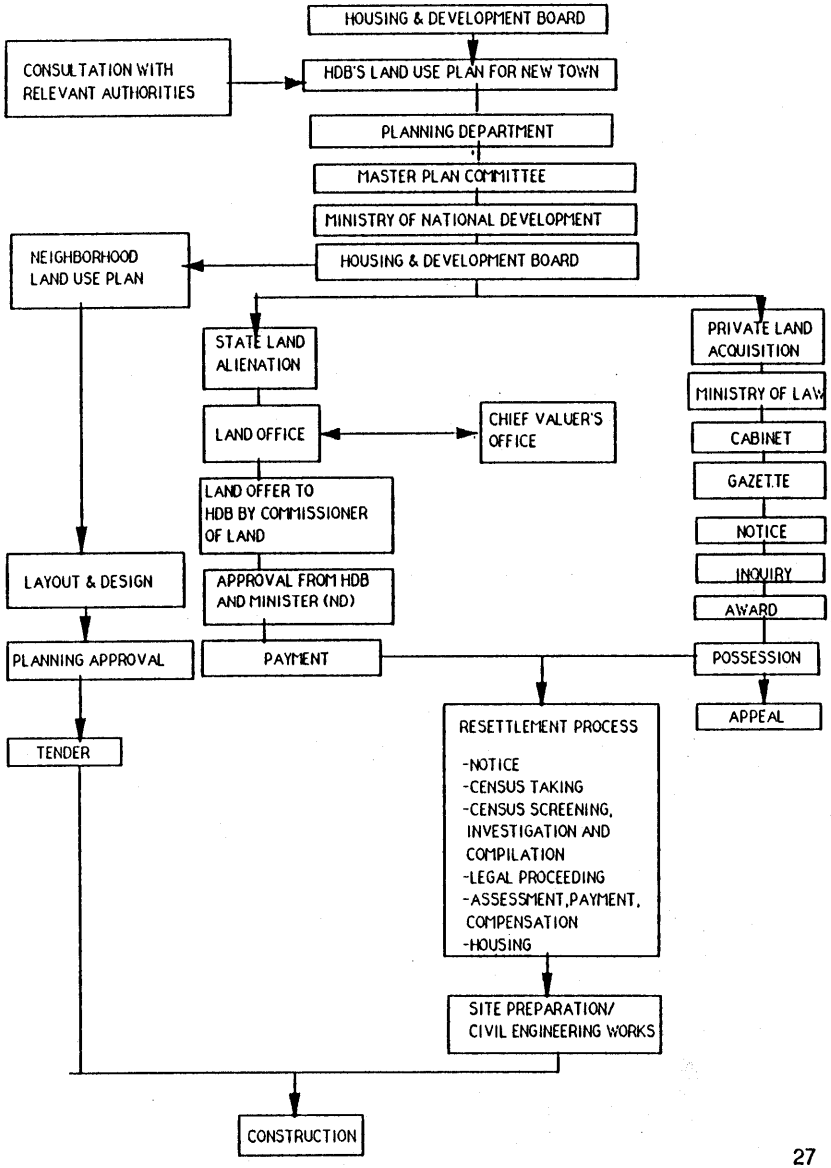
SOURCE :HDB COMPUTER SERVICES DEPARTMENT STATISTICS

ISSUE ONE — POLITICS :

Whatever level of political competence Singapore has achieved, it remains, in its public housing policy and new town development, heavily dependent upon the successful 'lead role playing' of the government (see Figure 2.1). The success story of public housing in Singapore since independence in 1959 to the present has been in no small measure due to the government playing the roles of entrepreneur, financier and developer. In the 28 years' history of consecutive success in public housing, the public sometimes forgot that they were partisan to this same venture. Thus when the 1986 economic recession hit its lowest point with a housing surplus, the full blame was laid on the government for its lack of foresight. Very few indeed challenged the need to re-examine the over-dominant role the government played n public housing. Only in March 1987, when a committee was appointed by the government to look into alternatives for public involvement in some of its major enterprises, did the government realize from the committee's recommendation that *"The time has come for the public sector to get themselves ready for privatization so that they can seize opportunities to privatize as these arise"* [22]

To postulate any transference of the housing program from the hands of one to the other, a vital questionhad to be asked : Has the time come for the Singaporean society as a whole to shoulder a more independent private role in the success of its housing program, even if it is necessary to create an alignment with the public sector ?

FIGURE 2.1 : NEW TOWN DEVELOPMENT PROCESS IN SINGAPORE
with central autonomy and minimum private and community participation



Many economists and planners have argued that since public housing programs have a high capital-output ratio, it demonstrates low productivity at the national level. It is argued, therefore, that housing should not be a public activity. Others see public housing as a basic need of mankind, and, as such, worthy of public support for essentially "welfare" reasons. This basic need is seen as a government obligation to its people. There are others who argue for the creation of public and private sector partnerships in both housing finance and production.

The involvement of the public sector in the provision of public housing is a necessary prerequiste in most newly developed countries. When Singapore attained self-government in 1959, the presence of a private sector was virtually non existent. The immigrant settlers hitherto had built their own temporary houses along the Singapore River (see Figure2.2). These homesteads were provided with the most rudimentary amenities and services, and did not arise from any planned or collective overriding infrastructure but was provided through individual improvisation. The existing housing shortage was further aggravated by the Rent Control Act of 1947 which was designed to check the spiralling increase in rental rates after the Second World War. In those days, the average household income was less than S$200 per month, according to the 1953-54 government social survey and 90 percent of all urban households in Singapore and 60 percent of the population earned below this average. Many were therefore not in a position to rent decent housing unit (see Table 2.2).

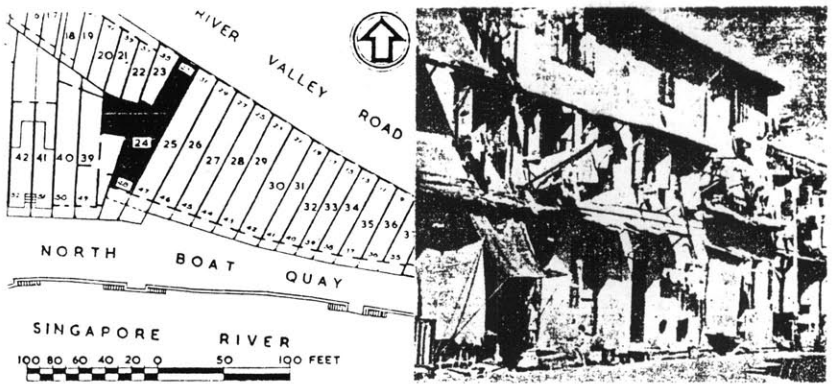
Limited subsidized housing was first provided by the British

TABLE 2.2 — DISTRIBUTION OF INCOME IN SINGAPORE 1967.

INCOME GROUP	NO.OF WORKERS	TOTAL INCOME (S$MIL.)	PERCENTAGE WORKERS	PERCENTAGE INCOME
1.UNEMPLOYED	75000			
2.NON-TAXABLE				
<S$2,400	315000	400	60.0	24.2
>S$2,400	80000	288	15.2	17.4
3.TAXABLE				
>S$2,400	46000	207	8.8	12.5
S$2000-7500	39000	163	7.4	9.9
S$7500-17500	36800	327	7.0	19.8
S$17500-55000	7730	210	1.5	12.6
>S$55000	630	60	0.1	3.6
TOTAL EMPLOYED	525160	1655	100.0	100.0
TOTAL LABOR FORCE	600160			

SOURCE: SINGAPORE INLAND REVENUE DEPT. ANNUAL REPORTS, 1965-1967 SAMPLE HOUSEHOLD SURVEY 1966

FIGURE 2.2 : TEMPORARY HOUSES ALONG THE SINGAPORE RIVER
These houses are very congested with many households staying in the same unit.



Colonial Government under the Singapore Improvement Trust (see Table 2.3). After Singapore's independence and the establishment of the Housing and Development Board in 1960, housing, defence, and industrial developments were identified as the new nation's top priorities.

The high land cost and the encumbrances engaged in the resettling of squatters in the residential areas had discouraged private developers to invest, especially in low-cost housing. The cost of developing a housing unit meeting with the stipulated minimum standards required by the government was not likely to result as a worthwhile investment for a private developer. The total investment outlay for the purchasing of lands, clearing of squatters, provision of infrastructure, and the final construction of the housing units is unlikely to be met by the returns from rents and sales. By and large then, the government total involvement in subsidized public housing is right and just. Notwithstanding its non-profit bearing returns, the social goals to be achieved for the nation as a whole are nevertheless self-evident — in terms of a more fulfilled and productive society.

The target to provide affordable housing as envisioned by the government continues in an ongoing program, from meeting the need of 20 percent of the population in the early 1960's to 85 percent by the 1980's. This increased housing commitment has placed a heavy burden on public expenditure, namely towards financing, provision of subsidies and supporting the administrative cost (see Table 2.4).

Viewed as such, it is perhaps timely to consider the potential and comparative advantages for a joint public

TABLE 2.3 — THE SINGAPORE IMPROVEMENT TRUST BUDGET, 1947-1959

EXPENDITURE/INCOME (S$MILLION)	YEAR 1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
CAPITAL EXP. ON HOUSING DEV.&IMP.	2.4	4.5	3.7	8.2	11.7	14.7	10.6	12.4	9.1	9.3	21.2	19.3	9.9
FINANCE BY:													
REV.CONTRIBUTION TO CAPITAL OUTLAY	1.6	1.6	0.4	0.9	0.1	0.4	0.01	0.03	0.3	0.8	0.4	0.3	0.5
GOVERNMENT LOANS	NA	2.3	3.1	6.9	11.3	14.2	10.6	12.4	8.8	8.5	20.8	19.0	9.4
S$10MILLION FUND	0.8	0.6	-0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
P. ELIZABETH FUND	NA	NA	0.2	0.4	0.3	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL EXPENDITURE	2.4	4.5	3.7	8.2	11.7	14.7	10.6	12.4	9.1	9.3	21.2	19.3	9.9
REVENUE INCOME													
IMPROVEMENT RATE	0.46	0.60	0.71	0.73	0.80	0.96	1.19	1.22	1.45	1.52	1.62	1.74	1.94
GOVT.CONTRIBUTION	0.46	0.60	0.71	0.74	0.77	0.84	1.08	1.20	1.38	1.45	1.55	1.65	1.88
RENTS	0.59	0.79	1.10	1.44	1.90	2.67	4.24	6.20	7.79	8.71	9.17	10.0	12.90
CONSERVANCY	NA	NA	0.03	0.04	0.05	0.18	0.33	0.59	0.69	0.86	0.25	0.02	0.02
SALE OF LAND	0.01	0.03	0.40	0.03	0.15	0.02	0.16	0.02	0.04	0.04	0.28	0.30	0.37
OTHERS	0.21	0.12	0.13	0.11	0.17	0.21	0.39	0.15	0.30	0.37	0.74	0.68	0.78
TOTAL INCOME	1.73	2.14	3.08	3.09	3.84	4.88	7.39	9.38	11.7	13.0	13.6	14.40	17.8
REVENUE EXPEND.													
PERS. EMOLUMENTS	0.31	0.46	0.53	0.66	0.95	1.17	1.38	1.59	2.05	2.31	2.44	2.72	2.79
ADMINISTRATION	0.19	0.22	0.25	0.30	0.38	0.54	0.68	0.60	1.01	1.07	1.23	1.24	1.12
MANAGEMENT	0.38	0.27	0.38	0.46	0.71	2.12	2.84	1.44	1.72	2.31	1.91	2.12	2.29
ASSESSMENT	NA	NA	NA	NA	NA	NA	NA	1.98	2.62	2.89	3.11	3.30	4.50
LOAN CHARGES	NA	0.01	0.14	0.50	0.73	1.08	1.62	2.15	2.20	2.60	3.51	4.46	7.53
OTHERS	1.70	1.69	0.83	0.94	0.36	0.57	0.44	0.23	0.49	1.43	0.70	0.67	0.95
TOTAL EXPENDITURE	2.58	2.65	2.13	2.86	3.13	5.47	6.96	7.99	10.10	12.6	12.9	14.50	19.20
SURPLUS/DEFICITS	-0.9	-0.5	0.9	0.2	0.7	-0.6	0.4	1.4	1.5	0.4	0.7	-0.1	-1.4

SOURCE : SINGAPORE IMPROVEMENT TRUST REPORTS 1947 -- 1959

TABLE 2.4 — THE HOUSING AND DEVELOPMENT BOARD BUDGET 1960-1985

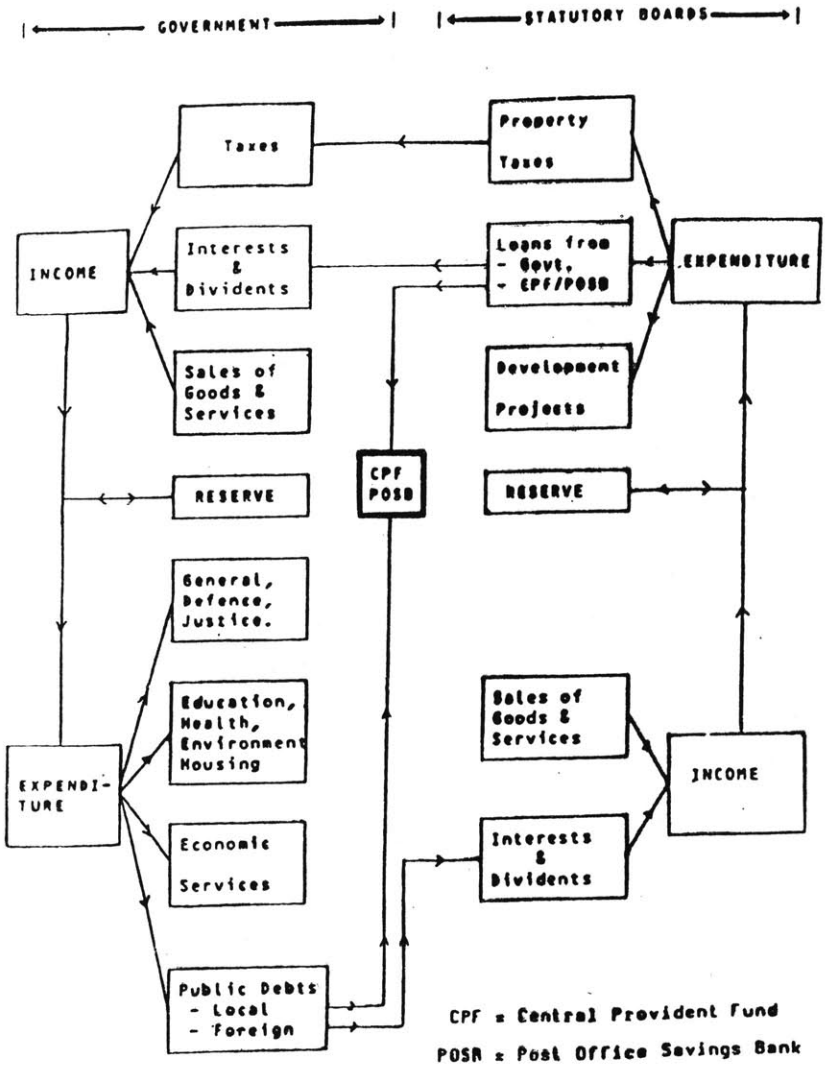
YEAR	HDB EXPENDITURE (S$MILLION) CAPITAL EXPENDITURE CONSTRUCTION	REVENUE EXPENDITURE OTHERS	EXPENDITURE	DEFICIT
1960	13	1	18	3
1965	88	22	52	9
1970	96	18	84	12
1975	605	113	238	59
1980	916	216	491	82
1985	3297	558	1211	164

SOURCE : HDB ANNUAL REPORTS 1960 – 1986

private partnership. The private sector in Singapore is now ready and capable of participating in housing finance, production and management. Many current leading private developers undertaking ventures in housing development in Hong Kong and China originated from Singapore. Amidst stiff international competition, they have proven thus far to be highly competent in housing production, upgrading, remodelling works and management skills. If the Singapore government is willing to initiate a policy for a public-private joint venture in undertaking the revitalization program, as had in the United States and Japan, an effective model for future public housing revitalization may well be devised. In the realm of financing, the public sector may be the provider of housing guarantees, deposits, insurance and the secondary mortgage market which may support the private housing finance institutions (see Figure 2.3). Usually these may be drawn by the buyers on the Government Central Provident Fund. In the actual housing production, both the public and private sectors may co-join in a venture to undertake the development. The government could continue to undertake the acquisition and provision of the sites; its clearance and compensation of resettlement of property owners and squatters, and the provision and upgrading of infrastructures. The housing designs, improvement and construction can all be vested with the private sector, with the enactment of supportive policies and regulations.

The issue in this partnership is nevertheless to fulfil the objective of providing affordable housing by keeping production and renovation costs low and by ensuring that the population has sufficient income and savings for purchase of the housing which is produced. The past achievements of

FIGURE 2.3 : HOUSING FINANCE IN SINGAPORE



the government in achieving this objective, through the establishment of the Central Provident Fund for public housing production, supply and regulation of building materials and the import of modern prefabrication methods of technology which reduce construction time and cost is highly commendable. This approach merits a sound framework for a future policy on public and private joint ventures in revitalizing new towns in Singapore.

ISSUE TWO -- ECONOMICS

The availability of housing financing is an important factor in the successful implementation of public housing in Singapore. Housing financing from the government is available both to the construction industry, as credits and loans, and to the people, as mortgage loans.

Under the Housing & Development Act Chapter 271, the HDB is required to prepare an annual budget for approval by the Minister for National Development. The HDB is bounded by the approved budget, though a supplemental budget to meet any urgent and unexpected spending is also provided. The main source of loan financing for the capital expenditure came from the Singapore Government in two forms: 1) a 60-year loan at 7.25 percent to 7.50 percent interest to finance public housing for rental;and 2) a 10-year loan at 6 percent interest to finance public housing for sale (see Table 2.5).The Singapore Government accords to housing the highest priority and such loans to the HDB has accounted for about one-third of the nation's total estimated Development Budget, yearly from 1975 to 1985[23] (see Table 2.6).

The major sources of finance and expenditures of the HDB shown in its annual revenue and capital accounts are published in the HDB annual reports. Rents, conservancy, service charges, and parking collections are the major items of its monthly revenue, while Government loans and Central Provident Fund collected from sales of flats under the "Home ownership for the People" scheme constitute the major sources of long-term finance (see Table 2.7).
As shown in theHDB Annual Reports from 1960 to 1986, the

TABLE 2.5 -- GOVERNMENT LOANS TO THE HDB 1960 - 1986

YEARS	LOAN AMOUNT (S$MMILLION) INTEREST FREE	6% INTEREST	7.25-7 .5% INTEREST
1960			48.00
1961	0.10		26.00
1962		6.02	80.00
1963		10.59	21.41
1964		5.43	37.71
1965		-	-
1966		5.43	37.71
1967		10.73	19.27
1968		44.71	4.67
1969/70		57.96	12.04
1970/71		32.63	27.62
1971/72		40.65	63.68
1972/73		38.38	221.36
1973/74		110.05	263.77
1979/80		39.80	174.14
1980/81		41.21	198.80
1981/82		41.38	248.01
1982/83		49.87	349.80
1983/84		85.23	501.01
1984/85		133.71	571.88
1985/86*		5.75	7.63

* : FIGURE TILL MARCH 1986

SOURCE : HDB ANNUAL REPORTS 1960 – 1986

TABLE 2.6 -- THE HDB ANNUAL INCOME & EXPENDITURE 1960 - 1986

AMOUNT S$ MILLION	YEARS 1960	1965	1970	1975/76	1980/81	1982/83	1983/84	1985/86
BUDGETED CAPITAL EXPENDITURE	14	110	114	718	1133	2254	3036	3855
% OF GOVT'S DEV. ESTIMATES	-	-	-	33%	31%	33%	39%	43%
CAPITAL EXPENDITURE	10	37	91	625	1061	2651	4045	3530
REVENUE EXPENDITURE	15	43	72	226	507	759	954	1144
REVENUE INCOME	13	39	69	181	467	667	833	1112
GOVERNMENT SUBSIDY	2	4	3	45	40	92	121	32

SOURCE : HDB ANNUAL REPORTS 1960 – 1986

HDB major revenue income were always insufficient to balance the annual capital output. This deficit is regularly met by the Government's subsidy. To date, the total deficit incurred for new town developments excluding land cost since the date of inception of the HDB in 1960 is 339 million Singapore Dollars. (see Table 2.6). The deficit is due mainly to the subsidized selling price of all different types of public housing and new town facilities. The government through its Housing and Development Board has constantly played the major role of providing low-cost subsidized public housing to its people.

TABLE 2.7 - HOME OWNERSHIP SCHEME

YEAR	NO. OF FLATS SOLD	PROCEEDS FROM SALE (S$MILLION)	MORTAGE LOAN (S$MILLION)	CPF AMOUNT (S$ MILLION)
1964	1451.00	6.10	4.20	0.00
1965	1516.00	14.50	13.90	0.00
1966	1320.00	13.80	21.50	0.00
1967	1499.00	12.80	27.60	0.00
1968	8504.00	45.60	55.90	6.30
1969	9897.00	62.50	90.60	28.00
1970	6967.00	63.70	124.20	50.90
1971	6062.00	58.90	149.00	74.10
1972	7808.00	50.00	167.60	99.20
1973/74	18345.00	183.20	269.80	149.80

SOURCE : HDB ANNUAL REPORTS 1960-1986

ISSUE THREE — SOCIAL QUESTIONS :

The evaluation of the social impacts of public housing on the Singaporean society must be carried out from two complimentary perspectives. The first is "looking in from without ". i.e.an analysis of quantitative data to assess its meeting with certain sets of overriding macro objectives. The second is "looking out from within" which from the point of view of the residents to assess whether their needs are being met.

The HDB has thus far conducted five sample household surveys in 1968, 1973, 1977, 1981 and 1985. Questions included in the five surveys are identical, covering essentially socio-economic characteristics , living conditions, and the associated levels of satisfaction; opinions on the change of environment; residential mobility and neighborliness. Results from these five surveys provided useful documents to assess the various needs and register the dissatisfaction level of the HDB residents .

Of the 7 categories of variables comprising the surveys, four of them relate to the physical design of the new town and its housing units, while the others relate to the social characteristics of the residents (see Table 2.8). The analysis of the data revealed the following : 1) There is an average of 2.8 percent to 8 percent of the sample households which aredissatisfied with the physical environment of a HDB town. These include the design and layout of the estate, the block, and flats in which these residents live (see Table 2.9). The majority of those who responded, stayed in 1-room and 2-room flats in the older estates. The most common negative

TABLE 2.8 - CATEGORIES OF SAMPLE HOUSHOLD SURVEY VARIABLES

SURVEY VARIABLES:

1. The Physical characteristics of the flat,
2. Socio-economic structure of household,
3. Personal characteristics of registered tenants and lessees,
4. Present living conditions,
5. Neighborliness,
6. Residential mobility,
7. Change in living conditions.

SOURCE: HDB SAMPLE HOUSEHOLDS SURVEYS1968,1973,1977,1985

TABLE 2.9 — PERCENTAGE DISTRIBUTION OF HOUSEHOLD'SATISFACTION

ITEM	SATISFACTION		ACCEPTABLE		DISSATISFIED		TOTAL
	1968	1977	1968	1977	1968	1977	
THE FLAT	67.6	73.0	23.6	19.1	08.8	07.8	100.0
THE FLOOR	62.1	73.5	24.7	21.4	13.2	05.1	100.0
THE BLOCK	68.2	71.4	27.1	24.9	04.7	03.7	100.0
THE ESTATE	71.7	73.4	25.7	23.8	02.6	02.8	100.0
NEARNESS							
TO CITY	48.7	60.6	41.0	31.9	10.3	07.5	100.0
TO WORK	40.4	55.9	38.5	31.2	21.1	12.9	100.0
TO CLINIC	69.1	69.0	23.9	25.7	07.0	05.2	100.0
TO POLICE STATION	36.8	37.4	27.0	29.3	36.2	33.3	100.0
TO PRIMARY SCHOOLS	61.0	61.2	23.9	24.4	15.2	08.4	100.0
TO SECONDARY SCHOOLS	43.8	67.2	34.7	26.6	21.5	12.2	100.0
EFFICIENCY OF LIFTS	39.0	65.3	-	-	61.0	34.7	100.0
LEVEL OF NOISE	38.8	55.0	35.9	41.2	25.3	03.8	100.0
BUS SERVICE	56.9	75.4	21.2	01.9	21.9	22.7	100.0

SOURCE : HDB SYSTEM AND RESEARCH DEPARTMENT- REPORT ON SAMPLE HOUSEHOLD SURVEY 1968 AND 1977.

responses included complaints ranging from "poor ventilation", "dark narrow double-loaded common corridor", "pervading sense of danger and lack of security", "lack of privacy", "general environmental decay, neglect and deprivation" etc. There is an increase, however, in the positive satisfaction level of some components that relate to the better planning, design and more adequate provision of facilities in the newer new towns, although there are corresponding decreases in the satisfaction level of the same components in the older estates and towns . The HDB's improvement and upgrading works to the older estates only started in the early1980s and proceeded at minimum efforts (see Table 2.9).

While the feedback from these sample household surveys have permitted the HDB to level in its public achievements and lend impetus to plan and design better new towns, attention towards the improvement of the older towns remains lacking. The disparity between them continues to widen. As is apparent in HDB's lack of priority towards the older towns, the first conscious effort at redeeming old towns was only undertaken in 1985 although the first survey was conducted as early as 1968.

ISSUE FOUR - PHYSICAL PLANNING

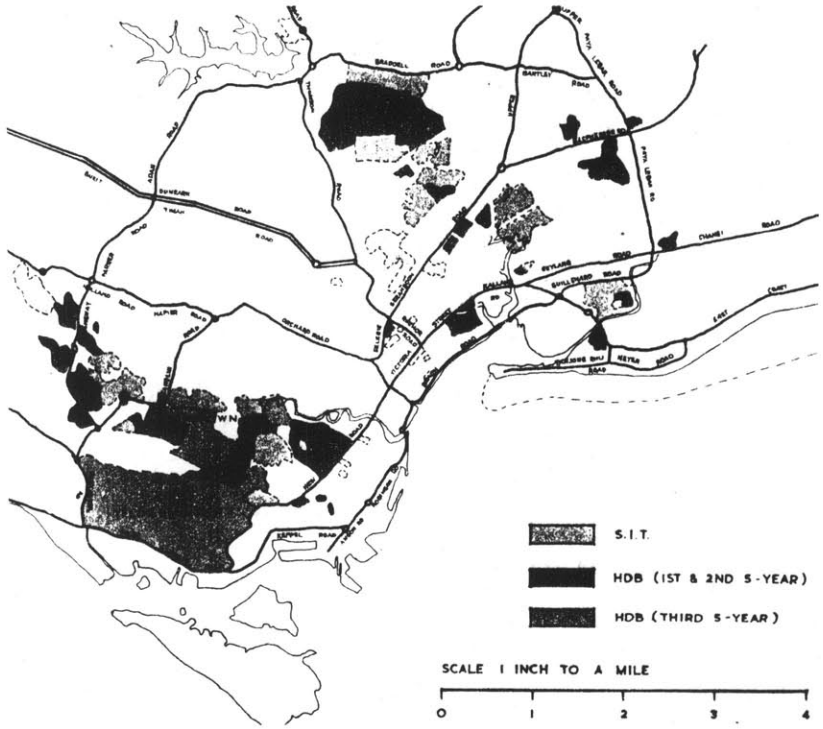
PHASE ONE 'NEW TOWNS' - PRE 1960 PERIOD

Phase one "new towns" consist mainly of isolated small housing estates developed within or near the fringe of the Central Area[24] to serve the residential needs of the people who work in these areas. They are considered, from the planning point of view, far from being true "new towns". Communal, recreational and educational facilities were not planned into these estates. Flats were also small and congested, with very high overall residential densities, ranging from 200 du/ha to 500 du/ha (see Table 2.1). Compounded to this problem is the locations of these estates within the fully developed Central Area of Singapore. To secure more land for additional facilities is physically and economically difficult. Besides these estates are each too small to justify the need for individual provision of more facilities. (see Figure 2.4).

In order to upgrade them to the present standards of self-contained new towns, redressing actions will require a conglomeration of these estates to form a substantial size new town so that justification for the provision of more facilities and employment opportunities may be substantiated. The conglomeration of Bukit Merah Estate, Henderson Estate, Redhill Estate and Tiong Bahru Estate into a sizable new town (see Figure 2.4) is such an example. . These conglomerated estates can then be systematically upgraded to a new town to provide a full range of new facilities. Sites can also be caustiously purchased or exchanged from nearby private land owners or lands cleared from demolishing the dilapidated building blocks.

FIGURE 2.4 : PHASE ONE ESTATES

These estates are often not provided with adequate facilities due to the low population catchment.



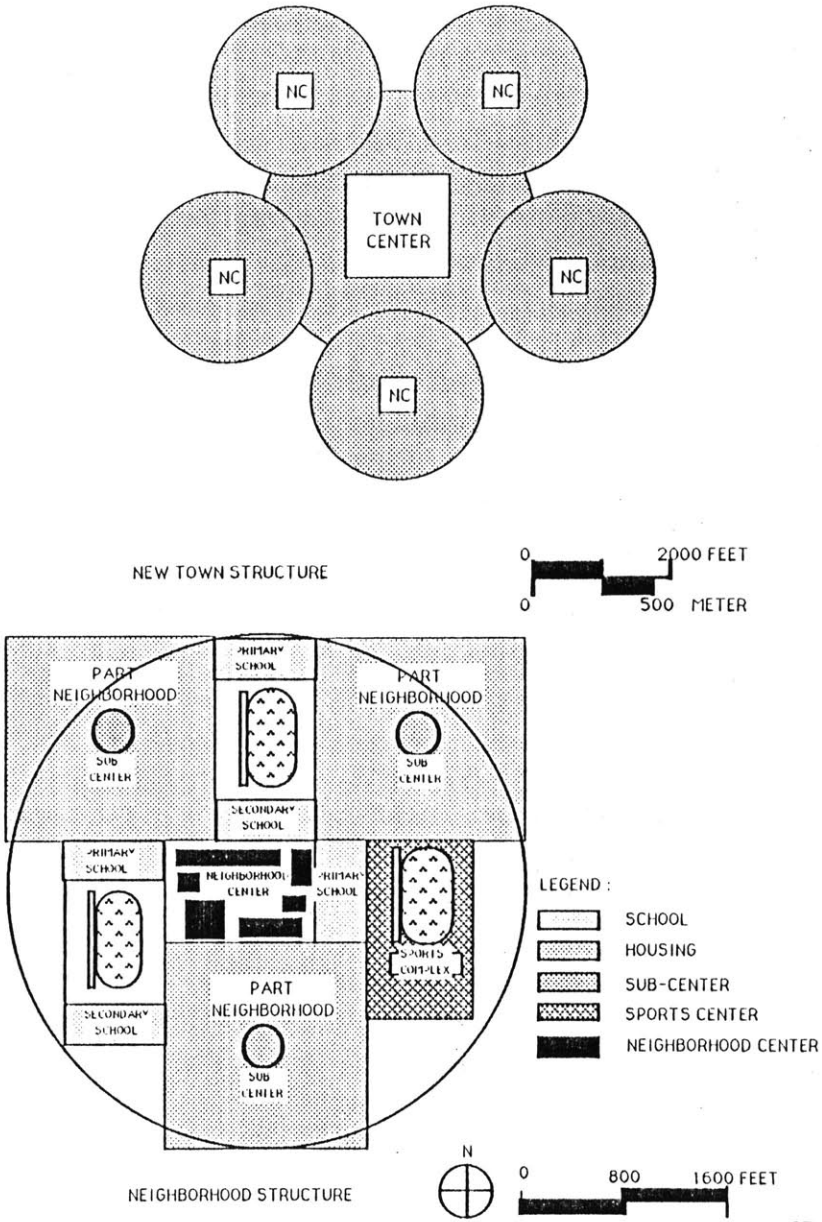
PHASE TWO NEW TOWNS - 1960 - 1969

This second phase of new town development witnessed the beginning of a conception of new town structure[24] -- one with a sizeable population of 200,000 persons, a town center and a range of facilities provided within a larger site area (see Figure 2.5).The Planning Concept for the new town was based on a concentric layout with the town center as the center of new town activities. Six to eight neighborhoods were planned around this town center, with each locally supported by a local activities center. The objective was to make the new town self-sufficient in terms of commercial, institutional and recreational facilities.

However, this early experimentation of large-scale development left much to be desired, with the uncertainty of facilities provision as well as the problems of uneven distribution of these facilities. For example, the ring road access used in Toa Payoh New Town form a series of internal loops which do not lend itself to a good orientation and easy accessibility for the residents and visitors to the new town , especially when most of the buildings were very similar. Neighborhood centers and recreational facilities were all concentrated around the Town Center. This resulted in the residential areas within the Town Center becoming over-provided with facilities while those on the outer neighborhoods were under-provided with facilities (see Figure 2.6).

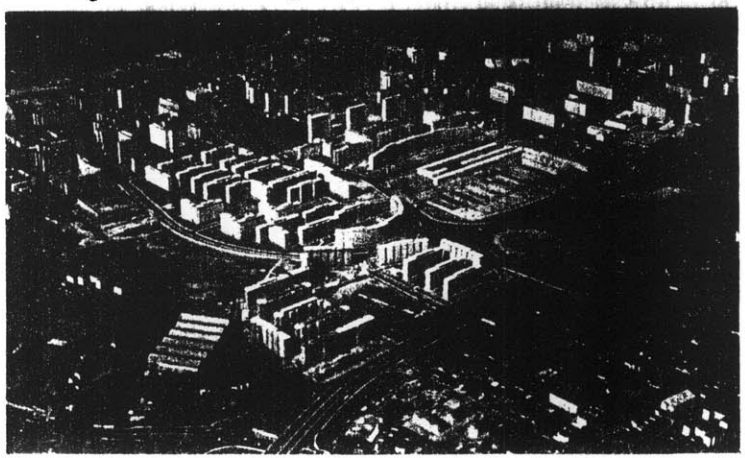
Revitalization actions for new towns built under this second phase will therefore need to be focused on the redistribution of facilities, especially with the relocation of neighborhood

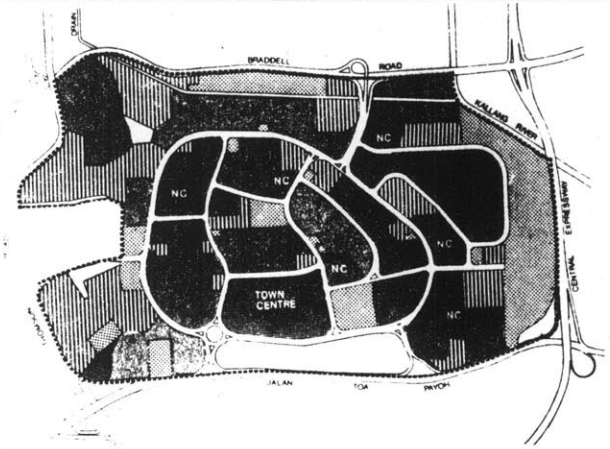
FIGURE 2.5: FIRST NEW TOWN AND NEIGHBORHOOD STRUCTURE IN SINGAPORE



centers and recreational facilities. Approaches and other accessibilities to these older new towns were often not planned with the anticipation of the present volume of traffic. Additional access to the island wide road network[26] will also need to be carefully identified.

FIGURE 2.6 : LAYOUT PLAN OF TOA PAYOH TOWN CENTER
This town center and its surrounding are over-provided with facilities which deprived other neighborhoods for having adequate facilities.





Legend	Land Area (ha)	Percentage
Residential	150	40
Commercial	34	9
Industrial	47	13
Open Space, Sports & Recreational	24	6
School & Institutional	69	19
Roads & Others	49	13
Town Boundary		
Total	373	100

PHASE THREE NEW TOWNS - 1970 -1979

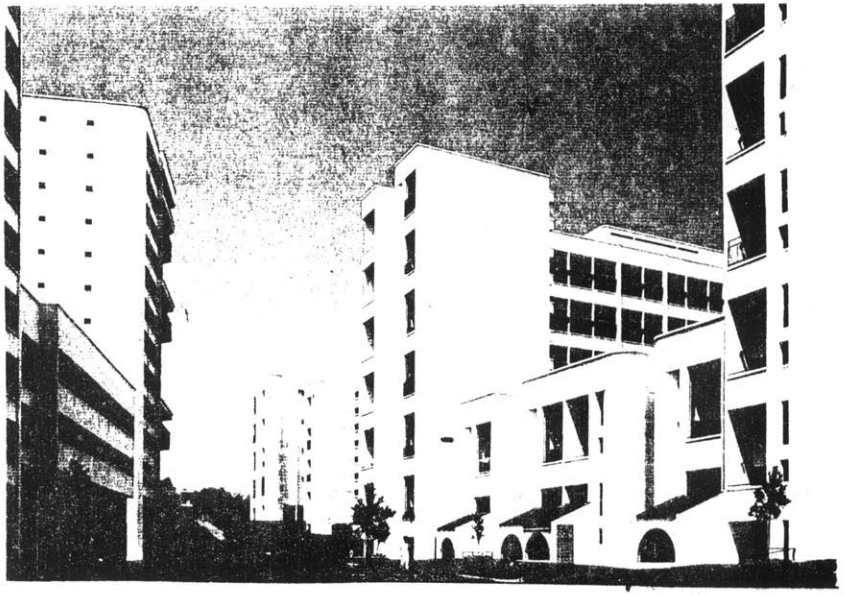
The new town structure developed under phase two of new town developments was developed with the refinement of the concept of neighborhood (see Figure 2.5). This was carried forward to the planning of phase three new towns with a better distribution of facilities within each neighborhood. However, each neighborhood was still planned and designed with highly repetitive and monotonous building blocks. This is due to the strict adhesion to the same set of planning and design standards, and the use of standard blocks in all the new towns which were introduced during this phase of development (see Figure 2.7).

The quality and identity of new town environments were not emphasized during this phase of development. A conceptual shift in the HDB's approaches to planning and design for the revitalization of new towns built under this phase is therefore necessary. There is a range of options for the HDB to recreate visual identities - such as the variation of skylines and roofscapes through the creative mix of high and low-rise buildings (see Figure 2.8). The siting of specially designed buildings at prominent locations in each new town and the invitation for private planners and architects to participate in the planning and design of some parcels of these new towns will certainly add better identiy and character to these new towns.

Visual identity can also be enhanced by applying principles of urban design to create landmarks, foci, nodes, axes and streetscapes in each new town. Landmark buildings such as the community center and religious buildings (see Figure

FIGURE 2.7 : A PANORAMIC VIEW OF ANG MO KIO NEW TOWN
Rigid site planning and tandardization of building blocks create highly repetitive and monotonous new town image.

FIGURE 2.8 : CREATIVE VARIETY OF HIGH AND LOW-RISE MIXED HOUSING
This allows an effective relief to the high-rise high density environment and provides an interesting streetscape.

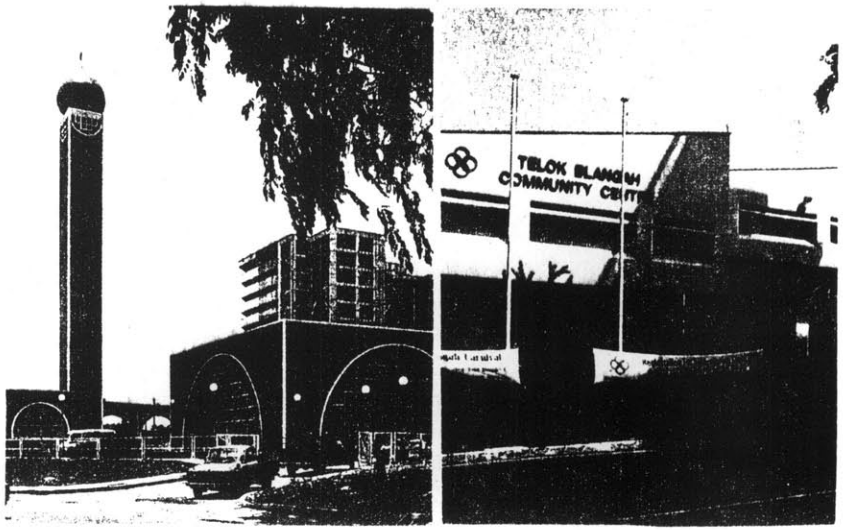


2.9) can be placed in prominent locations in relation to some predetermined axis and vista.

Distinctive architectural treatments and details could also be applied to neighborhood centers or buildings along major streets to create contrast against a backdrop of more standardized buildings.

However, any such additional features must first minimize the additional cost, and achieve functional and economical objectives. Variations in flat design, though interesting and provide choice and identity for the applicants, will have to be carefully executed because they are more costly and time consuming to produce. Detailed recommendations will be discussed in Chapter Three .

FIGURE 2.9 : LANDMARK BUILDINGS
They could be placed in prominent locations to enhance the character and identity of a new town



PHASE FOUR NEW TOWNS - 1980 - 1989

The precinct concept[27] (see Figure 2.10) was introduced during this phase of new town development to create new town identity and variety. However, in the actual planning and design of the phase four new towns, the precinct model failed to achieve its objective of creating a distinct identity. The model was rigidly used to plan and design new towns developed in this phase[28]. The rigid application of this model together with a massive influx of highly standardized prefabricated blocks[29] resulted in the new towns appearing fairly identical (see Figure 2.11)

In applying the precinct model, it is important to plan that each precinct has its own identity and that each new town has several distinct precinct models rather than one or two for the entire new town in the case of Tampines New Town (see Figure 2.10). The precinct model should also be used more effectively in the organization of land-use and circulation, allowing individual precinct designs to be developed in the same manner as any private development, free from the rigid constraints imposed by the HDB standards.

Competition or private participation at the precinct level should be encouraged to generate more ideas for each new town. If there is an uncertainty of the future residential needs, some designated precinct parcels within the built residential area should be reserved for the flexibility of future growth and changes that will take place.

FIGURE 2.10: NEW TOWN PRECINCT MODEL
The repetition of one precinct model to the entire new town defeats the objective of creating individual identiry .

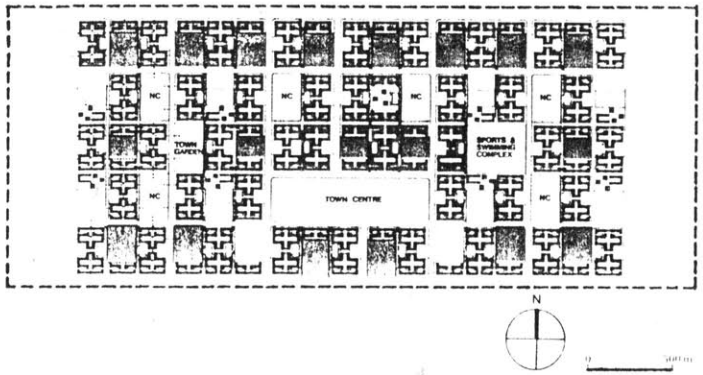
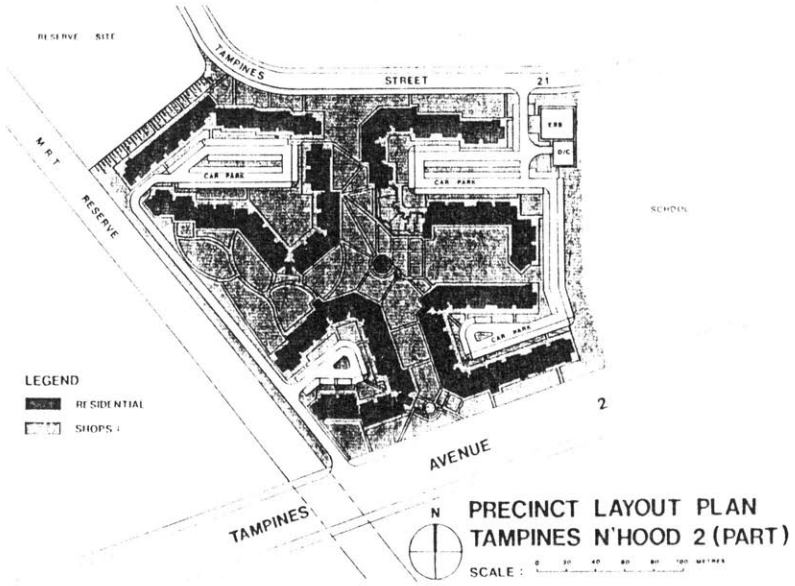


FIGURE 2.11: A TYPICAL PRECINCT MODEL OF TAMPINES NEW TOWN



ISSUE FIVE — DESIGN :

RESIDENTIAL FACILITIES — FLAT DESIGNS:

Under the HDB, flats are standardized, with fixed floor areas, accommodation schedules (see Table 2.10) and controlled selling and rental prices. In the past 28 years, the HDB has gone through five major phases of design improvements (see Table 2.11). Between 1960 and 1965, during the first five-year building program, there were only the Standard[30] one-room, 2-room and 3-room flats. From 1966 to 1970, these Standard flats were replaced by the Improved 1-room,2-room and 3-room flats, with larger floor space and separate bathrooms and toilets for the 2-room and the 3-room Improved flats. From 1971 to 1975, 4-room and 5-room New Generation[30] Flats were introduced, while the 1-room,2-room and 3-room improved flats remain largely unchanged during this period.From 1976 to 1980, 3-room and 4-room Model A [30] flats were introduced, with larger bathroom to accommodate a long bath and an overall 10 to 15 percent larger floor area. From 1981 to 1985, with the introduction of the prefabrication system for construction, a new series of 3-room and 4-room Simplified[29] flats was introduced (see Figure 2.12). These are economy models with 15 to 20 percent smaller floor areas than the New Generation Flats, which cater for those who cannot afford the larger models due to the sharp rise of construction cost and selling prices in the late1970s.

The 3-room and 4-room flats had been very popular among the applicants in the early1980s, and the demand for 1-room and 2-room flats had gradually lost their attraction during the

TABLE 2.10 -- INTERNAL FLOOR AREAS OF FLATS(SQ.M.)

FLAT TYPE / ROOM	1-ROOM IMPROVED	2-ROOM IMPROVED	3-ROOM NEW	3-ROOM SIMPLIFIED	4-ROOM SIMPLIFIED	4-ROOM "MODEL"A	5-ROOM IMPROVED
LIVING / DINING ROOM	22.1	15.4	16.4	14.5-16.0	19.0-22.0	28.0-33.0	29.0-35.0
MAIN BEDROOM	-	11.7	11.1	12.5-13.5	13.0-14.0	14.5-16.0	15.5-17.0
BEDROOM	-	-	11.2	11.0-12.5	12.0-13.0	13.0-14.0	13.0-14.0
BEDROOM	-	-	-	-	11.0-12.5	12.0-13.0	12.0-13.0
STUDY	-	-	-	-	-	-	11.0-12.0
KITCHEN	5.1	11.1	15.9	13.0-15.0	13.0-15.0	14.0-16.0	14.0-16.0
BALCONY	-	-	-	-	-	-	5.5- 6.5
ATTACHED BATH/TOILET	-	-	-	2.4- 2.7	2.4- 3.2	3.2- 3.7	3.2- 3.7
COMMON BATH /TOILET	2.3	2.4	1.9	2.4- 2.7	2.4- 2.7	2.7- 3.2	3.2 -3.7
STORE	-	-	-	1.4- 1.8	1.6- 2.0	1.8- 2.2	1.4 -2.0
TOTAL INT. FLOOR.AREA	29.5	40.6	56.5	60.0-62.0	78.0-80.0	97.0-99.0	112.0-114.0
DEVIATION	30 + 0.5	42 + 0.5	62 + 0.5	65 + 0.5	85 + 0.5	105 + 0.5	123 + 0.5

SOURCE : HDB BUILDING & DEVELOPMENT DIVISION, ARCHITECTURAL DEPARTMENT

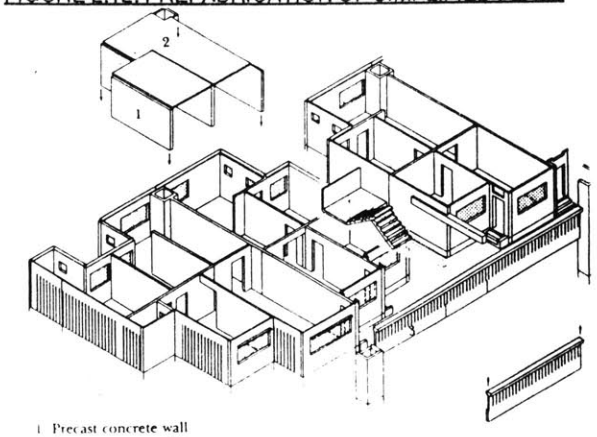
mid 1970s. This was due to the rising standards of living and household incomes. If this trend continue, the entire population will soon be able to afford the 5-room and even the bigger Executive[30] flats .

The various types of flats designed and constructed by the Singapore Improvement Trust (SIT)[31] from the 1950s to the 1960s and by the HDB from the1960s to the 1980s are shown in Figure 2.14. These flats show a diversity of floor areas for people of different income groups.They do not, however, reflect the corresponding family size. For example, the smaller 1-room and 2-room flats usually have a larger household size of six persons per unit while the larger five room flats often have a smaller household of four persons. The distribution of these flats across the site, however, is carefully planned to avoid segregation of different income groups.

The bedroom sizes are generally kept very small, to around 11 to 12 sq.meters (120 sq. ft.) merely sufficient to accommodate 2 single beds., while the living room has a large floor area of around 22 sq.meters. The cooking and dining areas are usually combined into a single space of approximately 17 sq.meters for the smaller 3-room and 4-room flats, while the bigger 5-room flat has a separate dining area (see Figure 2.13).

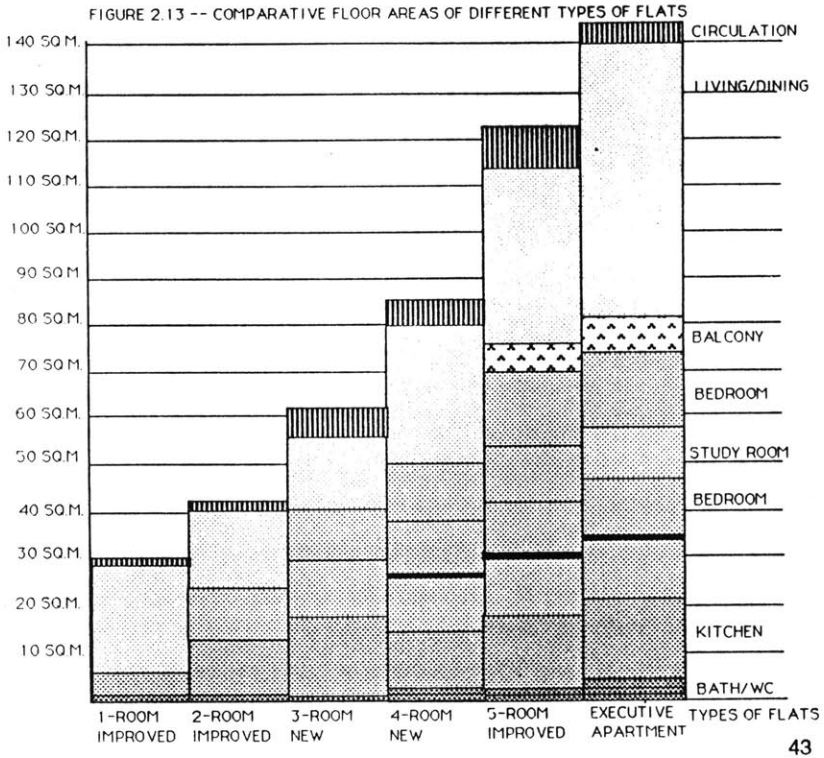
In principle, all flat designs are meant to be flexible, with a base shell for the residents to decorate and furnish their own flats according to their budget and creativity. The walls however are rigidly provided and restricted to any renovation or repartitioning by the HDB regulations.

FIGURE 2.12: PREFABRICATION OF SIMPLIFIED FLATS



1 Precast concrete wall
2 Precast concrete slab
3 Precast concrete parapet

FIGURE 2.13: COMPARATIVE FLOOR AREAS OF FLATS



The simplicity of the earlier smaller 1-room and 2-room flats have allowed them to be easily converted to bigger flats, but the later flat designs , especially the Model A with its complicated floor plans, and the Simplified flats, using the rigid prefabricated system of construction were more difficult to be remodelled (see Figure 2.14).

Rapid economic growth in the last decade has raised the demand for larger flats. In the older new towns built in the 1960s, such as Toa Payoh, 1-room and 2-room flats constitute 46 per cent of the total provision, while in the newer new town built in the1970s, such as Ang Mo Kio , 1-room and 2-room flats constitute about 16 per cent of the total, and the current new town planned in the 1980s, such as Tampines, 1-room and 2-room flats combined less than 0.2 percent of the total. (see Table 2.15). This increased demand for larger flats is expected to continue and it will bring with it the need to reduce the higher percentage of smaller flats and the increase of the percentage of larger flats in the older new towns. Recommendations to this problem will be identified in Chapter Three on the proposed new town revitalization model.

FIGURE 2.14: PROTOTYPE FLATS IN NEW TOWNS

RESIDENTIAL FACILITIES - BLOCK DESIGNS :

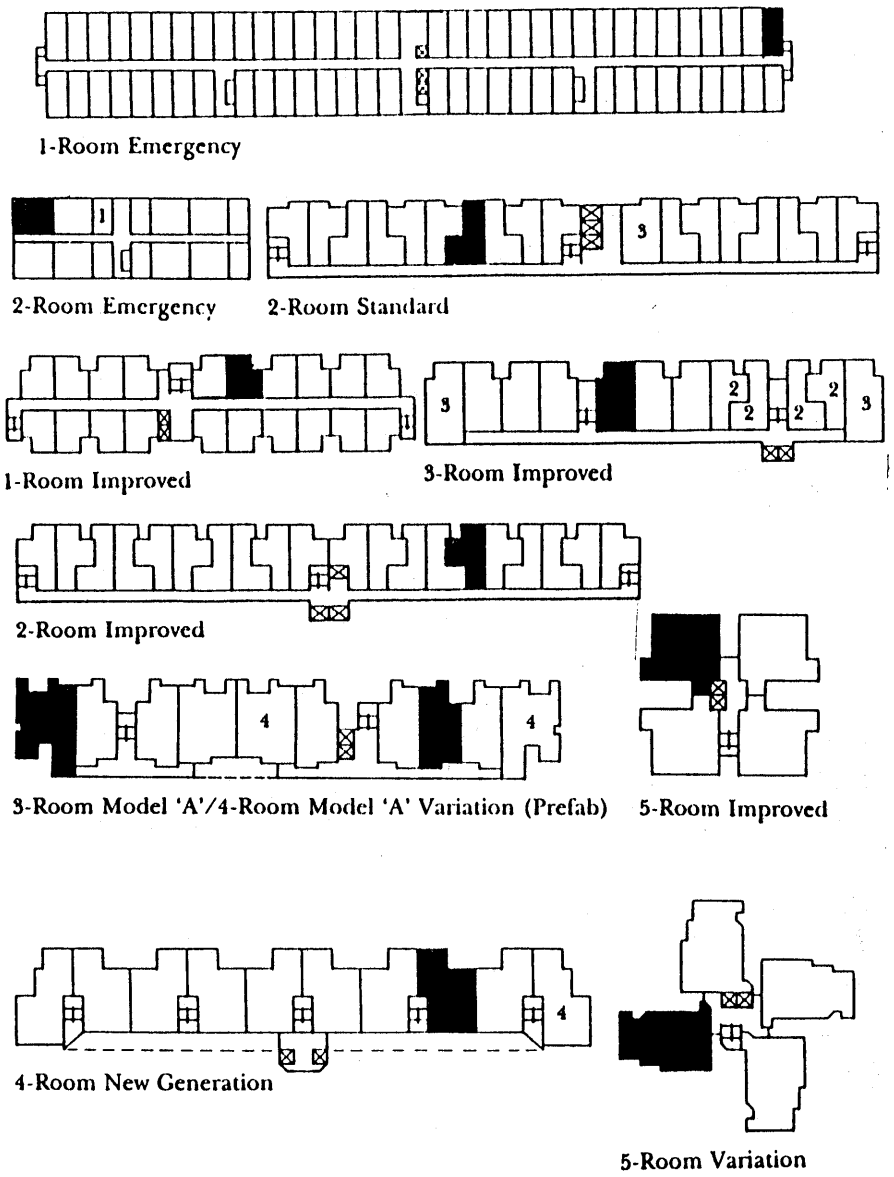
The design of the building block is closely related to the design of the flat. Like all flat designs, the design of building block has also gone through 4 phases of development corresponding to the flat design. Figure 2.15 illustrates all the 4 different phases of building block design.

The early blocks (1960-1965) are straight and simple block with double loaded internal corridor for the small 1-room and 2-room Emergency flats. These blocks have the problems of impediment to cross-ventilation, poor natural lighting and bad acoustics. There was also no mixing of flat types in these early blocks. This created distinct socio-economic groups within each block and within each estate.

During the second phase of building block design (1966-1970), efforts were made to increase the size of the flats and designed the block with an external corridor. Two attempts were used to mix and balance the socio-economic grouping in each block. Within a neighborhood, blocks of different room-types were first mixed. Within each blocks, there is also a mixing of successive room-types such as 3 and 4-room, 4 and 5 room combination of similar compatible socio-economic levels.

During the third phase of block design (1971-1975), segmented corridor between lift landing served by extra staircases was introduced to the New Generation block design. This helped to reduce the number of families served per corridor and thus improve the privacy of each unit, but at the expense of loosing the common corridor to facilitate

FIGURE 2.15: PROTOTYPE BLOCK PLANS AND VARIATIONS



social contact and neighbor surveillance against crime.

During the fourth phase of building block design (1976-1980), emphasis was placed on creating architectural variety and character for each block. However, with the committed huge number of prefabricated blocks, only minimum number of non-standard blocks per neighborhood could have variety and character. These non-standard blocks usually have staggered floor plan and extra external wall areas which render future conversion extremely difficult.

The fifth phase (1981-1985) witnessed the introduction of Middle Income Housing and Executive Apartment for those middle income group who cannot afford private housing, and a variety of 4-room and 5-room composite blocks (see figure 2.16.)

The building blocks, by virtue of its height and length[32], exerts a strong impact on the character and identity of a new town. The HDB strong emphasis on standardization to keep the construction cost low has often resulted in creating blocks of repetitive and monotonous visual quality (see Figure2.17). The slight variations in small external details used by the HDB's architects on the blocks do not seem to justify for the extra effort and cost. The strong visible impacts often come from the more diversified use of materials, variation in block forms , heights and roofscapes, and the creative interplay of size , height and massing of the blocks. Each new town should have its own set of distinct building components rather than repeatly using the same components for every new towns. The older new towns should also have their own components identified in order to introduce during the revitalization program.

FIGURE 2.16: MIDDLE INCOME AND EXECUTIVE APARTMENTS
This group of housing is for the yound middle income Singaporean who cannot afford expensive private housing and at the same time do not qualify for low-cost public housing.

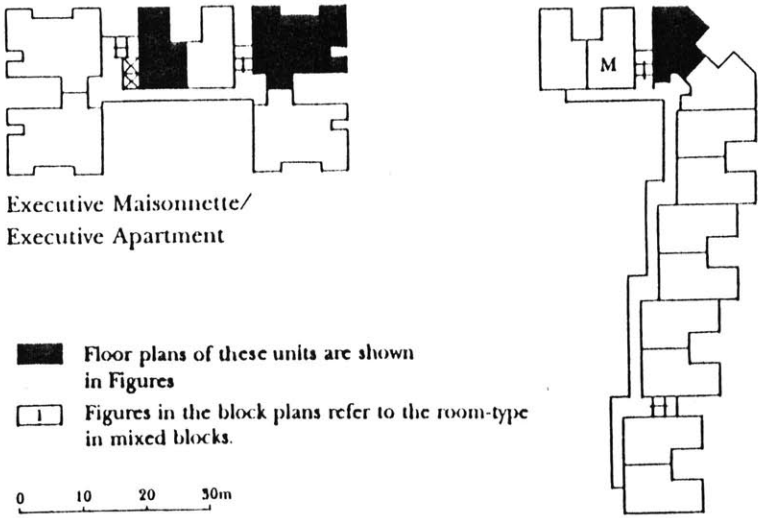
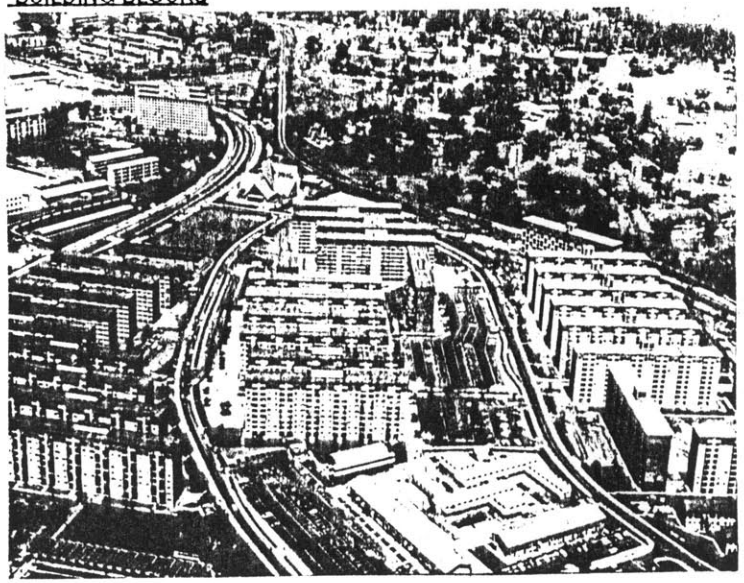


FIGURE 2.17: REPETITIVE AND MONOTONOUS VISUAL QUALITY OF BUILDING BLOCKS



COMMERCIAL FACILITIES :

In addition to residential housing, commercial facilities are also provided in every new town. To date, the HDB has built about 36,159 units of commercial facilities, comprising 14,134 shopsand eating house and 1,426 office units (see Table 2.12).

Table 2.13 lists the latest planning standards (1985) adopted by the HDB for the provision of commercial facilities in its new towns. There are basically 13 types of commercial facilities ranging from small kiosk (5 sq.m.) and shop (30 sq.m.) to large supermarket (1,200 sq.m.) and restaurant (2,000 sq.m.). These commercial facilities are located in Town Center, Neighborhood Centers and Precinct Centers in the newer new towns. Compared to the old planning standards used in the 1960s for the provision of commercial facilities in new town which allowed only 60 shops, 1 market and 1 hawker center in each Neighborhood Center together with only 10 other types of larger commercial facilities that can only be found in the Town Center. Obviously these older new towns such as Toa Payoh were in the first place, inadequately provided with commercial facilities in term of quantity (see Table 2.14). Moreover, some of the commercial facilities in these old towns were outdated by the changing needs and higher expectation of the new generation of residents. For example, the traditional wet market provided in the new towns, with stalls selling fresh meats and vegetables which are open only in the morning (see Figure 2.18), is loosing its attraction to the increasing small working couples who prefer to shop in comfort after work in supermarkets with refrigeration and air-condition facilities,

TABLE 2.12 – THE HDB'S COMMERCIAL PROPERTIES UNDER MANAGEMENT 1986

COMMERCIAL PROPERTIES	NO. OF UNITS
SHOPS/EATING HOUSE	14134
HAWKER STALLS	19151
KIOSKS/SHOPLETS	820
CANTEENS	52
RESTAURANTS	35
SUPERMARKET/EMPORIUM	46
COLDROOMS	476
OFFICES	1426
TRADESMAN AREA	8
BANKS	11
TOTAL	36159

SOURCE : HDB ANNUAL REPORTS 1985/86

TABLE 2.13 – HDB PLANNING STANDARDS FOR COMMERCIAL FACILITIES

COMMERCIAL FACILITIES	OLD STANDARDS IN 60'S	NEW STANDARD IN 80'S
SHOPS (30-400SQ.M.)	60 SHOPS / NEIGHBORHOOD	1 / 70 DU. 20% IN T.C. 50% IN N.C. & 30 % IN PRECINCTS
KIOSK(5-15SQ.M.)		1/600 DU. 30% IN T.C. & 70% IN N.C.
EMPORIUM (4500-6500SQ.M.)	1/NEW TOWN	1 TO 2/NEW TOWN
SUPERMARKETS (1200SQ.M.)	1 /NEW TOWN	1 TO 2 PER NEW TOWN
HAWKER CENTER/ EATING HOUSE (450 SQ.M.)	1 HAWKER CENTER/N'HOOD COOKED FOOD STALLS 40 2 EATING HOUSES/N'HOOD	1 E.H./750 DU.7% IN T.C. 23% IN N.C. & 70% IN PRECINCTS
RESTAURANTS (90-2000SQ.M.)	2 /NEW TOWN	1/1000 DU. 30% IN T.C. 70% IN N.C. & 2-3 FAST FOOD & 1 TO 2 BIG RESTAURANTS IN T.C.
OFFICE SPACE		60SQ.M./450 DU.70% IN T.C. & 30% IN N.C.
CINEMA (1800SQ.M.)	2/NEW TOWN	2/NEW TOWN
MINI-MARKET (450SQ.M.)		1/6000 DU.
MARKET PRODUCE SHOP (130SQ.M.)		1/3000 DU.
LOCK-UP SHOP (40SQ.M.)		1/500 DU.
WET MARKET/FOOD CENTER	1 MARKET PER NEIGHBORHOOD FRESH FOOD STALLS 162 COOKED FOOD STALL 20	1/5000 DU. REPLACED BY MARKET SHOPS SINCE 1982
HDB AREA OFFICE (2000 SQ.M.)	4/NEW TOWN	1/15,000 DU
PARKING FACILITIES	300 CAR PARKING SPACE/ NEIGHBORHOOD 60 BUS & LORRY SPACE/ NEIGHBORHOOD	

SOURCE: HDB BUILDING & DEVELOPMENT DIVISION

and better standards of cleanliness.

As compared to the older new towns, there is a better match between supply and demand of commercial facilities in newer new towns such as Ang Mo Kio New Town (Table 2.14). Standards for commercial facilities have improved over years to strike a better balance between their viability and the needs of the residents. However, the better principles and standards for commercial facilities must be extended to the older new towns to make them as self-sufficient as other new towns.

Improvements for commercial facilities in older new towns should go beyond the quantitative and take on qualitative needs. More and better commercial facilities such as supermarkets, restaurants, health clinics, pharmacies, service shops and hobby shops should be provided with air-conditioned comfort and longer operating hours for the changing lifestyles of the residents. Apart from providing more of these facilities in Town Center and Neighborhood Center, some facilities such as convenient store and launderette should also be dispersed throughout the residential precinct areas to cater for the day-to -day needs of the residents (see Figure 2.19).

In the future, the planning and design of commercial facilities is likely to be more demanding as standards of living and aspirations of the residents rise. The need for more flexible design of commercial facilities is expected to increase.

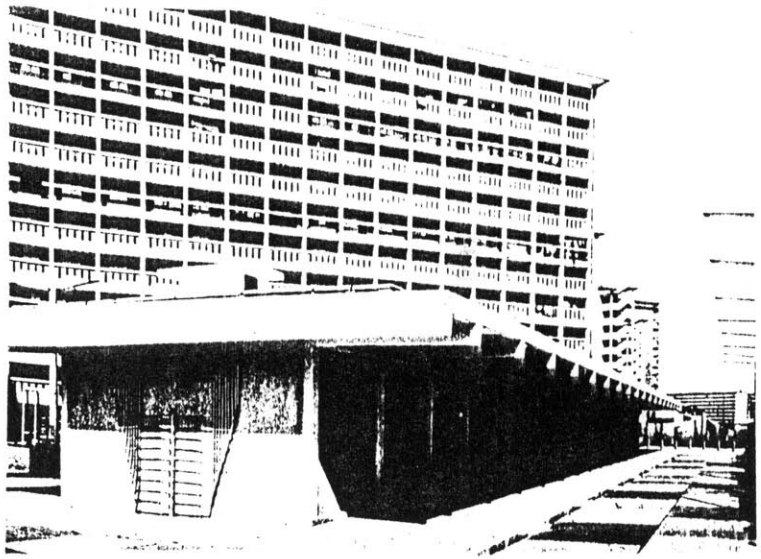
The HDB policies on commercial facilities in existing new

TABLE 2.14 -- COMMERCIAL FACILITIES IN HDB NEW TOWNS

COMMERCIAL FACILITIES	TOA PAYOH	ANG MO KIO	CURRENT STANDARD
NEW TOWN LAND AREA (HA)	373	713.1	780
PUBLIC HOUSING (DU)	36758	49483	50000
COMMERCIAL LAND AREA(HA)	33.5	54	107
PERCENTAGE OF TOTAL	9%	7.60%	13.70%
COMMERCIAL FACILITIES			
SHOP	480	759	853
EATING HOUSE	50	60	68
RESTAURANT	1	2	2
EMPORIUM	2	2	2
SUPERMARKET	1	2	2
HDB AREA OFFICE	4	4	4
MARKET/FOOD CENTER	7	8	10
PETROL STATION	8	8	11

SOURCE : HDB BUILDING AND DEVELOPMENT DIVISION STATISTICS 1985

FIGURE 2.18: COMMERCIAL FACILITIES IN OLDER ESTATES
Market produce stalls which are usually opened in the morning and closed for the rest of the day. They do not cater well to the changing needs of working families.



towns should be reviewed to encourage more attractive business environment (see Appendix A on HDB Policies on Commercial & Industrial Properties). Unlike public housing where there is a home ownership scheme, there is no equivalent for commercial facilities where a tenant may ultimately own his shop, office space or a market stall[33]. The present monthly tenancy system for all commercial properties in new towns does not ensure security of tenure or opportunities for tenants to expand, upgrade and provide better facilities. Most tenants are reluctant to make a long-term investment and improvement to their commercial premises since they not belong to them ultimately. Unless there is a system to ultimately transfer the ownership of these commercial premises to the tenants, there is no incentive to better the present state of things.

It is also unwise for the HDB to own an increasing number of these commercial premises. From 1981/82 to 1983/84, deficits from the operation of hawker centers and market in all existing HDB new towns alone ranged from S$4 million a year in 1982 to over S$1 million a year in 1984 (see Table 2.15). Besides facing the increasing cost to construct new commercial premises, the HDB is constantly under social and political pressure to keep the rentals of these premises low. Income from rentals alone often cannot meet the operation and maintenance cost, not to mention the interests incurred in the capital costs expended on the construction of new facilities.

The mode of allocation of shops and office retail spaces through public tender is not a good way to cater for the needs of the residents. Public tender through newspaper

FIGURE 2.19: NEW PRECINCT CENTER
With the provision of recreational facilities and daily convenient kiosk for the residents

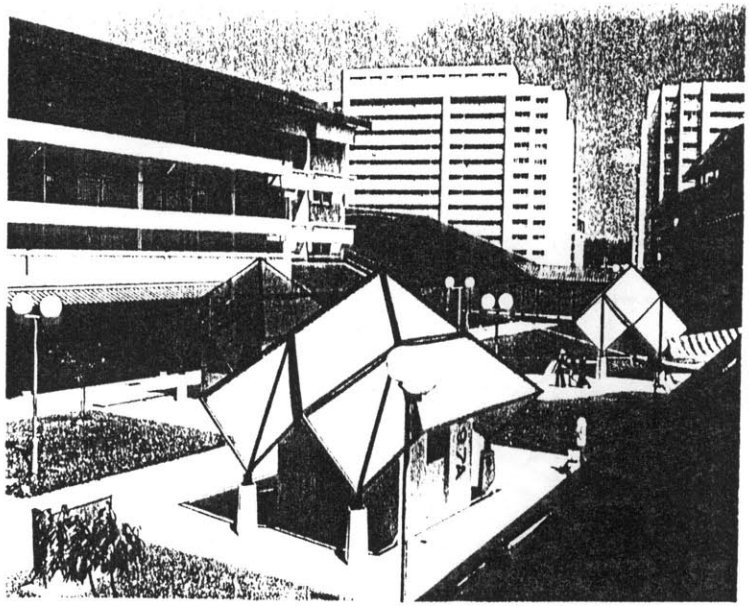


TABLE 2.15 -- HAWKER CENTRES/MARKETS OPERATION IN HDB NEW TOWNS

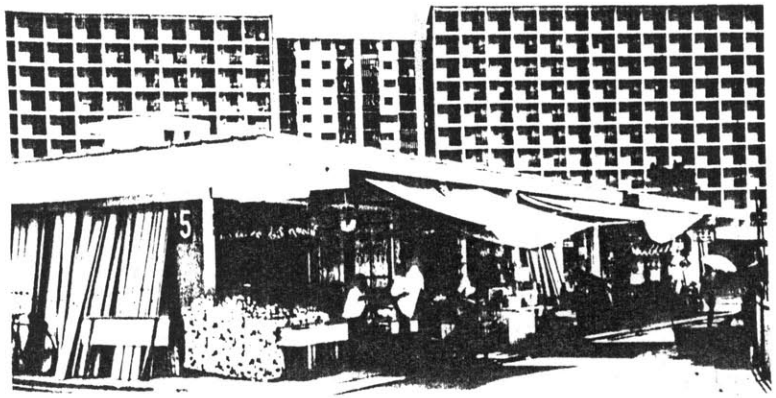
ACCOUNTS(S$ MILLION)	1981/82	1982/83	1983/84
RENTAL & OTHER INCOMES	12.19	12.96	20.83
EXPENDITURE	16.19	17.80	21.88
SALARIES/WAGES ETC.	5.31	6.34	7.17
MAINTENANCE ETC.	2.58	2.83	3.60
PROPERTY TAX	1.80	1.75	2.74
LOAN CHARGES	6.50	6.88	8.37
DEFICIT	4.00	4.84	1.05

SOURCE: HDB ANNUAL REPORTS 1981 TO 1984

advertisements has not changed significantly since the days of the Singapore Improvement Trust under the British Colonial Government. While this meet with free interplay of the market forces of supply and demand, it does not guarantee a right mix of trades for any location. Most of the available commercial premises are tendered out usually in a single exercise. The HDB has regulated that participating tenderers will have to commit to their trades [34] once they are successful in their application even before knowing the trades of his surrounding neighbors (see Appendix I). There also appears to be no control exercise on the spread and mix of different trades within each commercial center. Repetition of too many popular trades within the same location is a common phenomenon (see Figure 2.20). The limited catchment population is difficult for several same trade to survive at the same location. Once a tender has been awarded, tenant could not change the trade he or she listed in the application without going through the process of public tender again. It was recognized that these restrictive tenancy conditions had often stifled the successful operation of these commercial facilities.They provide no alternative for an unsuccessful operator to change his trade according to market demand but to return the premise back to the HDB.

Through insufficient coordinating and planning, coupled by the relative lack of experience in commercial retailing on the part of the HDB[35] , facilities were often mismatched with unsuitable trades and a lack of focus and coherence of the main facilities. Many a tenant have been compelled to close shop through such a manner of commercial failure.

FIGURE 2.20:COMMON PHENOMENON OF REPETITIVE TRADES WITHIN A SAME LOCATION -- Causes unbalance provision of commercial facilities for the residents and the limited catchment is difficultfor several same trades to survive at the same location.



The need for a comprehensive approach and study on the provision and allocation of commercial facilities, if need be by consultant expertise, should certainly be a major consideration in any revitalization and upgrading program of new towns development. Hitherto these facilities have been viewed mainly from the angle and interests of the entrepreneurs. To ensure the success of any revitalization program, these need to be viewed as very vital support elements which would contribute to a town growth and success.

INDUSTRIAL FACILITIES :

The development of light industries within new towns (see Figure 2.21), away from the city center, serves the dual purpose of relieving crowding and traffic congestion within the city center as well as providing alternative areas of employment for the population residing in the new towns. These have, hitherto been planned and located on the peripheries of the development.

Within the older new towns such as Toa Payoh, 10 to 15 percent of land were reserved for industrial facilities. Compared to newer new towns such as Bedok, this was increased to 20 percent (see Table 2.16). The obvious cause for locating light industries in close proximity to the residential blocks is principally to enable industries to tap the large pool of local labor.Particular emphasis in the earlier new towns was placed on the attraction of light, labor intensive, and pollution free industries. This policy was formulated in the early 1960s as part of the national strategy to diversify the economy and to reduce unemployment. It was also intended to dicongest the city center by locating industries within new town thus reducing residents' need to commute to the city center.

There were currently a total of nine industrial developments within the city center as shown in Figure 2.22. While these industries had been established upon the basis stated before, it would be important to investigate its success rate especially with regard to its economic, social and environmental impacts upon the local society in order to evaluate the needs to upgrade them in the new towns revitalization

FIGURE 2.21: INDUSTRIAL PREMISES AT THE FRINGE OF ANG MO KIO NEW TOWN

Most of the industries in new town are light industries located at the fringe of the new town

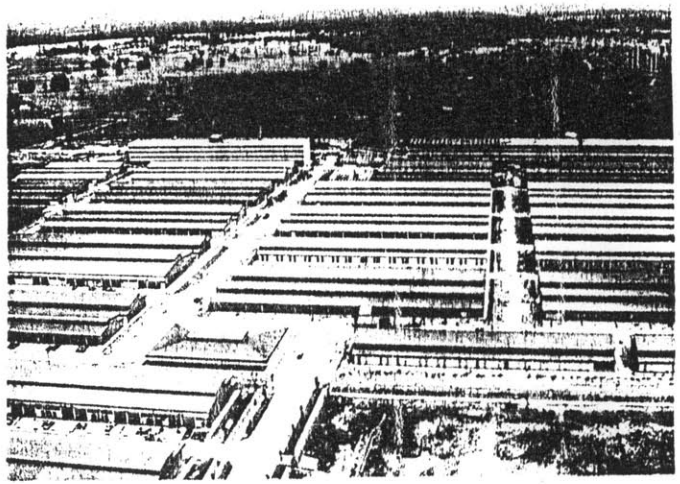


TABLE 2.16 -- THE HDB INDUSTRIAL FACILITIES

INDUSTRIAL FACILITIES	TOA PAYOH	ANG MO KIO	PROTOTYPE
PUBLIC HOUSING (DU.)	36758	49483	36758
TOTAL LAND AREA	373	713	780
INDUSTRIAL LAND	47	128	155
% OF TOTAL LAND USAG	12.60%	18.00%	19.90%

SOURCE: HDB BUILDING & DIVISION STATISTICS (1985)

program.

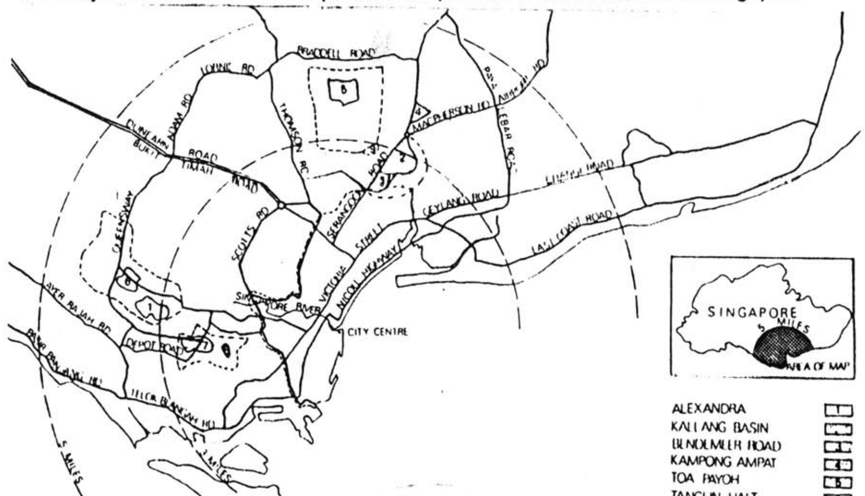
An employment survey was conducted in November 1972 on the total 238 industrial establishments operating in these nine areas as shown in Figure 2.22.

The results of this survey indicated that most of these industries were small medium-size firms[37] with two-thirds of which employed fewer than 100 workers (see Figure 2.23). Moreover, a majority of these small industries were owned by local entrepreneurs. The total number of workers employed in these industrial estates accounted for a total of 22 percent of the manufacturing work force in Singapore. Over two-thirds of the industries are textile and electronics assembly industries and all were labor-intensive and employed over 78 percent of single young women (see Table 2.17). 58 percent of these industrial workers came from within the same new towns or housing estates, 23 per cent came from other HDB new towns and estates, and only 19 percent came from other private estates. The unemployment rate in HDB estates and new towns amounted to 4 percent in 1973 and has reduced to less than 2 percent in 1986 (see Table 2.18).

A distribution in absolute terms of the estimated demand for and supply of labor in various HDB old estates and new towns in 1975 is shown in Table 2.19. Different labor market situations prevail in different HDB industrial estates. In certain areas supply exceed demand while in others the contrary seems to be the case. However, in most of the smaller old estates, supply of labor exceeds demand. This situation persisted because there were many industries

FIGURE 2.22: HDB INDUSTRIAL ESTATES IN CENTRAL AREA

The early nine industrial estates provides 22 percent of the work force in Singapore



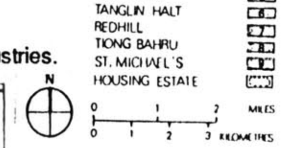


FIGURE 2.23: INDUSTRIES IN HDB ESTATES

Most of the industries are labor intensive manufacuring industries.

operating on smaller scale , such as motor vehicle repairs and wood products industries. Further more, most of these industries are already operating at full capacity, and there is no available room for them to expand. In the bigger new towns such as Toa Payoh and Kallang Basin, the demand for workers, particular for female workers far exceed the supply ,as most of these industries are foreign owned, large-scale, labor-intensive operation, like electronic assembly and textile.

For the smaller estates, more new industrial premises should be built to attract larger light industries and to generate more employments within the estates. Several small old housing estates in close proximity can be combined into a new town to share the industrial facilities. As for the larger new towns such as Toa Payoh, the labor shortage can be best resolved by converting and building bigger flats to encourage more working families to move to these new towns in order to provide a steady pool of young workers.

TABLE 2.17 - WORKERS IN HDB INDUSTRIAL ESTATES (PERCENTAGE)

INDUSTRIAL ESTATE	NO. OF INDUSTRY.	MALE%	FEMALE%	TOTAL%
ALEXANDRA	43	47.5	10.2	20.1
BENDEMEER	21	5.7	0.8	2.1
KAMPONG AMPAT	8	1.8	0.8	1.0
TOA PAYOH	9	8.2	24.1	19.9
KALLANG BASIN	60	13.7	24.1	21.4
TANGLIN HALT	13	3.2	5.4	4.8
REDHILL	37	8.6	12.9	11.8
TIONG BAHRU	27	6.5	18.0	15.0
ST.MICHAELS	20	4.8	3.6	3.9
TOTAL PERCENTAGE	-	100%	100%	100%
TOTAL NUMBER	238	10,252	28,581	38,833

SOURCE:1972 HDB EMPLOYMENT SURVEY & 1973 HDB SAMPLE HOUSEHOLD SURVEY

TABLE 2.18 - RESIDENTIAL STATUS OF WORKERS IN HDB INDUSTRIAL ESTATES (PERCENTAGE)

INDUSTRIAL ESTATE	SAME ESTATE	OTHER ESTATE	NON HDB ESTATE	TOTAL
ALEXANDRA	54.2	22.4	23.4	100%
KAMPONG AMPAT	36.1	39.4	24.5	100%
TOA PAYOH	50.0	21.4	28.6	100%
KALLANG BASIN	68.7	14.2	16.1	100%
TANGLIN HALT	59.3	27.5	13.2	100%
REDHILL	67.4	15.1	17.5	100%
TIONG BAHRU	72.3	17.4	10.3	100%
ST.MICHAELS	67.9	16.3	15.8	100%
PERCENTAGE	58.0	23.2	18.8	100%

SOURCE:1972 HDB EMPLOYMENT SURVEY & 1973 HDB SAMPLE HOUSEHOLD SURVEY

TABLE 2.19- SUPPLY & DEMAND OF WORKERS IN HDB INDUSTRIAL ESTATES.

INDUSTRIAL ESTATE	DEMAND MALE	FEMALE	TOTAL	SUPPLY MALE	FEMALE	TOTAL
ALEXANDRA	356	29	385	264	357	621
KAMPONG AMPAT	39	113	152	368	347	715
TOA PAYOH	393	2404	2797	1027	1039	2066
KALLANG BASIN	426	3229	3655	373	248	621
TANGLIN HALT	85	799	884	792	747	1539
REDHILL	312	3231	3543	395	707	1102
TIONG BAHRU	263	2816	3079	811	2224	3035
ST.MICHAELS	91	301	392	234	254	488

SOURCE:1972 HDB EMPLOYMENT SURVEY & 1973 HDB SAMPLE HOUSEHOLD SURVEY

ENVIRONMENTAL DESIGN

Environmental design in a new town is seen as an important element that should compliments the quantitative criteria of site planning and design. It implies different criteria for different phases of new town development.

Emphasis on environmental comforts of good orientation with natural lighting and cross ventilation for all housing units in earlier new town such as Queenstown had resulted in a very regimental site layout with predominantly north-south orientated straight blocks. The site plan is extremely rigid and the layout of building blocks often had very little regard for road network and streetscape (see Figure 2.24). Open spaces are often incidental or residual rather than well-integrated into the new town. In the newer new towns such as Tampines and Yishun, the site plans were more creatively planned with better relationship between building and street, open spaces were also planned and integrated into each precinct and neighborhood (see Figure 2.25). This marks the beginning of a conscious effort by the HDB to deal with the issue of environmental design. However, there are much more opportunities that could be explored to supplement the overall environmental qualities of a new town which will be discussed in details under Chapter Three of New Town Revitalization Model.

FIGURE 2.24: EARLY HOUSING LAYOUT
The early site plan is extremely rigid with very little regards to environmental quality.

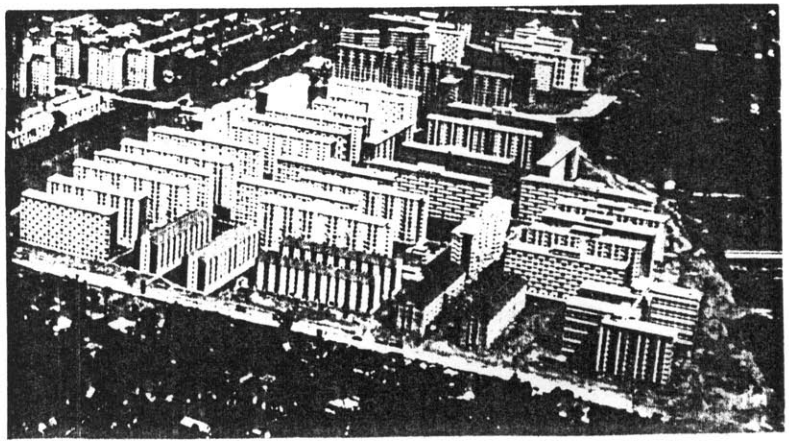


FIGURE 2.25: PRECINCT LAYOUT
The later site plan provides consideration for environmental quality

ISSUE SIX— INFRASTRUCTURE :

HDB is the largest builder and manager of residential properties in Singapore. More than 500,000 dwelling units are under its management, and its residents formed 85 per cent of the nation's population[36]. HDB residents are therefore the largest group consumer of electricity, water, gas, sewerage facilities, roads, car parks, and other related infrastructure in Singapore. As the living standard of the population rises, many residents have rising expectations of the type, nature and quality of infrastructure provided in their new towns (see Figure 2.26). As such, the provision and maintenance of quality infrastructure is a very important component in any new town revitalization program.

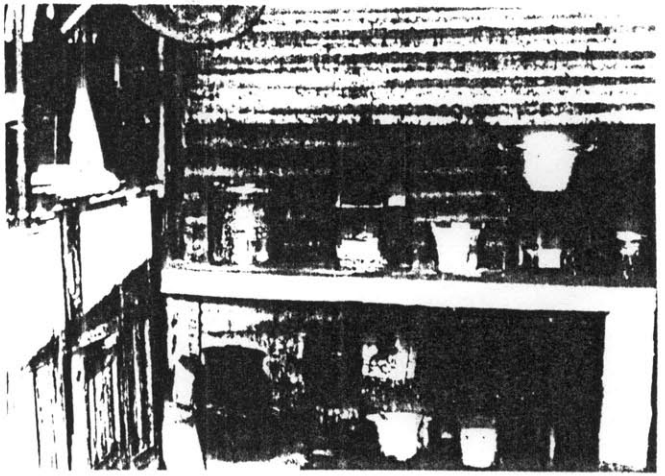
The major infrastructures needed to be addressed for any revitalization actions are:

* Roads and road-related facilities;
* Car parks;
* Lifts;
* Water and Sanitary Installation.

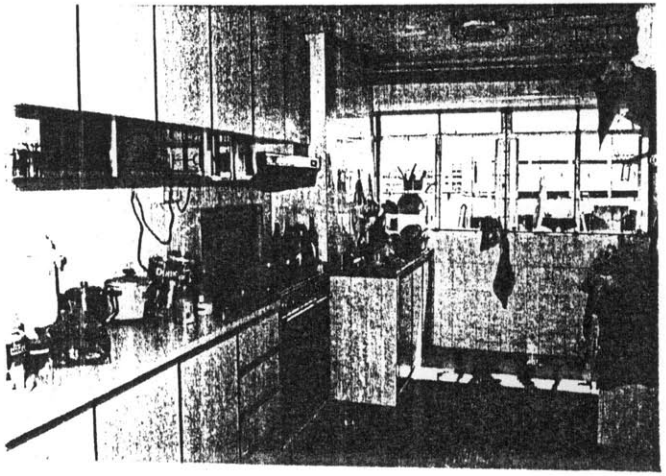
The existing provision and capacity of these infrastructures are evaluated in the following sections in accordance to projected demand to asses the needs for any further improvements that could be incorporated in the overall new town revitalization program.

FIGURE 2.26: COMPARISON OF INFRASTRUCTURE IMPROVEMENTS FROM SQUATTERS TO PUBLIC HOUSING

EARLY SQUATTERS UNIT WITHOUT INFRASTRUCTURE



NEW PUBLIC HOUSING UNIT WITH FULL RANGE OF INFRASTRUCTURE

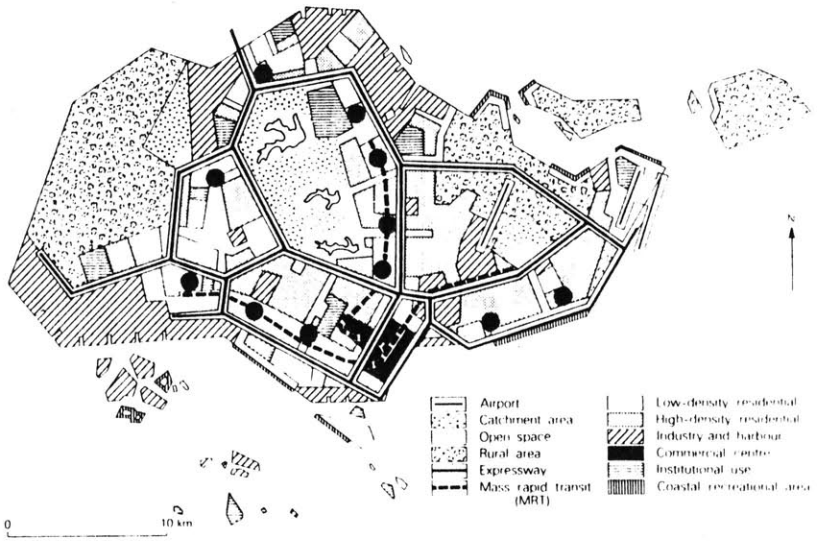


1.ROADS AND ROAD-RELATED FACILITIES :

The building of new towns in the suburbs to dicongest the inner city center was first conceptualized in 1967 by the HDB, assisted by a team of United Nation experts. The concept was embodied within the guidelines of a new indicative Concept Plan (CP). This Concept Plan comprised a long-range land-use plan with a supplementary transport plan as an integral component. According to the CP, future land use in Singapore would follow a ring-cum-linear pattern of development, with a series of ring-roads supported by an integrated system of expressways (see Figure 2.27). Though the intention to build a mass rapid transit system was not decided in those early years, the CP did anticipate the provision for a main public transportation route arranged in the shape of an inverted-T. This comprehensive road network system allow the cross-island traffic to by-pass the crowded city area, and future town centers to spread outward along the major roads, linking them back to the city center. New towns would then be planned and built around these nodal points, thus allowing the city center to renew and revitalize. It was generally agreed that each new town will be self-sufficient in all respects of needs, so as to serve as a viable counter-magnet to the city center.

However, under the HDB selection of sites for early new town developments in the 1970's it did not follow closely to the guidelines of the Concept Plan. They were carried out on an ad- hoc basis, depending on the availability of land for immediate implementation of the urgent housing programs and the cost-effectiveness of using the existing infrastructures at that time. Hence, many of these new towns and housing

FIGURE 2.27: CONCEPT PLAN OF SINGAPORE 1967
The Concept Plan proposed a ring-cum-linear pattern of new town development supported by an integrated system of expressway.



estates were built within eight kilometers of the city center (see Figure 2.28). The strategy which now appears short-sighted, was then to capitalise on labor resources located within a close distance to the city center, wherein most of the employment opportunities existed. Although there were early attempts to build new towns at further corners of the island such as Jurong and Woodlands, as those near city new town were being developed, they were unsuccessful in attracting enough residents. This was chiefly due to the lack of employment opportunities, sufficient through transportation services ,and the full range of infrastructure , commercial and recreational facilities. The facility with which slums and squatters were cleared off through government gazettes and the availability of existing infrastructure within and near the city center has helped the HDB to locate and build most of its early new towns along the north-eastern corridor of Singapore Island. The north-western corridor was initially reserved for military and agriculture developments. The high concentration of new towns in the north-eastern corridor[39] (see Figure 2.29) was later found not to be a good strategy since this generated enormous volume of traffic to the city center and through the city center to other parts of the Island. This situation will not have developed if new towns follow the dispersed development as according to the Concept Plan.

The new towns subsequently developed by the HDB have so far produced little employment opportunities other than those commercial facilities in the Town Centers and Neighborhood Centers. Most of these new towns are only self-contained to the extent of local shopping and community facilities provision. As such very little employment is

FIGURE 2.28: EARLY HOUSING DEVELOPMENT IN SINGAPORE
Early high concentration of housing development within eight kilometers of the city center generated enormous volume of traffic within the city center.

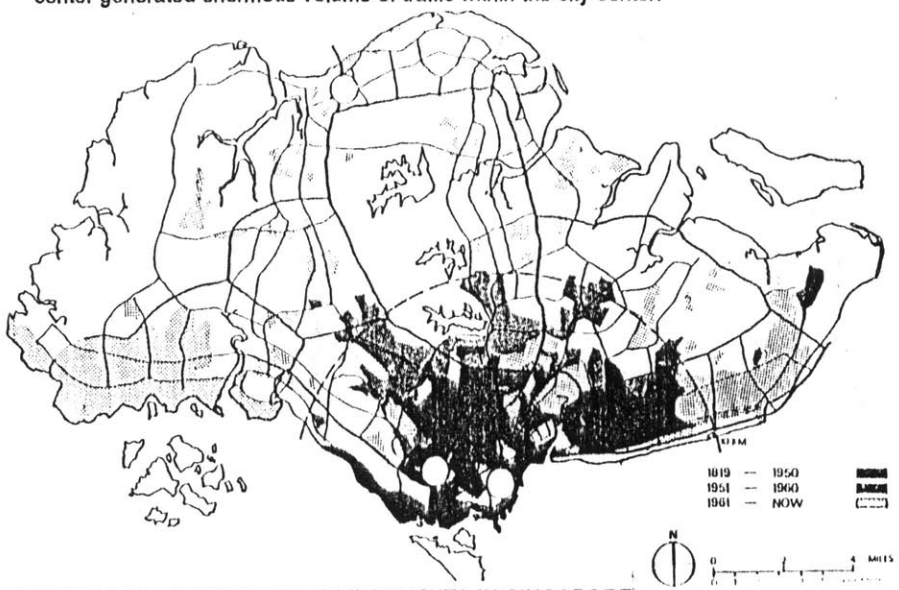
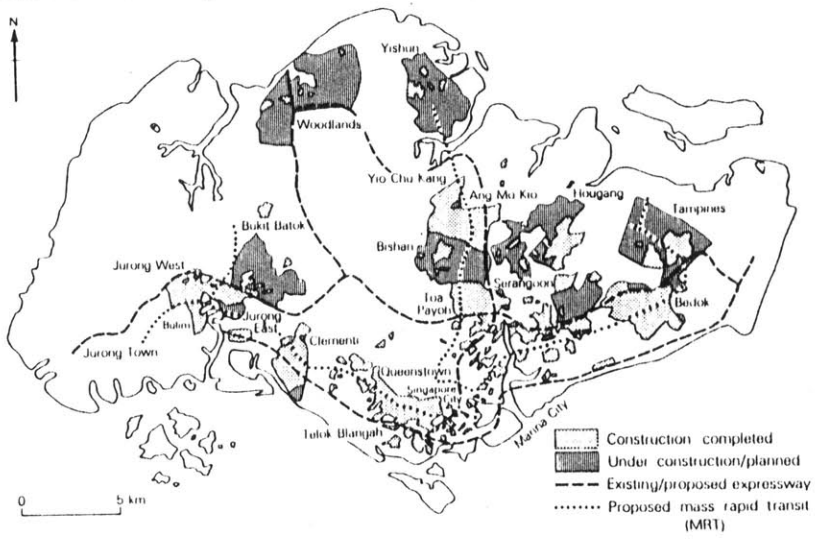
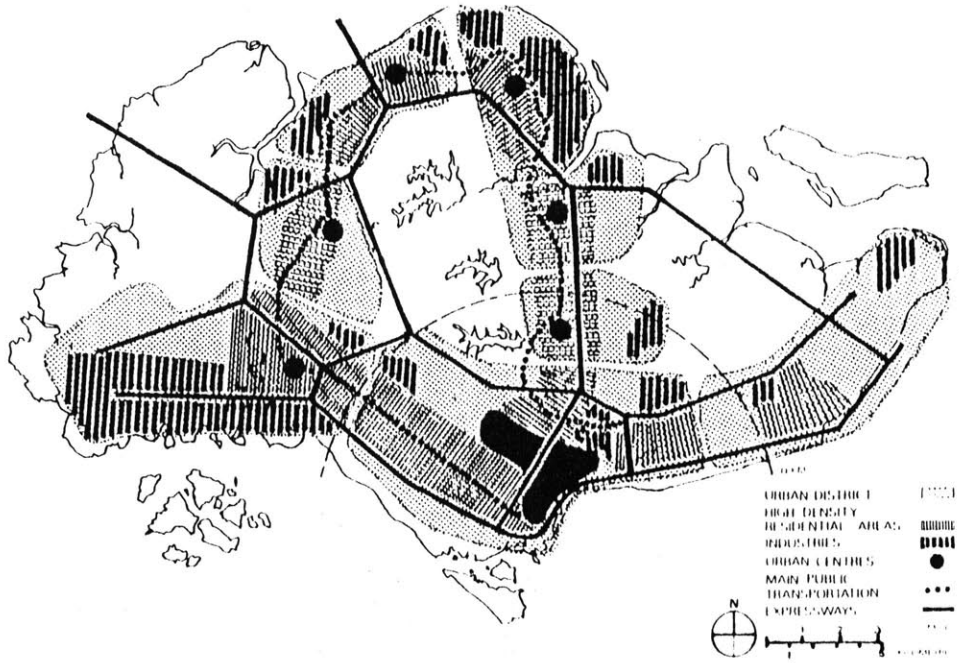


FIGURE 2.29: NEW TOWN DEVELOPMENTS IN SINGAPORE
The high concentration of new towns in the north-eastern corridor does not relieve the traffic volume to the city center.



generated through the assembly-type manufacturing. (See Chapter Two on industrial facilities). Provision for offices and other commercial activities is deficient as a high percentage of the residents in the HDB new towns continue to commute daily to work in the city center. This sectoral residential development pattern in new towns without the support of adequate employment opportunities have as anticipated, continue to cause tremendous strain on all traffic routes leading to the city center during peak hours. Although the completion of the Pan-Island Expressway[40] and the Central Expressway[41] together with the Mass Rapid Transit system (see Figure 2.30) have helped to ease the traffic congestion, these are by no means solutions to the root of the problem. The notion of a decentralised self-sufficient center is a viable concept worth putting into practice in any revitalization program. Unless the very problem of creating more opportunities for employment within new towns is tackled, the strain on the transportation network will continue.

FIGURE 2.30: NEW TRANSPORTATION NETWORKS IN SINGAPORE
The decentralization of new towns along major expressway is seen as a viable concept to relieve traffic congestion in the city center



2. CAR PARKS :

With the sustained economic growth and rising standards of living, car ownership in Singapore more than doubled in the last 27 years, from 1 car per 26 persons in 1960 to 1 car per 12 persons in 1984. This increase in car ownership unsurprisingly resulted in greater demand for car parking facilities. Provisions for car parking in respect of the different flat types in new town built in the 1980s were based closely on the national ratio of 1 car to 3 dwelling units of 3-room flat (or 1 car park to every 12 persons) (see Table 2.20). However, for all other estates and new towns built before the 1980s, car parking provisions were well below this standard.

Up till 1985, the HDB provided a total of 247,853 car parking spaces for its 500,200 dwelling units of public housing (see Table 2.21). This represents a ratio of 1 car parking space to 2.05 dwelling units or 1 car parking space to 9 persons which is close to the national ratio of car ownership. Despite this provision, the HDB still comes under strong frequent criticism from the public for what is perceived as an inadequate provision.

In 1983/84, a survey of car parking needs was carried out. Projection for an increased future demand for car parking requirements was subsequently made for 1986 to 1990. The survey result is shown in Table 2.20 . From it, it was proposed that future HDB car parking provision will be based on 80 percent of the projected demand. i.e. 1 car parking space to 8 persons by 1986, and 1 car parking space to 6.5 persons by 1990. This projected increase in car

TABLE 2.20 - CAR PARK PROVISION STANDARDS

TYPE OF FLATS	NUMBER OF DWELLING UNITS TO ONE CAR PARKING LOT			
	1971	1984	1986	PROJECTED 1990
1-ROOM	5.5	10	7.7	5.5
2-ROOM	2.1	5	5.2	3.9
3-ROOM	1.5	3	2.1	1.6
4-ROOM	1	1.5	1.7	1.4
5-ROOM	1	1	0.9	0.7
EXECUTIVE APT.	NA	1	0.9	0.7
MIDDLE-INCOME	NA	1	0.9	0.7
NEW TOWN AVE.	3.8	3	2.7	1.6

SOURCE: HDB ARCHITECTURAL DEPARTMENT.

TABLE 2.21 - HDB YEARLY CAR PARKING PROVISION

YEAR	TOTAL DWELLING	TOTAL PARKING LOTS	LOT/DU
1978	30176	7783	1:3.9
1979	27189	9850	1:2.7
1980	19875	24991	1:0.8
1981	16366	9029	1:1.8
1982	20918	3366	1:6.2
1983	42400	17278	1:2.5
1984	70345	31322	1:2.2
1985	50348	44566	1:1.1
HDB ACCUMULATIVE TOTAL PROVISION (1960-1985)			
	500200	247853	1:2.05
NATIONAL ACCUMULATIVE PROVISION (TILL 1985)			
	577200	337400	1:1.71

SOURCE : HDB ANNUAL REPORTS AND GOVERNMENT CENSUS

ownership has prompted the HDB to build multi-storey garages in new town to supplement the shortage of lands for more new surface car parks. In 1984, a major exercise to alleviate the problem of parking shortages was launched by the HDB in the construction of both garages and on grade parking facilities within almost all of its housing estates and new towns. While another 14,400 car parks were added to the existing provision, the demand for more facilities through an increasing ownership of cars was not abated.

Judging HDB's car parking provision for the period from 1982 to 1986, it is evident that more car parking space in its newer new towns have consistently been provided, in instances ranging from 1 car park per 2.71 dwelling units to 1 car park per 3.56 dwelling units for the groups with national average and below average incomes. Why then this constant barrage of demand for more? At close look, the problem might lie in the inadequate supply of the parking space and the distribution of these parking space within the older new towns and estates. These older new towns were often the source of complaints, such as Toa Payoh New Town which was provided with a car-park ratio of 1 space to 5.09 dwelling units, Redhill/Henderson with a ratio of 1 space to 4.4 dwelling units and Telok Blangah New Town was only provided with 1 car park for every 8.98 dwelling units. While the newer new towns and estates were provided with a higher ratio than the national standard. Such as 1 car parks to 2.2 dwelling units in Marine Parade Estate (see Table 2.22).

The issue of sufficient car parking provision or a manner of discouraging high car ownership has to be looked into as a

FIGURE 2.31: EXISTING SURFACE CAR PARKS PROVISION IN SINGAPORE
Existing extensive provision of surface parking consumes about 30 percent of valuable open spaces in each new town.

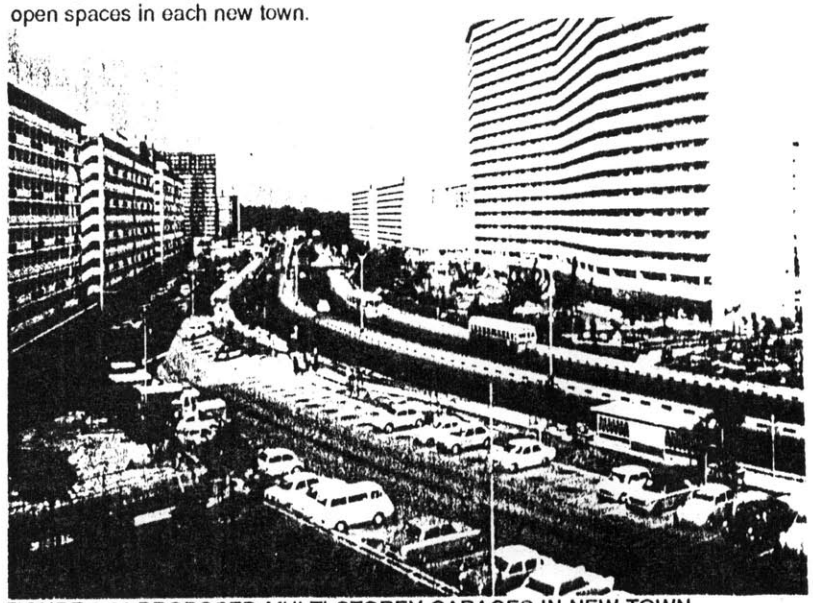
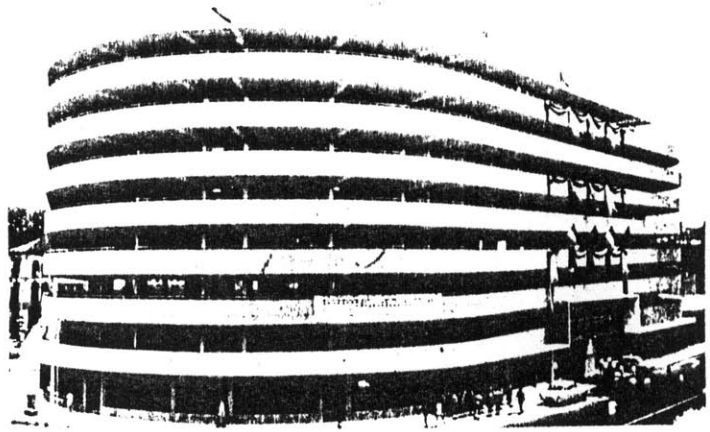


FIGURE 2.32:PROPOSED MULTI-STOREY GARAGES IN NEW TOWN
Multi-storey garages are regarded as a practical solution to meet car park deficiency in new town.



matter of policy making in a revitalization program. Needless to say, the problem of parking needs through securing more land for construction of more parking facilities is not often possible. However, multi-storey garages must come to be regarded as a practical solution to meet this deficiency. The location and distribution of these garages should be carefully considered to facilitate convenient access and walking distances for the residents just so that these garages may be fully utilized. The integration of these multi-storey garages is seen as an important component in the revitalization model which will be discussed in details in Chapter Three.

TABLE 2.22 -- COMPARISON OF CAR PARKING PROVISION

ESTATE/NEW TOWN	YEAR	DU/PARKING LOT
MARINE PARADE ESTATE	1977	2.20
BUONA VISTA ESTATE	1975	3.63
TELOK BLANGAH NEW TOWN	1971	8.98
REDHILL/HENDERSON ESTATE	1960	4.40
TOA PAYOH NEW TOWN	1964	5.09

SOURCE : HDB STATISTICS

3. Lifts:

The importance of a reliable and efficient vertical transportation system for the high-rise, high-density residential development cannot be underestimated. There are presently more than 7,000 lifts serving over 500,000 units of public housing in Singapore. This give a ratio of one lift per 70 dwelling units. During the first phase of public housing development in Singapore, many of the 6-storey 1-room Emergency flats were not provided with lifts, while other 12 to 16-storey high-rise blocks with several hundred dwelling units had only 1 lift each (see Figures 2.33 & 2.34). In 1978, the HDB under tremendous pressure from residents, expended S$45 million (an average of S$157,000 per lift) to provide an additional lift each to a total of 280 blocks. A total of 31,400 dwelling units of old apartment blocks benefitted from this scheme.

With this additional provision , the ratio for these older flats was improved from 1 lift per 112 dwelling units to 1 lift per 56 dwelling units. Compared to the lift-ratio adopted in the new towns of the 1980's, which were 1 lift per 40 to 60 dwelling units for 8 to 25 storey blocks. While the ratio of lift provision is much improved, the quality of lift services is still far from satisfaction. This is chiefly attributed to its location being relegated to the first half landing of main access staircases. As such it is still a tremendous physical barrier to the elderly and the disabled. Secondly, these new lift are often not grouped in proximity to the existing one(see Figure 2.33).As such a passanger is fixed to one choice of its location, while such planning does not make for the efficient and economical operation of the lifts. A better long-

FIGURE 2.33: TYPICAL OLD BLOCK PLANS

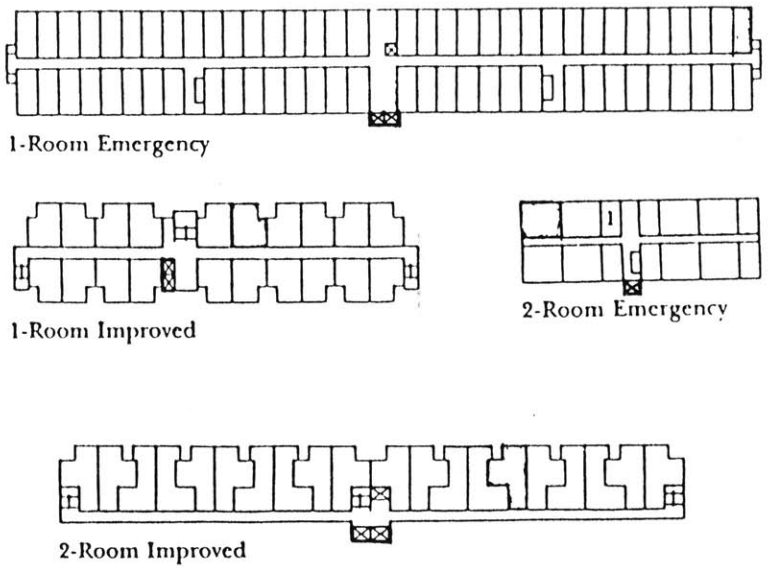
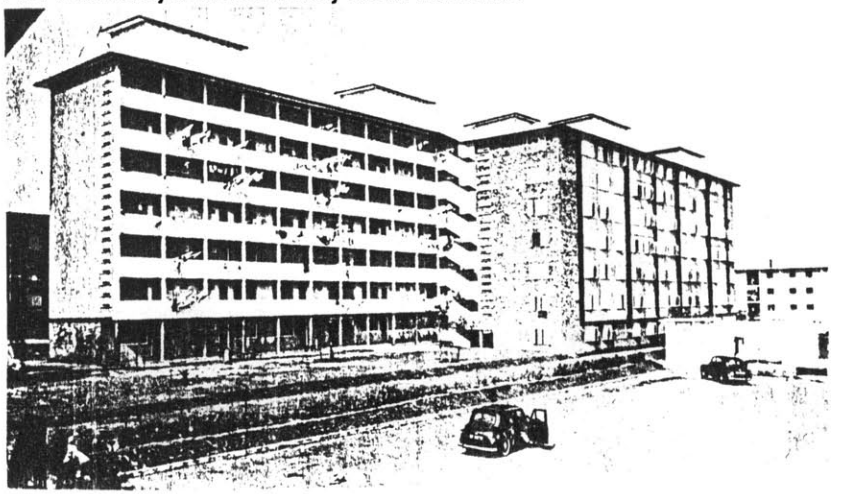


FIGURE 2.34: VIEWS OF EARLY BLOCKS WITHOUT LIFT.
Poor accessibility of old seven-story blocks without lifts



term solution might perhaps to provide 2 new lifts within a bigger combined lift core for each of these old blocks and remove the existing ones altogether. Most of the existing lifts would in any case have a remaining life span of 5 years or less by now.[43] .

Capital expenditure for the alternative provision of 2 new lifts per block may incur the HDB twice the S$45 million outlay for the existing 280 blocks of flats with only one or no lift, but this will certainly be off set by the long term replacement cost which is about due in the near future and no doubt the high maintenance costs of these old lifts.

4. Electrical Services:

The electrical services supplied to the different flat types are shown in Table 2.23. In any attempt to convert smaller units to larger units, there will certainly be an adequacy of design loads to work with. As an example, if 3 units of 1-room flat were to be combined into a new 3-room flat, they will have a total electrical load of 2.7 kw as compared to a new 3-room flat standardly provided with 1.7 kw.

In projecting the growing needs of an increasing affluent household, ownership of electrical appliances has risen many folds since the1960's (see Table 2.24). The HDB regularly revise its power point provision within the flats' standards. (see Table 2.25). Any recombining and conversion of smaller units such as the 1 and 2-room types into a larger 3 and 4-room flats may involve an additional provision of 1 or 2 more power points. This need to be taken into account in any conversion program.

TABLE 2.23 -- ELECTRICAL DESIGN LOAD FOR THE HDB FLATS

ROOM TYPE	DESIGN LOAD (KW)
1-ROOM	0.9
2-ROOM	1.3
3-ROOM	1.7
4-ROOM	2.0
5-ROOM	2.2
EXEC.APT.	2.5

SOURCE : HDB ELECTRICAL DEPARTMENT

TABLE 2.24 -- PERCENTAGE OWNERSHIP OF ELECTRICAL APPLIANCES IN HDB FLATS

ELECTRICAL APPLIANCES	1973	1977	1981
REFRIGERATOR	73.8	87.3	94.9
TELEVISION SET	71.6	83.8	94.9
ELECTRIC FAN	57.2	N.A.	85.2
TELEPHONE	19.5	37.4	80.6
ELECTRIC WATER HEATER	N.A.	8.5	13.7
AIR-CONDITIONER	N.A.	1.5	3.2

SOURCE : HDB SAMPLE HOUSEHOLD SURVEYS 1973,1977 & 1981

TABLE 2.25 -- NUMBER OF 13A POWER POINT PROVIDED IN HDB FLATS

ROOM-TYPE	1975	1982	1984
1-ROOM	3	4	6
2-ROOM	4	5	8
3-ROOM	5	6	9
4-ROOM	6	7	10
5-ROOM	7	8	11
EXECUTIVE APT.	N.A.	9	12

SOURCE: HDB ELECTRICAL DEPARTMENT

5. Water Supply:

Water to all public housing is supplied in two ways. Flats on the lower floors of a high-rise block will receive direct supply from the government water main. Those on the upper storeys receive indirect water supply from tanks installed at the roof of the building (see Figure 2.35).

However, in many of the old apartment blocks built in the 1960's, there were sever problems of lead corrosion, attributed to the use of corrosive materials in its water pipes and storage tanks[45] . Namely, the use of unlined galvanized steel. Water to the higher storeys is either fed from the roof water tanks by force of gravity or often enough by old and inefficient pumps and control system.

The HDB has so far carried out several improvement works in respect of this area to several old housing blocks as shown in Table 2.29. In 1984, 3,550 high-rise blocks were provided with additional water pressure booster systems at a cost of S$16 million to improve the pressure of water supply during peak period. It is interesting to note that while most of the corrosive water tanks in these old blocks were replaced free by the HDB, the corrosive water supply pipes within each units were not replaced by the HDB[46]. Replacement of these internal corrosive water pipes should also be addressed in the overall revitalization plan to improve the overall housing environment.

FIGURE 2.35 : WATER SUPPLY TO A TYPICAL HDB BLOCK --
Direct supply from the government water main and indirect supply from water tank.

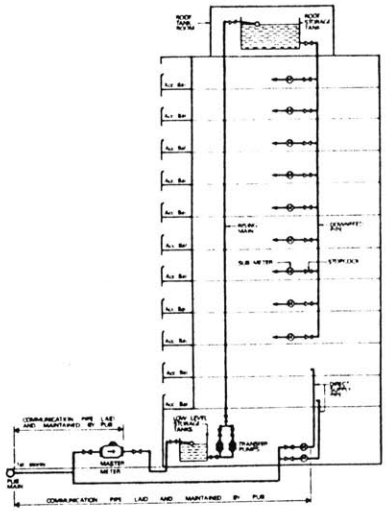


TABLE 2.29 : HDB MAINTENANCE WORKS

ITEM	FREQUENCY
CONSERVANCY	DAILY SWEEPING FORNIGHTLY WASHING OF EXTERNAL FLOORS
REFUSE REMOVAL	DOMESTIC REFUSE - DAILY REMOVAL BULK REFUSE - WEEKLY REMOVAL
GRASS CUTTING & MAINTENANCE	TWICW MONTHLY
LANDSCAPING MAINTENANCE & PLANTING	ON-GOING
REPAIR TO BUILDINGS & EQUIPMENT	ON-GOING
EMERGENCY SERVICES ON-GOING	
BUILDING REPAIRS & REDECORATION	EVERY 3 - 5 YEARS
RE-SURFACING CAR PARKS	EVERY 7 YEARS
RE-ROOFING	EVERY 10 YEARS
REWIRING	EVERY 15-20 YEARS
LIFTS:	
SERVICING	EVERY 2 WEEKS
TESTING	QUARTERLY INSPECTION & YEARLY TESTING
AUTOMATIC RESCUE DEVICE	QUARTERLY
WATER PUMPSETS & STORAGE TANKS:	
SERVICING	EVERY 45 DAYS
FLUSHING & STERILISATION	EVERY 15 - 18 MONTHS
PUMPSET REPLACEMENT	EVERY 10 YEARS
CATV SYSTEM SERVICING	HALF-YEARLY
PUBLIC LIGHTING POINTS CHECKS	EVERY 2 WEEKS

SOURCE : HDB ESTATES AND LANDS DIVISION REPORTS.

SYNOPSIS OF MAJOR FINDINGS :

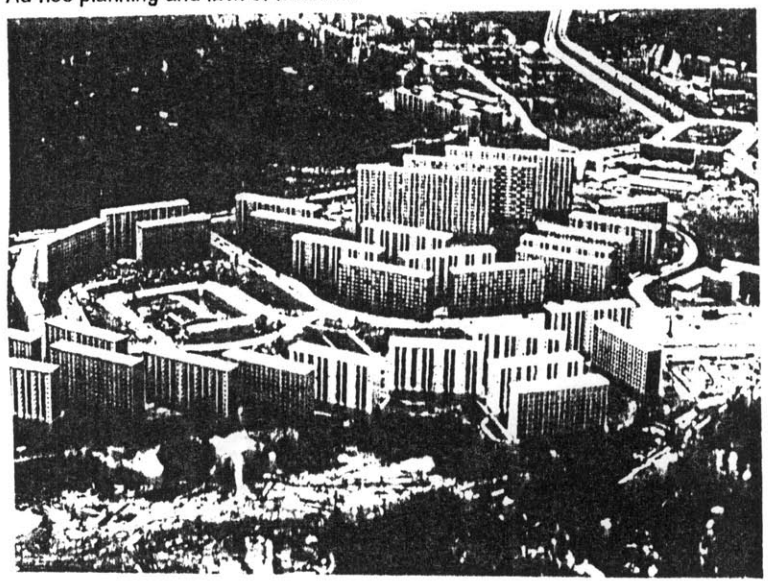
In twenty eight years of public housing and new town development in Singapore, there has been a passive and negligible process of upgrading of the old physical environment. While there may have been significant changes in new town planning and in the provision of facilities to respond to the increasingly affluent Singaporean and to improve the functional need and quality of these new towns, they did not however filter through the older new towns and estates (see Figure 2.36).

Appraisal of the major issues raised in this chapter has prompted the author to reach the following conclusions:
1.) Politically, the central autonomy on new town development in Singapore provides effective and institutional mechanism, but this put extreme burden on the government, and will soon reach its limits in terms of manpower and finance. The *laissez faire* approach, in which decisions are determined by the market place, deserves some serious considerations. The government should consider providing continuing political and financial support in the area of master planning and resettlement, and gradually transfer the design, construction and estate management tasks to the private sector and the community.

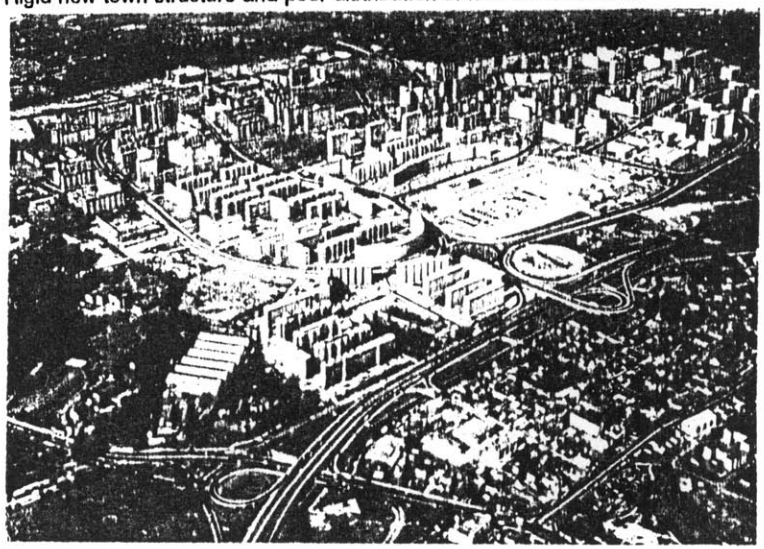
2.) Socially, both the physical and social environments of a new town must function well and capable of providing varied life-style. The increased level of community supports and the willingness for the HDB to allow more community participation in the revitalization process are equally important. The continuous extension and upgrading of the

FIGURE 2.36: COMPARISON OF NEW TOWN ENVIRONMENTS

PHASE ONE NEW TOWN ENVIRONMENTS(PRE 1960):
Ad-hoc planning and lack of facilities.



PHASE TWO NEW TOWN ENVIRONMENTS(1960-1969):
Rigid new town structure and poor distribution of new town facilities.



new town environment require regular active community participation towards the pursuance of better environment.

3.) Economically, the rapid increase of financial commitment by the government to built new town will soon reach its limit. The government should realize that the rehabilitation of housing is often cheaper than developing new ones, and should begin to transfer more development funds for the improvement of its older new towns.

4.) Physically, there is a need for significant quantitative and qualitative changes in flat designs, block arrangements, site planning, in the provision of facilities, treatment of external spaces etc. in the new town environment. These changes are necessary to respond to the changing needs and aspirations of the more affluent and sophisticated residents.

Major lessons learned and significant tasks foreseen in this chapter are important for the successful achievements of new town revitalization and should not be taken lightly. The government support, the HDB experience, the salient planning and design policies and practices, the vision and drive of the people towards better environment appear valid and have contributed to the past success of new town development in Singapore. It is hope that the following recommendation built from the major issues raised in this chapter will further contribute to the successful story of the future new town development in Singapore.

FIGURE 2.36: COMPARISON OF NEW TOWN ENVIRONMENTS

PHASE THREE NEW TOWN ENVIRONMENTS(1970-1979):
Dense and monotonousnew town identity.

PHASE FOUR NEW TOWN ENVIRONMENTS (1980-1989):
The bogining of emphais on environmental qualities.

CHAPTER THREE -- RECOMMENDATIONS

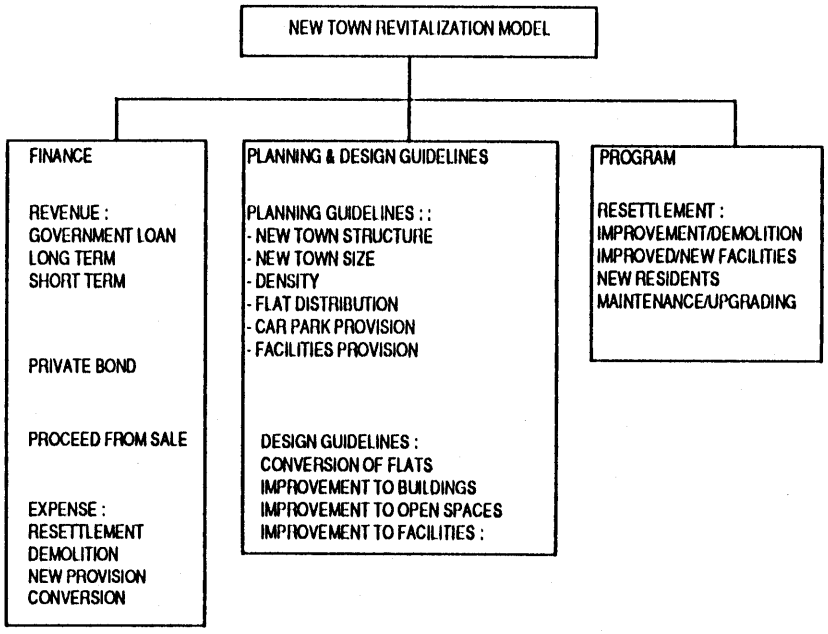
Three sets of recomendation are proposed to form the framework for new town revitalization model (see Figure 3.1): They are :

1. Financing Revitalization: based upon an analysis of projected expenses and revenues associated with new town revitalization, recommendations are made to develop additional sources of funds to be made available for new town revitalization.

2. Planning and Design Guidelines : macro-planning guidelines for new town structure, size, density, flat distribution, infrastructure and facilities provision are proposed; Micro-design guidelines of improvements to flats, buildings, open spaces and facilities are outlined.

3. Program Implementation: proposes a process for resettling existing tenants, demolition/conversion programs, improved/new facilities, attracting new residents, and future maintenance and upgrading works.

FIGURE 3.1 : PROPOSED NEW TOWN REVITALIZATION MODEL



RECOMMENDATION ONE — FINANCING NEW TOWN REVITALIZATION :

The assurance of the availability of financing for new town revitalization actions is seen as an important factor in its successful implementation. The HDB is empowered to raise funds from the government through mortgages or charges derived from any property vested with the HDB. This is arranged in the form of a 60-year loan at 7.25 to 7.50 percent interest on housing for rent and a 10-year loan at 6 percent interest on housing for sale as raised in the previous chapter (see Chapter Two Table 2.5). Alternatively the HDB can create and issue debenture stock. In view of the complexity and scope of a comprehensive revitalization program, financing will involve both short-term and long-term planning (see Figure 3.2).

The Long-term financing may come from government loans. Currently government loans to the HDB account for about one-third of the nation's estimated total annual Development Budget for the past seven years[49] . With the projected scaling down of new town and public housing development to half of the present volume from 1990 onwards at least half of the present government loans of approximately S$60 millions to the HDB (see Chapter Two Table 2.5) may be channelled towards financing the new town revitalization programs. Compared to the past six years period, from 1980 to 1985, little efforts towards revitalization was possible because of the limited available budget which ranged only from S$0.42 million to S$ 1.14million per year respectively for HDB's expenditure on Improvement works (see Table 3.1).

FIGURE 3.2: SOURCES OF NEW TOWN FINANCE

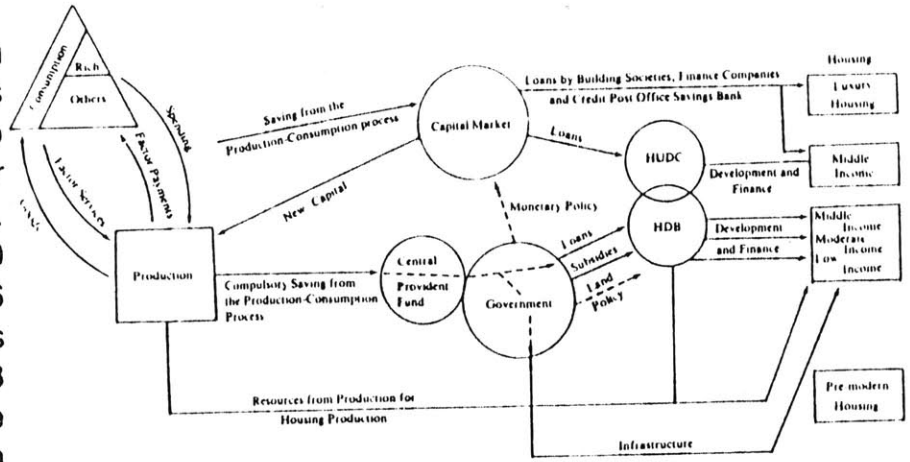


TABLE 3.1 - HDB'S EXPENDITURE ON IMPROVEMENT WORKS

YEAR	IMPROVEMENT EXPENDITURE (S$MILLION)	DEVELOPMENT EXPENDITURE (S$MILLION)	% OF TOTAL DEVELOPMENT EXPENDITURE
1980	0.42	12.29	2.4
1981	0.51	11.94	2.2
1982	0.55	15.63	2.1
1983	0.76	23.63	2.5
1984	0.95	25.58	2.2
1985	1.14	92.09	1.7

SOURCE : HDB ANNUAL REPORTS 1980 TO 1985

Revitalization programs unlike new town development, do not require huge budget outlay for any purchase of land or infrastructure provision. They could be economically and even profitably handled by either the public or private sector. Unit cost for converting 1-room or 2-room flats into 3-room or 4-rooms amounts to less than half the construction cost for a new unit (see Tables 3.2 and 3.3 for the comparative new and conversion costs of a 3-room and a 4-room flats). If these newly converted flats are to be sold at the current selling prices, a 3 and 4-room unit each will be able to fetch S$15,000 and S$25,000 respectively in excess of the conversion costs incurred. An annual vacancy rate of 10,000 to 12,000 units of the 1-room and 2-room flats, can thus be profitably converted into 5,000 units of 3 and 4-room flats at a cost of S$90 million and an annual revenue of approximately S$ 192 million. The net surplus of S$100 million can then be employed in upgrading and providing more facilities in those older new towns.

TABLE 3.2: 3-ROOM UNIT COST IN SINGAPORE DOLLARS(1983)

	3-ROOM NEW FLAT	%	3-ROOM MODEL A	%	3-ROOM CONVERSION	%
1. BUILDING	$23,700	62.40%	$29,900	62.80%	$8,970	58.86%
2. SANITARY	2600	6.90%	3000	6.30%	3000	19.69%
3. ELECTRICAL	850	2.20%	950	2.00%	950	6.23%
4. LIFTS	890	2.30%	900	1.90%	-	-
5. ROOFING	250	0.70%	280	0.60%	-	-
6. TV ANTENNA	90	0.20%	100	0.20%	-	-
7. PUB CONNECTIONS	270	0.70%	270	0.60%	-	-
8. EARTHWORKS	900	2.40%	1100	2.30%	-	-
9. PILING	5250	13.80%	6200	13.00%	-	-
10. SEWER	1200	3.20%	2100	4.40%	2100	13.78%
11. ROADS/CAR PARKS	1800	4.70%	2600	5.40%	-	-
12. SUPERVISION	200	0.50%	220	0.50%	220	1.44%
TOTAL COST	$38,000	100%	$47,620	100%	$15,240	100%
SELLING PRICE (1986)	$30,400		$37,300		($30,400)	

SOURCE : HDB ANNUAL REPORTS 1983/84 AND 1985/86 FOR 3-ROOM NEW FLAT AND MODEL A

* : CONVERSION COST IS BASED ON 30% OF THE TOTAL BUILDING COST ON ON PARTITION AND FINISHES

() : DENOTE SUGGESTED SELLING PRICE FOR CONCVERTED 3-ROOMFLAT

TABLE 3.3: 4-ROOM UNIT COST IN SINGAPORE DOLLARS(1983)

	4-ROOM NEW FLAT	%	4-ROOM MODEL A	%	4-ROOM CONVERSION	%
1. BUILDING	$32,900	63.30%	$42,400	65.60%	$12720	61.83%
2. SANITARY	2900	5.60%	3500	5.40%	3500	17.02%
3. ELECTRICAL	950	1.80%	1250	1.90%	1250	6.08%
4. LIFTS	1220	2.40%	1170	1.80%	-	-
5. ROOFING	350	0.70%	380	0.60%	-	-
6. TV ANTENNA	90	0.20%	100	0.20%	-	-
7. PUB CONNECTIONS	270	0.50%	270	0.40%	-	-
8. EARTHWORKS	1100	2.10%	1300	2.00%	-	-
9. PILING	7200	13.90%	7500	11.60%	-	-
10. SEWER	2200	4.20%	2800	4.30%	2800	13.61%
11. ROADS/CAR PARKS	2500	4.80%	3700	5.70%	-	-
12. SUPERVISION	250	0.50%	300	0.50%	300	1.46%
TOTAL COST	$51,930	100%	$64,670	100%	$20,570	100%
SELLING PRICE (1986)	$46,400		$57,300		"$20,570)	

SOURCE : HDB ANNUAL REPORTS 1983/84 AND 1985/86 FOR 4-ROOM NEW FLAT AND MODEL A

* : CONVERSION COST IS BASED ON 30% OF THE TOTAL BUILDING COST ON ON PARTITION AND FINISHES

() : DENOTE SUGGESTED SELLING PRICE FOR CONCVERTED 4-ROOMFLAT

RECOMMENDATION TWO -- PLANNING AND DESIGN GUIDELINES

PLANNING GUIDELINES:

Frequently enough, any attempt by the HDB to upgrade or replan its existing estates often results in realization of guidelines that are far behind even the latest projected needs. Needless to say more comprehensive planning guidelines for revitalization of its new towns are needed, as well as policy decision on what to do with the remaining 106,000 units of 1-room and 2-room old flats that are spread over 72 older estates [19]. The disparity in quality among new towns built under different phases of development could be minimized through a continuous comprehensive effort to propose and upgrade the planning policies and standards. The planning standards for facilities in new towns and old estates such as distribution of flat types, provision of car parks, recreational, commercial facilities etc. have to be constantly updated and revised to keep its projection accurate.

This section proposes to focus on the macro-planning problems and difficulties faced by the HDB in attempting to project the national needs to meet with change overtime. It is hope then, that some guiding principles with a built-in flexibility may be developed as useful planning guidelines for new town revitalization (see Table 3.4).

The structure of these planning guidelines encompasses the following:

TABLE 3.4 — PLANNING & DESIGN GUIDELINES

A) PLANNING GUIDELINES	REVITALIZATION MODEL
1. NEW TOWN SIZE	500 TO 800 HA
2. NEW TOWN DENSITY	64 TO 69 DU/HA
3. TOTAL DWELLING UNIT	"35,000 TO 55,000 DU"
4. LAND USE	
-COMMERCIAL TC & NC.	86HA (13.7%)
-RESIDENTIAL	207HA (33.1%)
-SCHOOLS	73HA (11.7%)
-OPEN SPACE	23HA (3.7%)
-SPORTS COMPLEXES	13HA (2.1%)
-INSTITUTIONS	23HA (3.7%)
-INDUSTRY	120HA (19.2%)
-MAJOR ROADS	75HA (12.0%)
-UTILITIES	5HA (0.8%)
TOTAL LAND USE	625HA (100%)
3. FLAT DISTRIBUTION (%)	
1-ROOM	0.10%
2-ROOM	0.10%
3-ROOM	38.20%
4-ROOM	44.60%
5-ROOM	12.80%
EXEC.APT.	3.70%
MID.INCOME APT	2.50%
TOTAL:	100.00%
4. CAR PARK/FLAT RATIO	
1-ROOM	5.5
2-ROOM	3.9
3-ROOM	1.6
4-ROOM	1.4
5-ROOM	0.7
EXECUTIVE APT.	0.7
MIDDLE-INCOME	0.7
NEW TOWN AVE.	1.6

*New Town Structure
*New Town Size
*New Town Density
*Number of Dwelling Units
*Flat Distribution Ratio
*Car Park Provision Ratio
*Provision of Facilities
*Locations of Facilities
*Reserve Sites for Future Uses

NEW TOWN STRUCTURE :

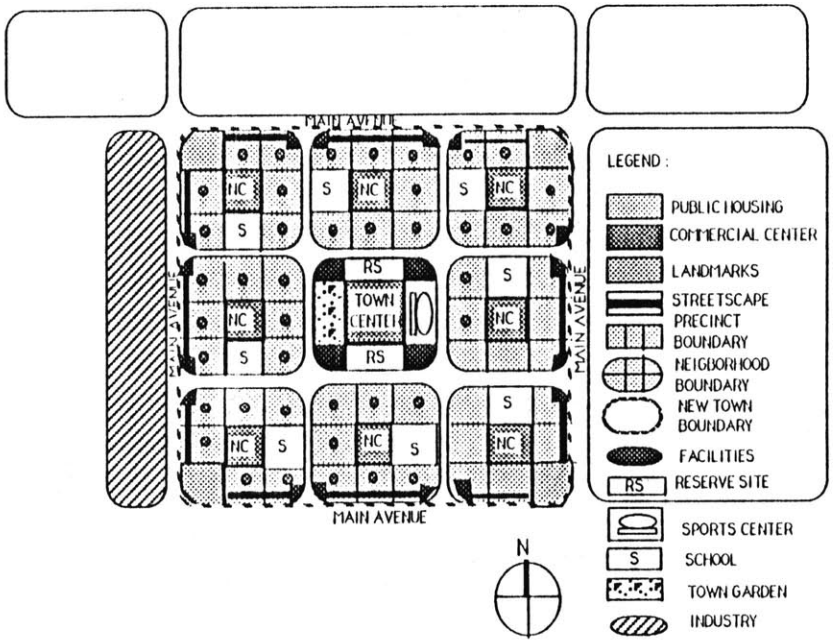
New town layouts in Singapore follow closely to the new town structure which was developed in the early 1960s and later refined in the early 1980s. This new town structure stipulates a new town size of 200,000 persons or 50,000 dwelling units with five to eight neighborhood centers, a town center, and a range of new town facilities (see Chapter 2 Figure 2.5). However, in the actual planning and layout of new town, this structure is subjected to different interpretation by different planners and architects. No guidance of the locations of new town facilities in the new town structure, had often resulted in the poor locations of facilities in some new towns, such as the high concentration of facilities within the town center in Toa Payoh New Town and the inconvenient fringe locations of sports and swimming complexes in the case of Ang Mo Kio New Town.

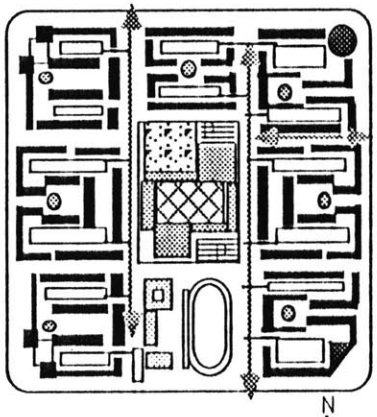
In planning for the revitalization actions and the future new town layouts, it is therefore necessary to develop a set of more detailed new town structure to guide these actions. The proposed set of new town revitalization structure is shown in Figure 3.3. which consists of a new town structure and a neighborhood structure.

This set of detailed new town structure is developed with the following objectives:

1. To demarcate the hierarchy of facilities according to their serving functions for precinct, neighborhood and new town;
2. To locate new town facilities in the most desirable positions according to the needs of the residents;
3. To site these facilities along major approaches in order to

FIGURE 3.3: PROPOSED NEW TOWN REVITALIZATION STRUCTURE





The neighborhood structure allows facilities to be located at their most desirable locations and provide an integrated pedestrian and vehicular circulation.

enhance new town character and identity;

4. To strengthen the checker-board principle of new town development by circumscibe sites for facilities with low-rise structure in between the high-rise high-density precincts relieving the effects of scale and density.

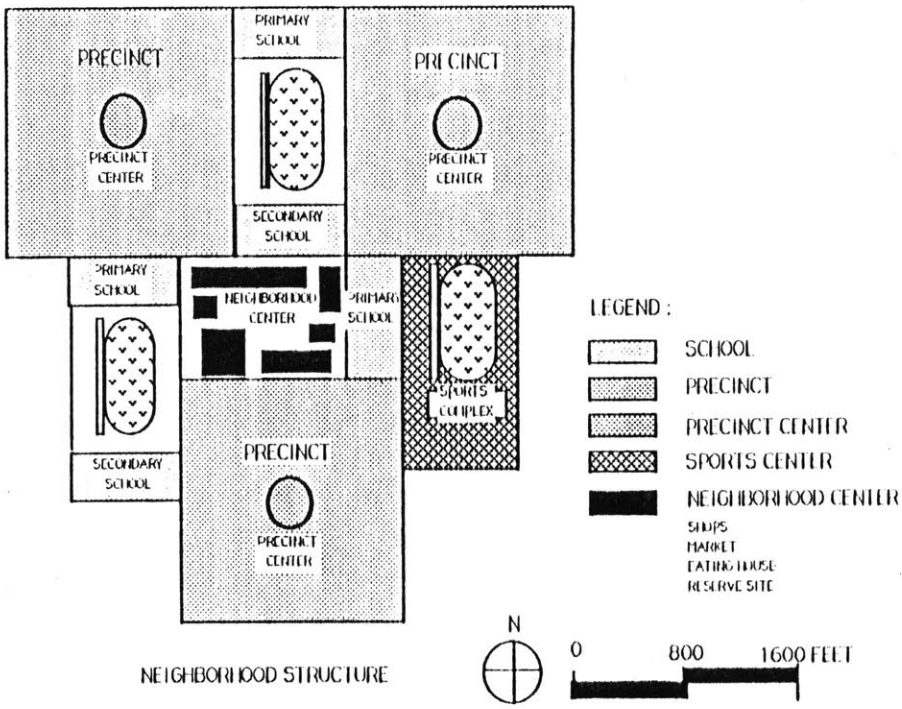
The proposed detailed set of new town structure is to be read in conjunction with the revised planning standards(see Table3.4) which encompasses the following (see Figure 3.3)

1. An overall new town structure for 200,000 persons (50,000 dwelling units) with eight neighborhoods each with its neighborhood center, a town center, a town garden, a sports complex, and sites for a range of new town facilities;

2. A neighborhood structure for 25,000 persons (6,000 to 7,000 dwelling units) with six to eight precincts each with its precinct center, a neighborhood center with market, shops and eating houses, a neighborhood park, a school site for both the primary and secondary schools, and sites for a range of neighborhood facilities;

3. A precinct structure for 3,000 persons (600 to 800 dwelling units) with six to eight blocks of low and high-rise apartments surrounding a precinct center with shops for daily needs such as laundrette, coffee shop and convenient store, a precinct garden with a children playground and a multi-purpose court.

FIGURE 3.3 : PROPOSED NEW TOWN REVITALIZATION STRUCTURE(CONTINUED FROM PREVIOUS PAGE)



NEIGHBORHOOD STRUCTURE

NEW TOWN SIZE:

Planner and architect in the HDB use the long-range Concept Plan as a guide to decide on the approximate location of a new town. However, the size of a new town depends on the land available for public housing and new town development. By the end of March 1985, a total of 8,250 hectares of private land have been compulsorily acquired and 332 hectares have been purchased by private negotiation for this purpose, together with 4,010 hectares of state land alienated by the government to the HDB, the HDB currently hold a total of 12,592 hectares of land. Based on the HDB past experience in new town developments of various new town sizes ranging from the smallest new town (Queenstown) of 285 hectares to the largest new town (Woodlands) of 1260 hectares (see Table 3.5), the HDB had established that a new town size of around 500 to 800 hectares which could house a total of 30,000 to 50,000 dwelling units to be most desirable in terms of land acquisition, physical planning, social integration and estate management. With this optimum new town size, there are sufficient lands for another 12 to 14 new towns in Singapore (see Figure 3.4).

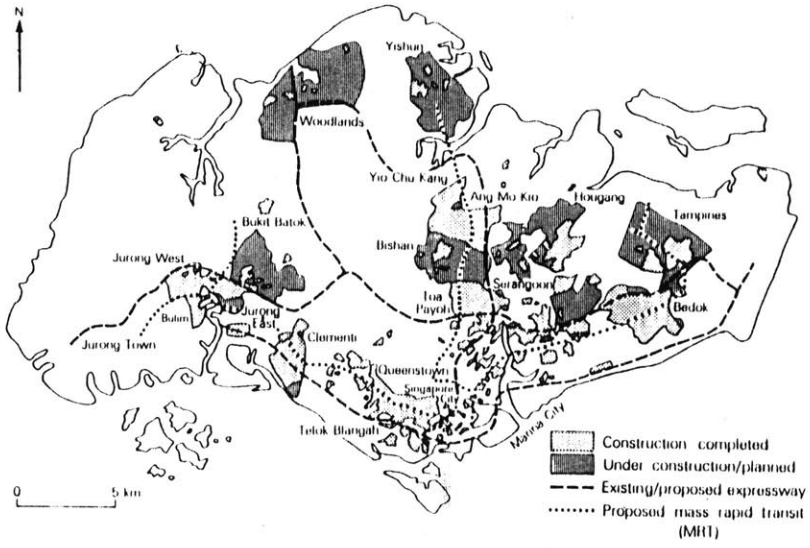
Thus it is important to keep this in mind for new town revitalization. Small estates and new towns should be carefully studied to explore the possibility of integration or enlargement to an optimum size of around 500 to 800 hectares where facilities provision and new town environment could be exploited to the fullest. As for the larger new towns, it may be desirable to shrink them to the optimum size and reserve more lands for future uses.

TABLE 3.5 : EXISTING HDB NEW TOWNS IN SINGAPORE

NEW TOWN	YEAR OF CONSTRUCTION PHASE	YEAR	AREA (HA)	PUBLIC HOUSING UNITS PROJECTED	COMPLETED
QUEENSTOWN	1	1952	285	28,000	28,000
TOA PAYOH	2	1965	375	39,000	37,700
WOODLANDS	3	1971	1260	66,000	22,600
TELOK BLANGAH	3	1972	365	13,200	13,200
BEDOK	3	1973	770	49,000	49,000
ANG MO KIO	3	1973	740	50,000	49,500
CLEMENTI	3	1974	425	25,000	24,100
YISHUN	3	1976	920	60,000	32,100
HOUGANG	3	1979	520	25,500	24,900
JURONG EAST	3	1979	300	21,000	19,500
JURONG WEST	3	1979	380	33,000	32,700
TAMPINES	4	1980	925	56,000	29,900
BUKIT BATOK	4	1981	750	26,000	26,300
SERANGOON	4	1983	600	18,000	13,100
BISHAN	4	1984	700	25,000	9,200
ZHENGHUA	4	1984	475	30,000	900

SOURCE : HDB ANNUAL REPORTS 1960-1986

FIGURE 3.4 : NEW TOWNS IN SINGAPORE



DENSITY:

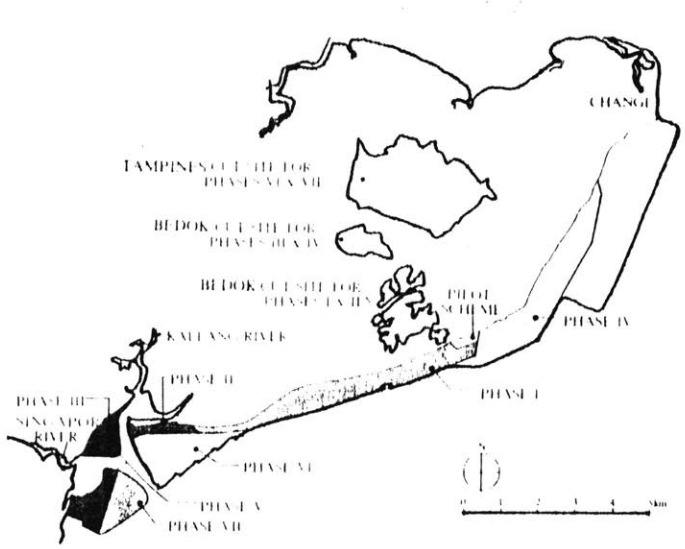
One of the most important planning in new town planning and revitalization in Singapore is to adhere to its high density development. Singapore is a small island. By the end of 1984, its total land area including offshore islands was 618 sq.km.(see PREFACE Figure I). In comparison with its size, Singapore has a large population of 2.5 million by the end of 1986. The population increases at an average annual rate of 1.7 percent since 1967, while the total land area has grown only marginally of 15 sq.km. (2.4 percent of toal land area) through land reclamation at the annual rate of 0.4 percent (see Figure 3.5).

In order to conserve the scarce land resources in Singapore, the HDB was given the task of achieving as high a residential density as possible. Early new towns developed in the 1960s, such as Queenstown and Toa Payoh have a high net residential density of between 200 du/ha to 500 du/ha or a gross new town density of 99 du/ha. This, an equivalent to 4000 person per square kilometer is amongst the highest in the Asian region, ranking next to Hong Kong, and ten times that of Western Europe's most densely populated country, the Netherlands.

These early new towns consisting mainly of small 1-room, 2-room and 3-room flats and the supporting new town facilities, are found to be inadequate. The experience of the negative impacts of having too many small units to a low ratio of public amenities and facilities , HDB have been convinced to improve the density of later new towns of the 1970's such as Bedok and Ang Mo Kio. They have net

FIGURE 3.5: LAND RECLAMATION IN SINGAPORE

EAST COAST RECLAMATION



EAST COAST RECLAMATION	AREA (HA)	PERIOD	PROJECTCOST (S$MILLION)	COST/SQ.M. (S$)
PHASE 1	405	1966-70	45	11
PHASE 2	53	1970-71	10	19
PHASE 3	67	1971-75	23	34
PHASE 4	486	1971-76	44	9
PHASE 5	154	1974-77	106	69
PHASE 6	234)	1979-85	385	107
PHASE 7	126)			

SOURCE: HDB CIVIL ENGINEERING DEPARTMENT.

residential densities reduced to between 168 du/ha to 200du/ha while gross new town density reduced to 64 du/ha (see Table 3.6) . With this improved density, the HDB found that it can provided more and larger units of 3-room and 4-room flats. The supporting new town facilities are also consequently improved.

In the formulation of an optimum residential density, one must take into consideration the availability of residential lands in Singapore, the projected long-term demand for housing and facilities based on the demographic trends and socio-economic changes and the liveability and environmental quality. Though over the last 28 years, the territory of Singapore Island has increased by 15 square kilometers (6 square miles) through land reclamation (see Figure 3.5), it is still a country with very small in size. The total land area of Singapore is 618 sq.km. (61,800 ha) with the main island comprising 92 per cent (571 sq.km.) of the total. However, the projected net buildable urban areas on the main island accounts for only 45 percent at 259.5 sq.km. (25,950 ha) [52] (see Figure 3.6).

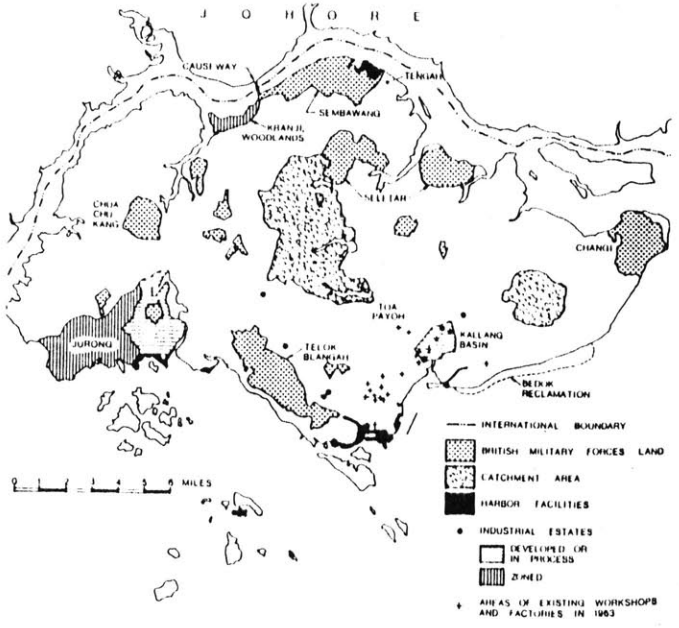
From 1960 to 1988, the HDB has already constructed a total of 557,612 dwelling units on 15,791 ha sites gazetted for public housing and new town developments . This gives an average new town density of 35.3 du/ha. When all HDB new towns are completed within this designated site area, there will be a total of 846,270 dwelling units with a combined average density of 53.6 du/ha. With the remaining 10,159 ha of buildable urban areas only a further allocation of 6,300ha sites are available for new town developments[53], the HDB will need to maintain its new town density of 64 du/

TABLE 3.6 - PROPOSED NEW TOWN DENSITY

NEW TOWNS	PHASE 1 OLD ESTATES	PHASE 2 TOA PAYOH	PHASE 3 ANG MO KIO	PHASE 4 TAMPINES
PUBLIC HOUSING UNITS		39,000 DU	50,000 DU	56,000 DU
EXIST.NET RESIDENTIAL DENSITY	350 DU/HA*	248 DU/HA	168 DU/HA	200 DU/HA
EXIST. GROSS NEW TOWN DENSITY	-	99 DU/HA	69 DU/HA	64 DU/HA
PROPOSED DENSITY FOR NEW TOWN REVITALIZATION	64 DU/HA	64 DU/HA	64 DU/HA	64 DU/HA
AVERAGE LAND AREA/NEW TOWN				
- RESIDENTIAL LAND		157 HA	297 HA	
- TOTAL LAND IN NEW TOWN		375 HA	740 HA	925 HA
ADDITIONAL LAND AREA AVAILABLE		55 HA	21 HA	0 HA

* : AVERAGE FIGURE FOR SEVERAL OLD ESTATES
DEFINITION:
"NET RESIDENTIAL DENSITY = NO. OF DWELLING UNITS ON A SITE / NET SITE AREA INCLUDING DRIVEWAYS, CAR PARKS ETC."
GROSS NEW TOWN DENSITY = TOTAL NO. OF DWELLING UNITS IN A NEW TOWN/ TOTAL LAND AREA OF A NEW TOWN

FIGURE 3.6: LANDS AVAILABLE FOR NEW TOWNS IN SINGAPORE
55 percent of the entire main island is reserved for water catchment, military installation and indusries, only 45 percent at 259.5 sq.m. is not buildable urban area.



ha in order to house a total of a projected 3.8 million population in Singapore[54].

There is a need therefore to investigate how the older new town with gross new town density of 99 du/ha may be reduced to meet the latter standards of the newer new towns with a gross new town density of 64 du/ha ?

Several possible courses of action may be considered (see Figure 3.7) :

1. Horizontal Combination : Larger 3 and 4-room flats can be formed by combining two, three or four small existing 1 and 2-room flats thus reducing the overall density by one-third.

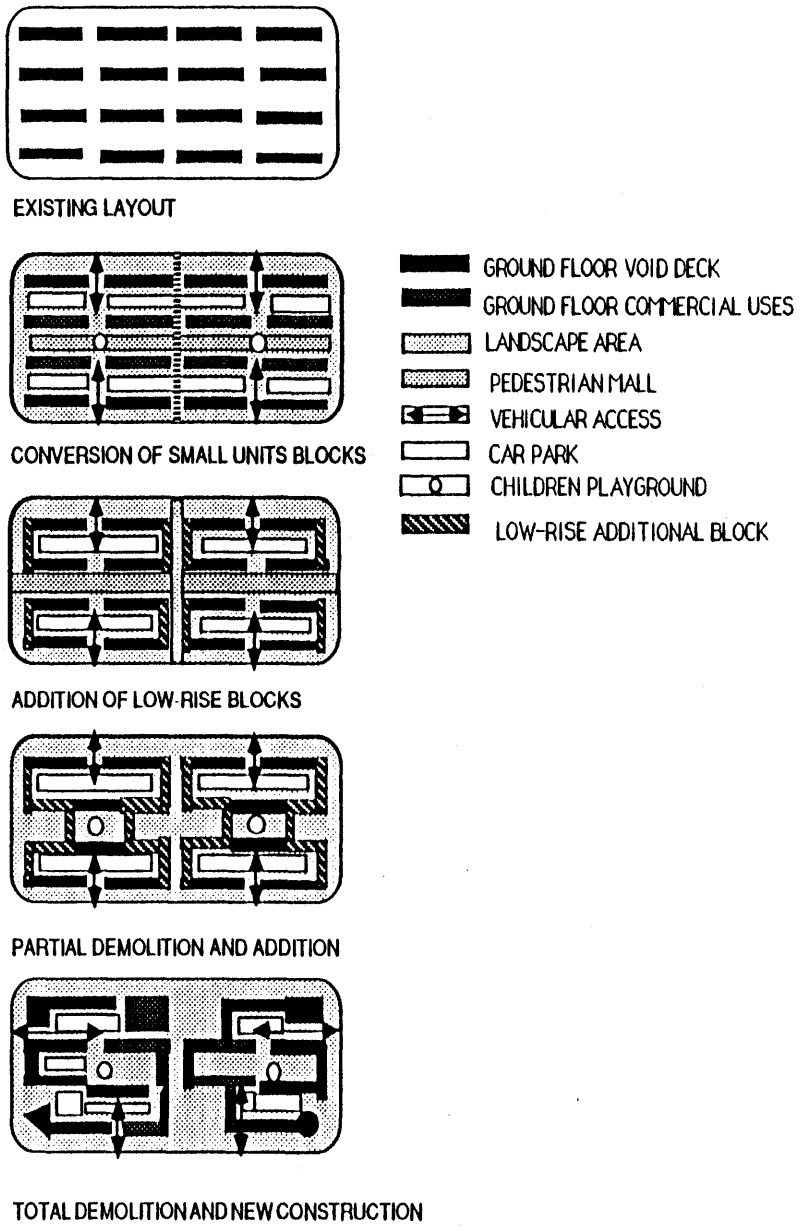
2. Vertical Combination: Larger 3 and 4-room flats can also be formed by adding a new internal staircase to combine what are now immediate floor units into duplex apartments. This will also help to reduce density by approximately one-third.

3. Partial Demolition: Certain dilapidated small 1 and 2-rooms blocks could be demolished to made way for better facilities and thus reducing the overall crowdedness within an area.

4. Total Demolition and New Construction: An entire area of blocks could be demolished to make way for new blocks with lower density, bigger flat types and better facilities.

The choice of adopting the right course of actions or a combination of these actions will ultimately depend on the

FIGURE 3.7 : CONVERSION OF OLD ESTATES
Proposed 4 sceneries for the revitalization of old housing estates



different constraints and opportunities presented by each new town. Although there is no hard and fast rule to one solution, the ultimate objective is to maintain a more optimum new town density of around 64 du/ha.

FLAT DISTRIBUTION:

During the first phase of 'new town' development, 1-room and 2-room flats constitute almost the entire supply and demand; while the supply and demand for these smaller flats had gradually dropped from 64 percent during the second phase to 33 percent during the third phase and eventually to 0.3 percent to the current fourth phase of development (see Table 3.7). Base on this trends, the distribution of flats for the next phase and any future revitalization action will have to at least maintain or improved on the present distribution of flat types , that is

1-room 0.1 percent or less;
2-room 0.1 percent or less;
3-room 36.2 percent or less;
4-room 44.6 percent or more;
5-room 12.8 percent or more
Executive Apartment 3.7 percent or more
Middle-income housing 2.5 percent or more

The percentage of types of flats to be reduced or increased will depend on the number of new and existing applications received daily by the HDB. In revitalizing the older new towns, larger flats have to be injected through the extension of boundaries, redevelopment or conversion of smaller to larger flat types. While these improvements are taking place, it is also important to keep a small number of less than 0.1 percent of the smaller flats for those who can only afford the extremely low monthly rental of S$16.50 plus S$11.00 conservancy fee.

TABLE 3.7 - PERCENTAGE DISTRIBUTION OF FLATS IN HDB NEW TOWNS

PERIOD	1-RM.	2-RM.	3-RM.	4-RM.	5-RM.	EXEC.	MID.INC.	TOTAL
1960-65	34	29	36.4	0.4	0	0	0	100
1966-70	45	19	34.3	1.7	0	0	0	100
1971-75	27	6.5	45.4	14.6	6.8	0	0.2	100
1976-80	3.2	7.7	52.6	25.6	9.9	0	1	100
1981-85	0.1	0.2	36.2	44.5	12.8	3.7	2.5	100
RECOMMD.	0.1	0.1	36.2	44.6	12.8	3.7	2.5	100

SOURCE : HDB BUILDING AND DIVISION STATISTICS

PROVISIONS OF FACILITIES :

Although the HDB has endeavoured to develop, improve, and maintain its planning and design standards for commercial, institutional, sports and recreational facilities within new towns (see Table 3.8), theY do still sometimes lagged behind the needs and aspiration of an increasing standard of living and an affluent life style that is fast pervading the Singaporean. Take for example the case of the commercial standard provision of 1 shop to 70 du. This is an acceptable ratio if the shop is one that cater for the daily sundry needs of the residents such as a grocery store or a bakery shop. The same ratio becomes proportionally over-provided if the proposed facility is to cater to a specific group of residents, such as a goldsmith or a piano shop. The main shortcoming of the HDB planning standards in this respect is its tendency of generalization. Such an approach takes into consideration only the quantum value, without due regard to the complex issues of the quality and the nature of the facilities. Another shortfall of the current HDB planning standards is its lack of the provision of guiding principles and forward planning as pertains to the location of the facilities. For example : In applying the standard provision of 1 swimming complex of 1.5 ha at Toa Payoh New Town, its lack of perception lead to it being ultimately located at the fringe of the new town. As such it benefits especially those within its immediate neighborhoods, rather than the entire new town population.

These planning standards can at best then, served as a most superficial frame of reference It needs much to be improved, amplified, and modified to include the considera-

TABLE3.8 - HDB PLANNING STANDARDS FOR NEW TOWNS

FACILITIES	OLD STANDARDS IN 60'S	NEW STANDARD IN 80'S
COMMERCIAL FACILITIES		
SHOPS (30-400SQ.M.)	60 SHOPS / NEIGHBORHOOD	1 / 70 DU. 20% IN T.C. 50% IN N.C. & 30 % IN PRECINCTS
KIOSK(5-15SQ.M.)		1/600 DU. 30% IN T.C. & 70% IN N.C.
EMPORIUM (4500-6500SQ.M.)	1/NEW TOWN	1 TO 2/NEW TOWN
SUPERMARKETS (1200SQ.M.)	1 /NEW TOWN	1 TO 2 PER NEW TOWN
HAWKER CENTER /EATING HOUSE (450 SQ.M.)	1 HAWKER CENTER/N'HOOD COOKED FOOD STALLS 40 2 EATING HOUSES/N'HOOD	1 E.H./750 DU.7% IN T.C. 23% IN N.C. & 70% IN PRECINCTS
RESTAURANTS (90-2000SQ.M.)	2 /NEW TOWN	1/1000 DU. 30% IN T.C. 70% IN N.C. & 2-3 FAST FOOD & 1 TO 2 BIG RESTAURANTS IN T.C.
OFFICE SPACE		60SQ.M./450 DU.70% IN T.C. & 30% IN N.C.
CINEMA (1800SQ.M.)	2/NEW TOWN	2/NEW TOWN
MINI-MARKET (450SQ.M.)	NO PROVISION	1/6000 DU.
MARKET PRODUCE SHOP (130SQ.M.)	1 MARKET/NEIGHBORHOOD	1/3000 DU.
MARKET PRODUCE LOCK-UP SHOP (40SQ.M.)	)FRESH FOOD STALLS 162	1/500 DU.
WET MARKET/FOOD CENTER	)COOKED FOOD STALL 20	1/5000 DU. REPLACED BY MARKET SHOPS SINCE 1982
HDB AREA OFFICE (2000 SQ.M.)	4 PER NEW TOWN	1/15,000 DU
INSTITUTIONAL FACILITIES		
PRIMARY SCHOOL SITE	1 P.S. TO 2,500 DU (1.4 H)	1 P.S. TO 2,300 DU. (1.8 HA)
SECONDARY SCHOOL SITE	1 S.S TO 3,500 DU (1.8 HA)	1 S.S. TO 4,100 DU. (2.7 HA)
JUNIOR COLLEGE SITE (6 HA)	NO PROVISION	1 PER NEW TOWN
VOCATIONAL INST. SITE (6 HA)	NO PROVISION	1 PER NEW TOWN
LIBRARY (0.3 TO 0.4 HA)	1 PER NEW TOWN	1 PER NEW TOWN
POLYCLINIC (0.5 HA)	1 PER NEW TOWN	1 PER 30,000 DU.
COMMUNITY CENTER	1 PER N'HOOD (0.6 HA)	1 SITE TO 4,000-5,000DU.(0.4HA)
MOSQUE (0.3 HA)	1 PER NEW TOWN	1 SITE PER NEW TOWN
CHINESE TEMPLE (0.2 HA)	NO SPECIFIC STANDARD	1 SITE TO 9,000 DU.
CHURCH (0.3-0.4 HA)	NO SPECIFIC STANDARD	1 SITE TO 12,000 DU.
HINDU TEMPLE (0.2 HA)	NO SPECIFIC STANDARD	1 SITE FOR 2 NEW TOWNS
"OTHERS - RESIDENTS' COMMUNITY CENTER, "COMMUNITY HALL," NEIGHBORHOOD POLICE POST KINDERGARTEN," CHILD CARE CENTER SENIOR CITIZENS' CLUB.	NO SPECIFIC STANDARD	AS AND WHEN REQUIRED USUALLY LOCATED AT THE GROUND FLOOR VOID DECKS OF THE APARTMENT BLOCKS.
SPORTS & RECREATION FACILITIES:		
SWIMMING COMPLEX (1.5 HA)	1 PER NEW TOWN	1 PER NEW TOWN
SPORTS COMPLEX (3 HA)	1 PER NEW TOWN	1 PER NEW TOWN
INDOOR STADIUM (1.2 HA)	NO PROVISION	1 PER NEW TOWN
FOOTBALL FIELD 140M X 100 M OR 95 M X 70M)	1 IN SPORTS COMPLEX	1 PER NEIGHBORHOOD (MIN.)
HARD COURT FOR BADMINTON & VOLLEY BALL (16.5 M X 8.5 M)	) NO SPECIFIC STANDARD) 0.6 - 0.9 HA PER 1,000	1 COURT TO 1,000 - 1,200 DU.
MULTI-PURPOSE COURT (30M X 18M)	) PERSONS DEPENDING ON	1 COURT TO 2,500 - 3,000 DU.
PRECINCT GARDEN (0.2 HA)	) OPEN SPACE	1 TO 3,000 DU."
NEIGHBORHOOD PARK (1 TO 1.5 HA)	) SITUATION	1 PER NEIGHBORHOOD
TOWN GARDEN (5 TO 10 HA)	1 PER NEW TOWN	1 PER NEW TOWN

tion of the qualitative aspects, meeting with the intended practical usage. Thus while more facilities have been added over the years to enhance the self-sufficiency of each new town, improvements in a revitalization program should go beyond the mere quantitative consideration, and a qualitative approach to ensuring these meet with its functional objectives.

The recommended planning standards for new town revitalization is shown in Table 3.9 . A well-balanced mix of types of commercial facilities should be provided for each precinct, neighborhood and the new town at large. The

TABLE 3.9 : RECOMMENDED NEW TOWN REVITALIZATION PLANNING STANDARDS

A) PLANNING GUIDELINES	REVITALIZATION MODEL
1. NEW TOWN SIZE	500 TO 800 HA
2. NEW TOWN DENSITY	64 TO 69 DU/HA
3. TOTAL DWELLING UNIT	35,000 TO 55,000 DU
4. LAND USE	
-COMMERCIAL TC & NC.	86HA(13.7%)
-RESIDENTIAL	207HA(33.1%)
-SCHOOLS	73HA(11.7%)
-OPEN SPACE	23HA(3.7%)
-SPORTS COMPLEXES	13HA(2.1%)
-INSTITUTIONS	23HA(3.7%)
-INDUSTRY	120HA(19.2%)
-MAJOR ROADS	75HA(12.0%)
-UTILITIES	5HA(0.8%)
TOTAL LAND USE	625HA(100.0%)
ADDITIONAL LAND AVAILABLE	
3. FLAT DISTRIBUTION (%)	
1-ROOM	0.10%
2-ROOM	0.10%
3-ROOM	36.20%
4-ROOM	44.60%
5-ROOM	12.80%
EXEC.APT.	3.70%
MID.INCOME APT	2.50%
TOTAL:	100%
4. CAR PARK/FLAT RATIO	
1-ROOM	5.5
2-ROOM	3.9
3-ROOM	1.8
4-ROOM	1.4
5-ROOM	0.7
EXECUTIVE APT.	0.7
MIDDLE-INCOME	0.7
NEW TOWN AVE.	1.6

(CONTINUE ON NEXT PAGE)

locations of these facilities should be convenient to most residents. These should also be upgraded to reflect the changing expectations of the residents, such as the provision of air-conditioning comfort and longer hours of uses for an increasingly affluent working population.

New Town development in Singapore has very little explicit provision for the elderly. The demographic characteristics of Singapore indicate an increasing proportion of elderly population in Singapore. Many of these elders will live with their children or may wish to be accommodated in facilities near to their families, such as home for the elderly. The existing new town housing and facilities structure do not facilitate multi-generations family occupancy. There should be more adequate provision of housing mix with homes designed for the elderly who could choose to live in close proximity to their children and grandchildren. The development of housing accommodation for the elderly either within public housing estates or in or private establishments need to be addressed in revitalization programs in order that these response to the demographic needs of the aging population.

TABLE 3.9 : RECOMMENDED NEW TOWN REVITALIZATION PLANNING STANDARDS (CONTINUED FROM PREVIOUS PAGE)

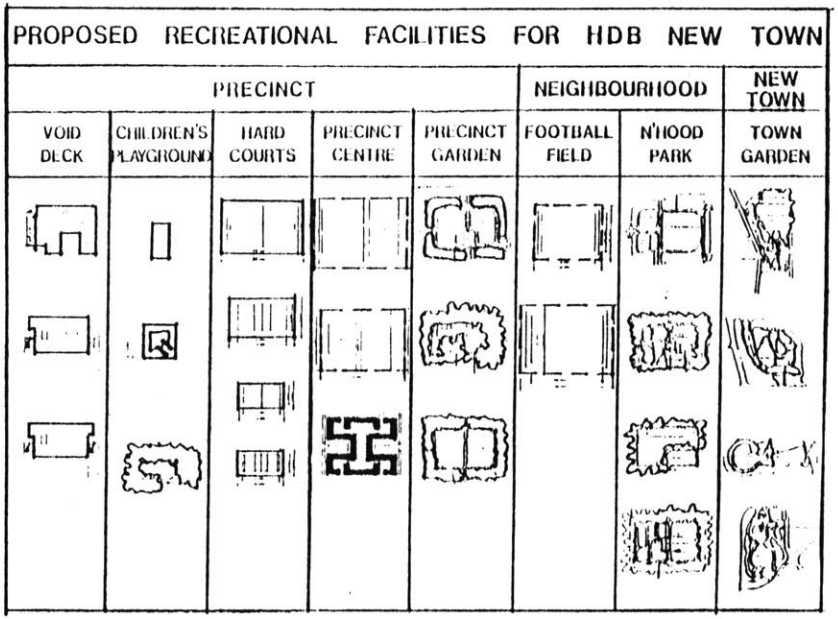
A) PLANNING GUIDELINES	REVITALIZATION MODEL
5. FACILITIES PROVISION	
COMMERCIAL FACILITIES	1 / 70 DU. 20% IN T.C.
SHOPS (30-400SQ.M.)	50% IN N.C. & 30 % IN PRECINCTS
KIOSK(5-15SQ.M.)	1/600 DU. 30% IN T.C. & 70% IN N.C.
EMPORIUM (4500-6500SQ.M.)	1 TO 2/NEW TOWN
SUPERMARKETS (1200SQ.M.)	1 TO 2 PER NEW TOWN
HAWKER CENTER / EATING HOUSE (450 SQ.M.)	1 E.H./750 DU.7% IN T.C. 23% IN N.C. & 70% IN PRECINCTS
RESTAURANTS (90-2000SQ.M.)	1/1000 DU. 30% IN T.C. 70% IN N.C. & 2-3 FAST FOOD & 1 TO 2 BIG RESTAURANTS IN T.C.
OFFICE SPACE	60SQ.M./450 DU.70% IN T.C. & 30% IN N.C.
CINEMA (1800SQ.M.)	2/NEW TOWN
MINI-MARKET (450SQ.M.)	1/6000 DU.
MARKET PRODUCE SHOP (130SQ.M.)	1/3000 DU.
MARKET LOCK-UP SHOP (40SQ.M.)	1/500 DU.
MARKET/FOOD CENTER	1/5000 DU.
HDB AREA OFFICE (2000 SQ.M.)	1/15,000 DU
INSTITUTIONAL FACILITIES	
PRIMARY SCHOOL SITE	1 P.S. TO 2,300 DU. (1.8 HA)
SECONDARY SCHOOL SITE	1 S.S. TO 4,100 DU. (2.7 HA)
JUNIOR COLLEGE SITE (6 HA)	1 PER NEW TOWN
VOCATIONAL INSTITUTE SITE (6 HA)	1 PER NEW TOWN
LIBRARY (0.3 TO 0.4 HA)	1 PER NEW TOWN
POLYCLINIC (0.5 HA)	1 PER 30,000 DU.
COMMUNITY CENTER (0.4 HA)	1 SITE TO 4,000-5,000 DU.
MOSQUE (0.3 HA)	1 SITE PER NEW TOWN
CHINESE TEMPLE (0.2 HA)	1 SITE TO 9,000 DU.
CHURCH (0.3-0.4 HA)	1 SITE TO 12,000 DU.
HINDU TEMPLE (0.2 HA)	1 SITE FOR 2 NEW TOWNS
OTHERS - COMMUNITY CENTER, COMMUNITY HALL , NEIGHBORHOOD POLICE POST KINDERGARTEN, CHILD CARE CENTER SENIOR CITIZENS' CLUB.	1 PER NEIGHBORHOOD
SPORTS AND RECREATION FACILITIES:	
SWIMMING COMPLEX (1.5 HA)	1 PER NEW TOWN
SPORTS COMPLEX (3 HA)	1 PER NEW TOWN
INDOOR STADIUM (1.2 HA)	1 PER NEW TOWN
FOOTBALL FIELD 140M X 100 M OR 95 M X 70M	1 PER NEIGHBORHOOD (MIN.)
HARD COURT FOR BADMINTON & VOLLEY BALL (16.5 M X 8.5 M)	1 COURT TO 1,000 - 1,200 DU.
MULTI-PURPOSE COURT (30M X 18M)	1 COURT TO 2,500 - 3,000 DU.
PRECINCT GARDEN (0.2 HA)	1 TO 3,000 DU.
NEIGHBORHOOD PARK (1 TO 1.5 HA)	1 PER NEIGHBORHOOD
TOWN GARDEN (5 TO 10 HA)	1 PER NEW TOWN

LOCATIONS OF RECREATIONAL FACILITIES:

Proposed approach for the incorporation of facilities to revitalize each new town is to begin by dividing the functions of each recreational facilities into a hierarchy of provisions to serve each precinct, neighborhood and new town. Town garden, sports and swimming complexes are provided for the entire new town and therefore should be located within strategic and convenient location such as near the town center; football field, neighborhood park are provided for each neighborhood and should be conveniently located near the neighborhood center; and children playground, games court and mini-garden are provided for each precinct and therefore should be located within the precinct center. The choice of location for each facility should be planned with easy accessibility to each planning unit that the facility served. (see Figure3.8).This hierarchy of recreational facilities provision can be used to set up the conceptual frameworks for the revitalization of new town.

Based on the existing new town structures , three facilities location models are proposed (see Figure 3.9): They are namely the Coaxial Model which fit into the Concentric Layout of phase two new town such as Toa Payoh; the Checker-Board Model which fit into the Gridiron Layout of phase three new town such as Ang Mo Kio and phase four new towns such as Tampines; and the Organic Model which could fit into any of the new town structure.

FIGURE 3.8 :PROPOSED PROVISION OF A HIERARCHY OF RECREATIONAL FACILITIES



Coaxial Model:

In a coaxial model, the proposed concept is to locate the recreational facilities and open spaces within the center of each planning unit to provide convenient and equidistant for each residential unit. This location model is particularly useful for existing new towns that were planned in concetric layout such as Toa Payoh New Town, and that required minimum effort to revitalize them.

Checker-board Model:

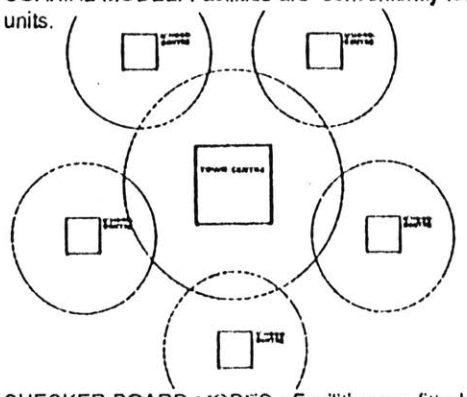
In a Checker-board Model, the concept is to fit in facilities according to a checker-board pattern that interlocks high-rise high-density housing with open spaces and low-rise facilities . This model is applicable to new towns planned under the gridiron layout such as Tampines New Town.

Organic Model:

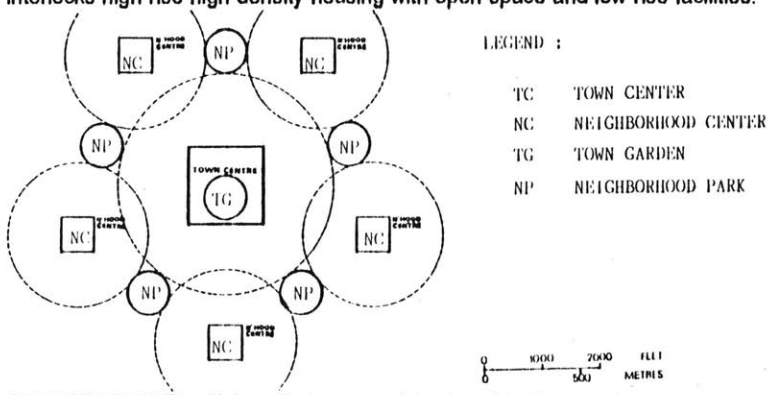
In an Organic Model, the proposed concept is to integrate existing environment such as reservoir in the case of Tampines New Town, and features such as woodlands in the case of Ang Mo Kio New Town and Jurong New Town, as an integral part of the new towns and optimizing allocation of urban functions to response to these natural features. This model could be used in any existing new town layout that has some unique natural features.

FIGURE 3.9 -- FACILITIES LOCATIONS

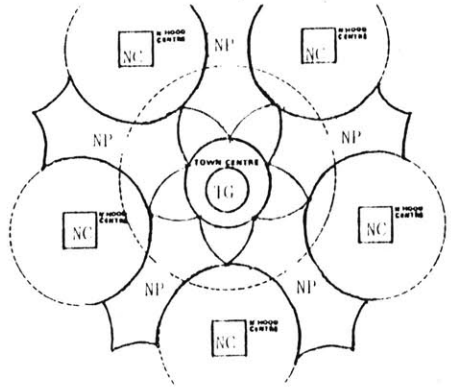
COAXIAL MODEL: Facilities are conveniently located at equidistant to the residential units.



CHECKER-BOARD MODES : Facilities are fitted in a checker-board pattern that interlocks high-rise high density housing with open space and low-rise facilities.



ORGANIC MODEL : Unique features are introduced to the new town.



CAR PARKING PROVISION:

The recommended standards of car parking provision are determined according to different types of flats(see Table 3.10). The demand for car parks is directly proportionate to car ownership, which in turn depends on household income. The households of larger flats usually have higher income and thus are more likely to own cars.

The trend of car ownership and the demand for more car parking lots are on the rise. It is projected that by 1990, every 1.5 household will have one car and need a parking lot.This ratio is current maintained at 3 households to 1 parking lot for newer new towns and much less for the older new towns. Unless more parking lots can be created within the older new towns, the parking situation will be further worsen.

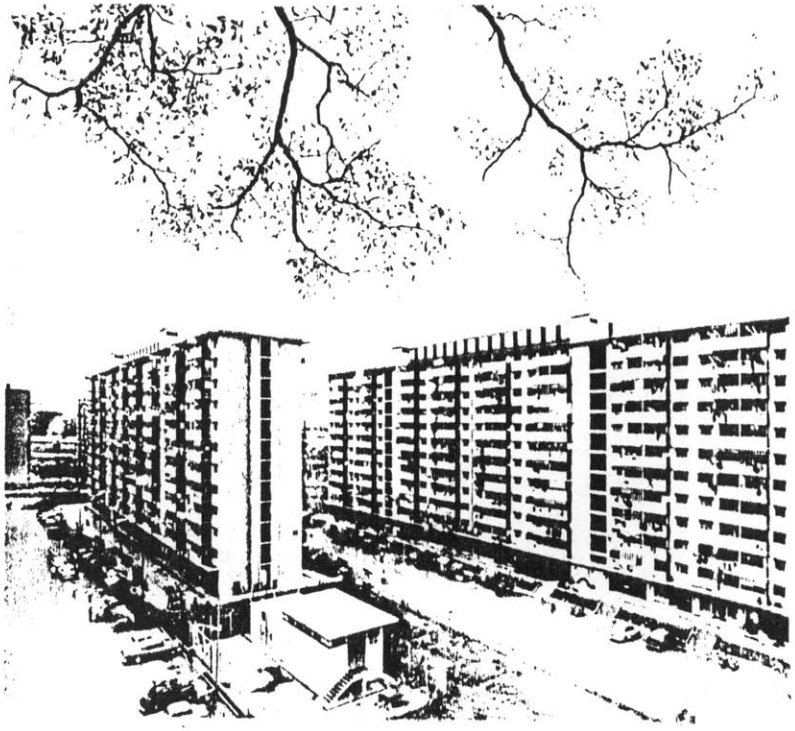
To achieve car park ratio of at least 1 parking lot to 3 dwelling units or less, additional parking provision in the form of multi-storey garages will have to built. Currently almost all of the parking provisions within new towns are surface parking located within the building spaces in the residential area(see Figure 3.10). In view of the scarce land resources in Singapore, these surface parkings consume a large portion of the valuable lands which could easily range from 40 percent to 60 percent of residential areas. If car ownership continue to increase, multi-storey garages will have to be introduced. The replacement or substitute of surface parking with multi-storey garages will free more lands for other uses and allow greener and safer environment.

TABLE 3.10 - RECOMMENDED CAR PARK PROVISION RATIO

ROOM TYPE	CAR PARK/DWELLING UNIT RATIO
1-ROOM	1 CP. TO 7.7 DU
2-ROOM	1 CP. TO 5.2 DU
3-ROOM	1 CP. TO 2.1 DU
4-ROOM	1 CP. TO 1.7 DU
5-ROOM	1 CP. TO 0.9 DU
EXECUTIVE APARTMENT	1 CP. TO 0.9 DU
MIDDLE INCOME HOUSING	1 CP. TO 0.9 DU

FIGURE 3.10: CAR PARK PROVISIONS

Currently all parking provisions within new towns are surface parking which consume about 30 percent of the valuable open spaces.



The implementation of new car park standards and garages to older new towns will have to be implemented in stages subject to review of the actual demand in order to minimize disruption and traffic problems within these new towns. Location of garages must also be carefully thought out to ensure even distribution and convenient to every blocks of flats.

ENVIRONMENTAL DESIGN:

Site planning for new towns in Singapore must help to create a sense of urban space. Vistas should be planned with strategically-located buildings at the entrances and approaches to a new towns. Emphasis on streetscape is another means to create a sense of localized street environment(see Figure 3.11).

Integration of precincts, neighborhoods, facilities, town and neighborhood centers with better pedestrian and vehicular linkages could foster a more coherent sequences of circulation from place to place. Open spaces and low-rise blocks though restricted in number due to the high-density required for each new town, must be carefully woven into the land use pattern of a new town to relieve the massive impacts of high-rise high-density environment (see Figure 3.12).

Every new town should have its own identity and some elements of surprises through careful site planning and environmental design. Whenever possible, visually strategic locations should be reserved for low-rise, non-standard institutional, recreational or religious buildings such as school, sports complex and mosque to enhance the character and identity of a new town. Through careful alterations and additions of building blocks, embellishments and varied landscaping and environmental design, older new towns can start to acquire their own identity especially at the ground visible level and to add variety and richness to their environment. Redevelopment of these new towns thus provide opportunities for a more pronounced face lifts that

FIGURE 3.11: STREETSCAPE AND VISTA
An inter-mixed of low-rise buildings with high -rise housing provides a better sense of localized street environment.

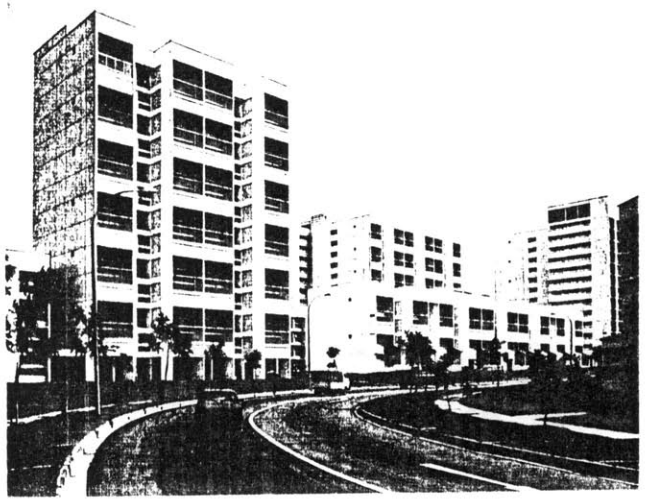
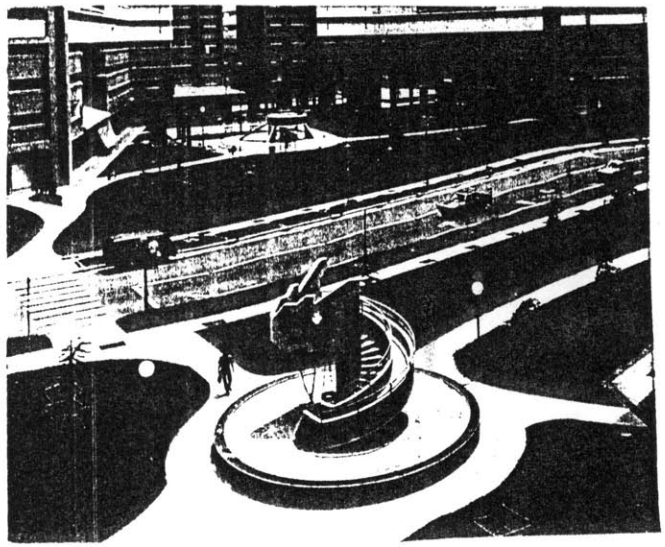


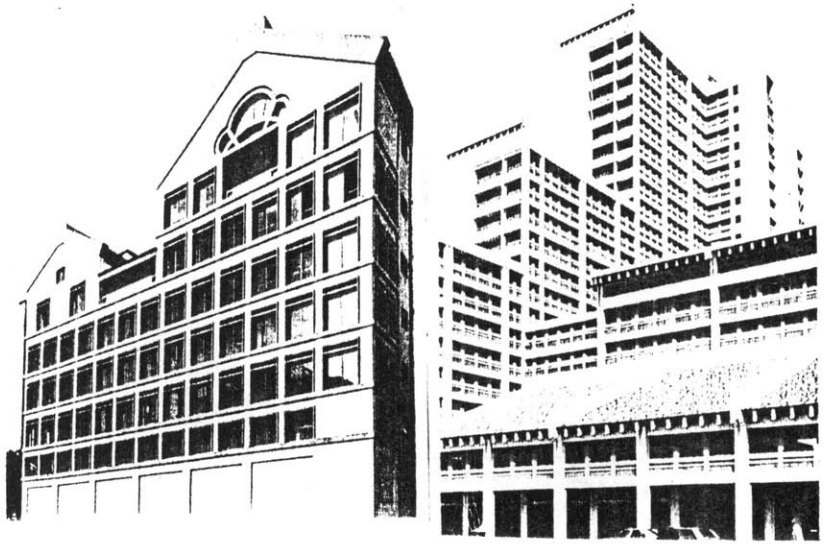
FIGURE 3.12: PEDESTRIAN AND VEHICULAR CIRCULATION
Facilities and circulation can be creatively woven into the land use pattern to relieve the high-rise high-density environment.



were missed during the phases of development (see Figure 3.13).

Developments and improvements of environmental design should therefore move away from the exclusive emphasis on environmental comfort towards a greater emphasis on the quality of a pleasant and human-scaled environment.

FIGURE 3.13: IDENTITY AND LANDMARKS
A pronounced face lifts such as this will give a better identity to the high-rise building .



PHYSICAL DESIGN:

While the physical layouts of the different new town model, neighborhood and precinct concepts and the design of flats and building blocks have generally optimized the use of scarce land resources in Singapore, it is not embodied with much scope for flexibility to meet future needs and changes.

This section seeks to analyze the pitfalls of HDB's current flat design philosophies. Thereafter, it is hoped that a scenerio may be developed which could incorporate design guidelines for the overall improvement on various aspects of the flat and building block designs within new towns. Illustrated examples for the application of these design guidelines to address specific problems within the concern of a revitalization program will be incorporated.

Three sets of design principles are proposed:
1) Program principles : to guide the overall design process;
2) Design principles : to guide the conversion of apartments which includes:
*The conversion of smaller 1-room and 2-room flats to larger 3-room and 4-room flats;
*The conversion of 1-room and 2-room building blocks to 3-room , 4-room, and 3/4- rooms building blocks.
3) Implementation principles : procedural guidelines for staging, resettlement and management which will affect how the selected design is implemented.

1.FLAT DESIGN:

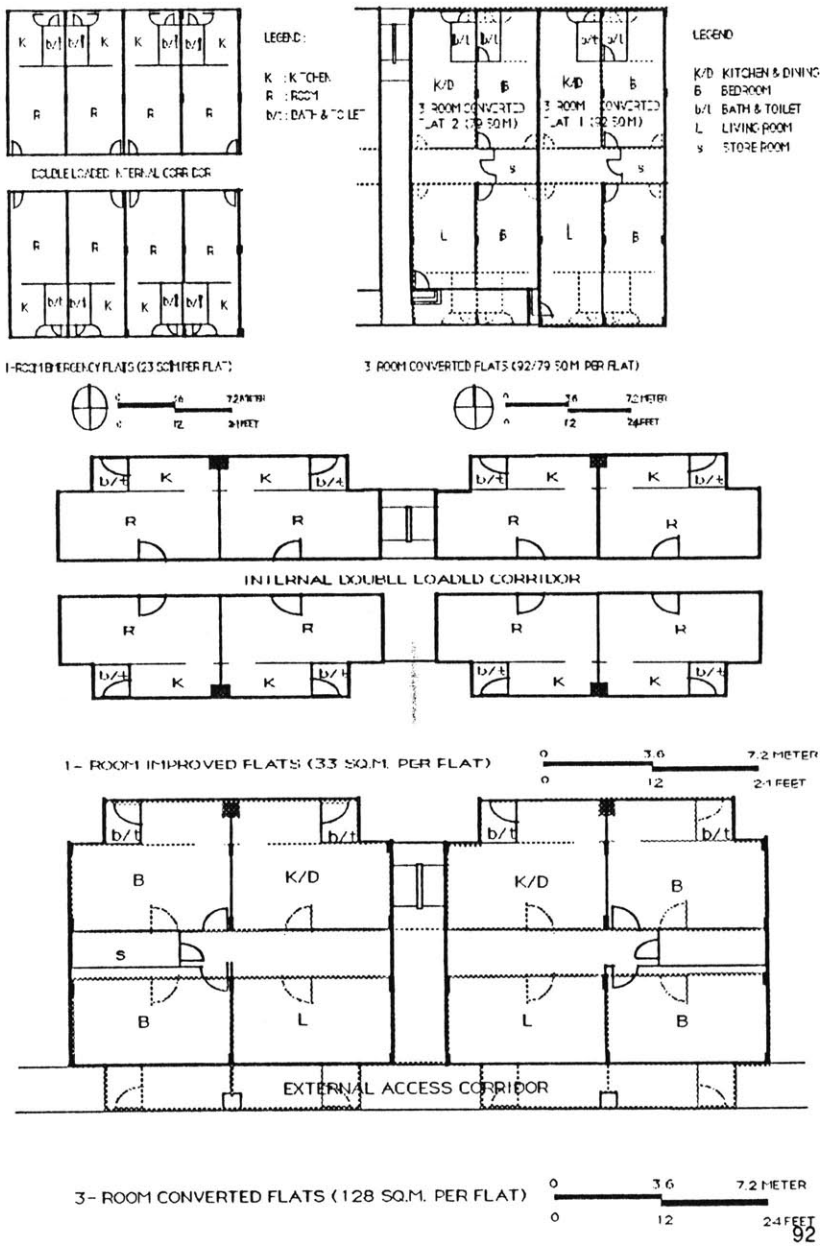
The design of HDB Flats is dictated by two factors: Namely to keep the cost of the flat low and to provide the optimum size and accommodation within this limitation. Within the same constraints, rehabilitation of existing flats may take the following courses of action :

1)Conversion and transforming smaller flats like the 1 and 2-room types to larger flats 3 and 4-room types (see Figures 3.14 and 3.15) to meet the increasing demand from a more affluent public.

2)Simultaneously, upgrading and reconfiguring the design of these smaller flat types can be accomplished through replanning them to make the internal layout more functionally effective; upgrading basic utilities and services; improving quality of interior finishes and workmanship; and supply of better basic sanitary and built- in facilities.

In comparing the cost of Reconfiguration works involving demolition/reconstruction against that of renovation/ modification. It is revealed that the latter is a more economical solution (see Chapter Three - Tables 3.2 and 3.3 - Conversion costs for three-room and four-room flats). The amount of cost saving to be derived from pursuing a course of renovation work could be as high as of the new construction cost. This perhaps indicates that renovated flats in older new town could be sold at a more competitive price to attract more people from moving into the revitalized old towns. Currently, there are approximately nineteen thousand 1-room and 2-room old Emergency Flats needing

FIGURE 3.14 : CONVERSION OF 1-ROOM FLATS



improvement. These could profitably be converted to larger 3-room and 4-room flats. Only as small as 5 per cent of 1 and 2-room types (approximately 900 units) need be maintained for the very few low income households who currently pay and can only afford the extremely low rentals of S$16.50 and S$11.00 maintenance cost per month[55] .

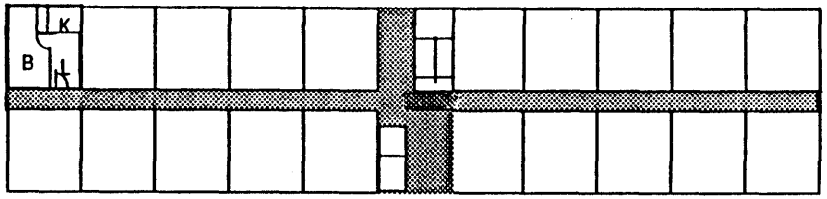
Renovation works involved in these conversion may take the forms of

1) Grouping 3 or 4 1-room unit into a 3-room or 4-room flat (see Figure 3.14), or;

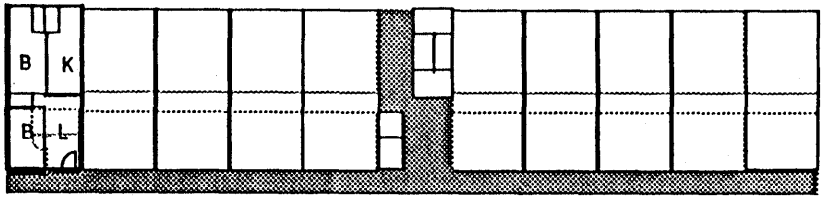
2) Combining 2 units of 2-room flats to form a 4-room unit (see Figure 3.15).

Conversion would involve repartitioning of rooms, repositioning of baths and toilets and provision of new finishes and rewiring. The simplicity in structure and layout of these early prototype small flats would without much difficulty, facilitate such renovation work with minimal structural and external facade alterations.

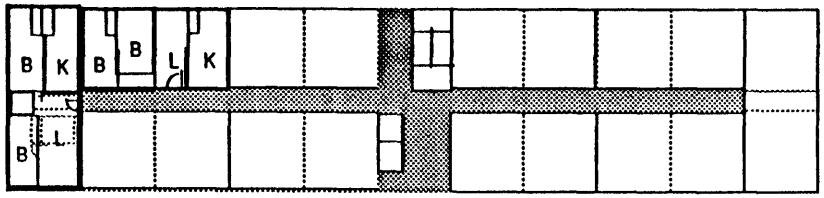
FIGURE 3. 15:: CONVERSION OF 2-ROOM FLATS



EXISTING 2 - ROOM EMERGENCY FLATS



3 -ROOM CONVERTED FLATS (OPTION 1)



3 - ROOM CONVERTED FLATS (OPTION 2)

2. BUILDING BLOCK DESIGN:

The design of the building blocks is closely related to and the resultant outcome of the flat designs. The early blocks of 1 and 2-room flats were simple in layouts usually comprising of a double-loaded internal corridor with two rows of either 1-room or 2-room Emergency Flats on each side of it (see Figures 3.16 and 3.17). This was done obviously in consideration of the cost factor when compared to the latter single-loaded external corridor arrangement, which serve only one row of flats. Its drawbacks are only too evident, resulting in poor ventilation, lighting and acoustic. Revitalization of such building blocks should entail efforts direct at improving the internal environment and visual quality on the external. The internal environment could be improved by converting the smaller units into larger ones and repositioning the internal corridor to the external corridor. (see Figures 3.16 and 3.17). Another alternative would be to segment the external corridor at the storeys between lift landings. This provides the flexibility to mix different flat types within the same block, creating a well-mixed of socio-economic groupings which might result in the better upkeep of the whole building and its environment .

Ensuring more visual identity for building block design should also be a vital consideration in a new town revitalization program. In the past, the massive and rapid scale of new town development in Singapore to meet the acute housing shortage has resulted new towns mushrooming simultaneously within close proximities. Standardization of the design models being used in more than one new town, it is inevitable that one development soon looks identical to

FIGURE 3.16 : CONVERSION OF 1-ROOM BLOCKS

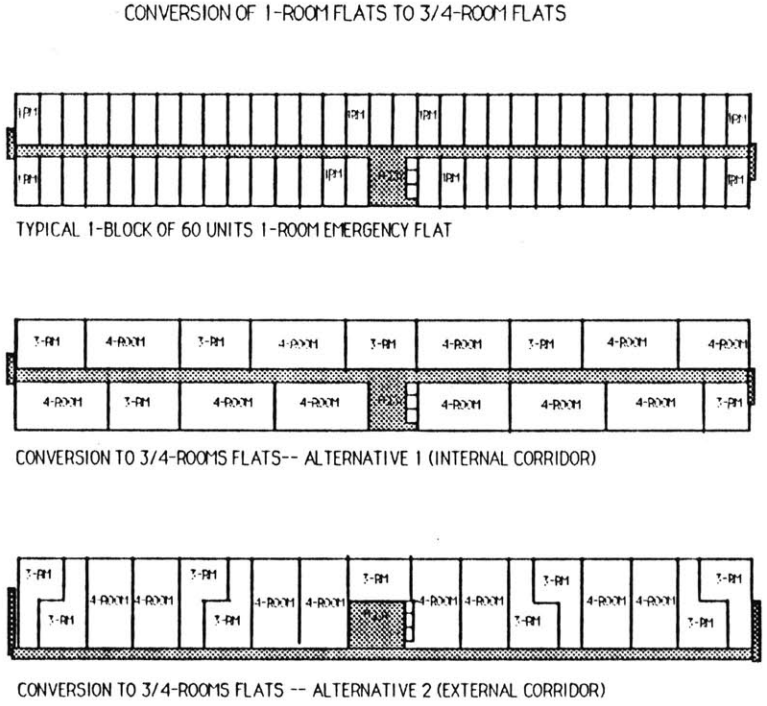
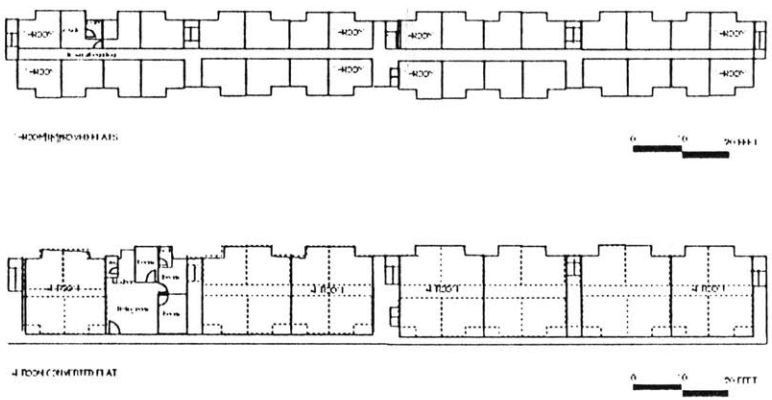


FIGURE 3.17 : CONVERSION OF 2-ROOM BLOCKS



another (see Figure 3.18). Even within the same new town, a set of neighborhood and precinct layout have often been duplicated many times, giving fray to ambiquity. any attempt to revitalize a new town should endeavour to reduce this pervading monotony caused by uniformity. Efforts should be made to differentiate and heighten visual contrast between neighborhoods, precincts and ultimately the new town by creating and emphasizing themes and characters. Much can be done through the recreation and modification of block identities and facades. This may take the form of improving its overall silhouette or skyline introducing appropriate roofscape themes, such as the creation of a line of distinct pitched roof along important vista, avenue or focal point (see Figure 3.19). Alternatively, visual contrast may be created through enhancing the facade with special ornaments, windows , parapets or finishes and colors to create some variations (see Figure 3.20). A guiding principle to be noted, however, is the different components for building blocks within a new town must not be dealt with in isolation, but should ultimately relate to the overall new town image and identity.

FIGURE 3.18: STANDARDISATION OF BLOCK DESIGNS
Create a monotonous image

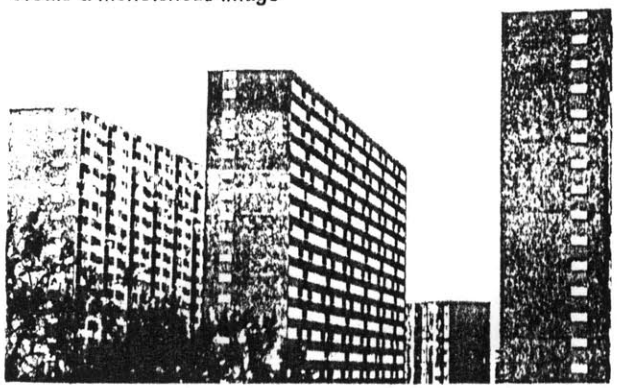
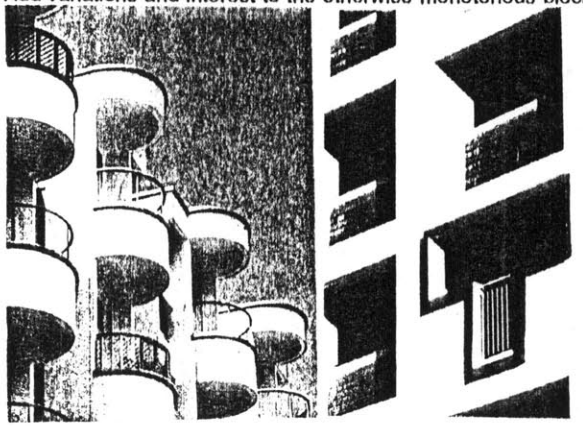


FIGURE 3.19: CREATION OF BETTER ROOFSCAPE
Enhance positive appearance of the otherwise monotonous blocks

FIGURE 3.20: CREATION OF BETTER FACADE
Add variations and interest to the otherwise monotonous blocks



RECOMMENDATION THREE - REVITALIZATION PROGRAM :

Th approach to the launching of any revitalization program must ultimately be brought to bear within the operatives of the political, social and economical policies in Singapore. The program must also be geographically and timely staged in manageable increments to avoid disruption and inconveniences to the existing residents.

It is attempted in this section that a comprehensive schedule and its procedure be recommended within the frame work of a suggested development budget. The proposed revitalization program would include the following schedule and procedure:

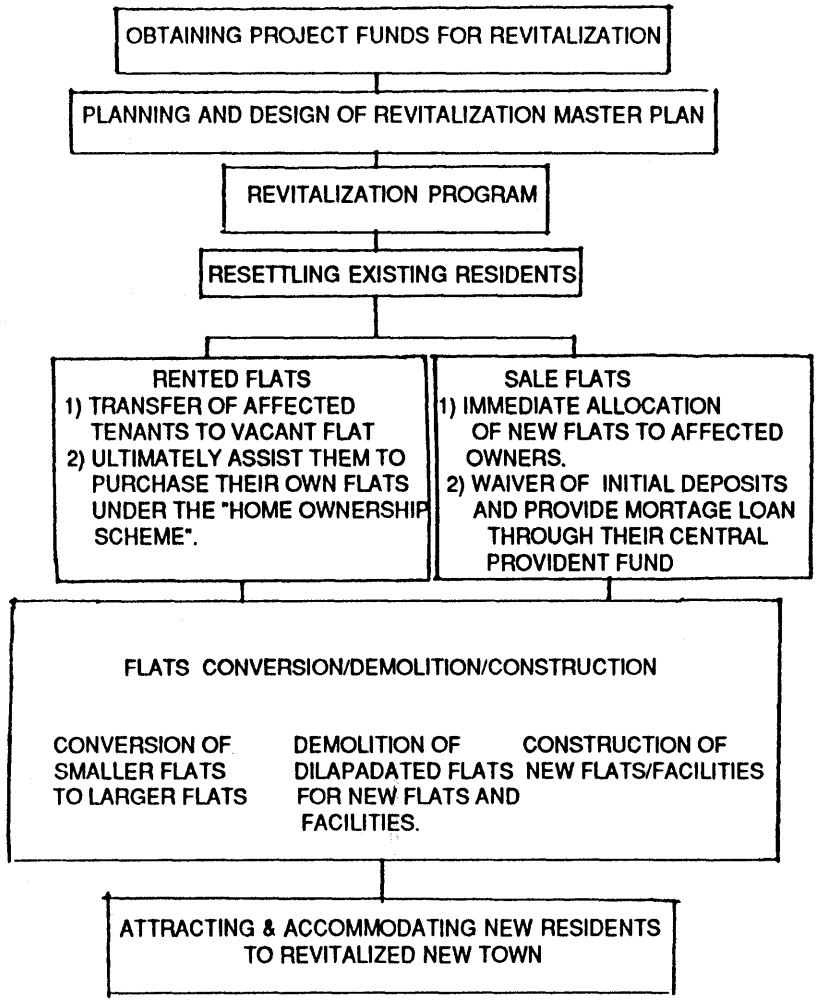
1. Obtaining project fund, which is discussed in Recommendation One;
2. Planning and Design of Revitalization Plan, which is discussed in Recommendation Two;
3. Resettling existing residents;
4. Preparing Contract tender and award;
5. Implementing Revitalization works,

which include:

a. Improvement to existing flats and facilities.
b. Demolition of old flats and facilities and construction of new flats and facilities.
6. Attracting and accommodating new residents in revitalized new towns.

A schedule of staging and implementation is recommended in Figure 3.21. This schedule will later be applied and evaluated to a new town in each phase of new town development.

FIGURE 3.21 :-REVITALIZATION PROGRAM



1. RESETTLING EXISTING RESIDENTS:

The first task to be carried out before any revitalization work could be attempted is obviously the resettlement of the existing tenants. This is often a thornier issue than can be imagined and need to be resolved sensitively. Most of the 1-room and 2-room flats rented out to the low income tenants on monthly basis are currently still owned by the HDB. Legally, the HDB as landlord need serve only one month notice to all its tenants to vacate the flats, with no compensation entitled. However, from past history, resettlement has always been a politically sensitive issue in Singapore.In practice, the HDB often provide alternative or temporary accommodation to its tenants affected by such resettlement programs. The HDB currently owns 102,032 units of 1-room and 2-room flats for rent (see Table 3.11). With a voluntary vacancy rate of 10,000 to 12,000 units a year, the HDB could also arrange for the transfer of these tenants in flats affected by revitalization to these vacant flats. In this way , the HDB could ensure a smoother transition for its residents while keeping vacancy rate of its 1-room and 2-room flats low.

Of the 1,212 units of 1-room units and 4,171 units of 2-room flats (HDB Annual Report 1986/87) sold to the tenants, the resettlement process will be more complicated. The flat allocation policy currently practised by the HDB does not lend incentive to these flat owner to 'upgrade' and trade in their smaller units for larger flats. The current policy requires all applicants for new flats to pay a 20 percent initial down payment of the purchase price of the new flats while being registered on the queuing list. This policy was formulated to

TABLE 3.11 - EXISTING 1-ROOM & 2-ROOM FLATS IN HDB NEW TOWNS

ESTATES	1-ROOM	2-ROOM
ALEXANDRA HILL		900
ANG MO KIO	2432	5264
AYER RAJAH		686
BALESTIER	2024	
BEDOK	2042	1562
BRICKWORKS	1456	
BUKIT BAN KEE	534	56
BUKIT BATOK	92	164
BUKIT HO SWEE	524	1960
BUKIT MERAH	3052	1726
BUONA VISTA	1580	
CANTONMENT ROAD	72	72
CHIN SWEE	1105	67
CLARENCE LANE		160
CLEMENTI	484	656
DELTA	520	
DUCHESS	153	1150
ELLENBOROUGH	340	
FARRER PARK		216
FRENCH ROAD	740	176
GEYLANG EAST	198	298
GHIM MOH		624
HENDERSON HILL	2208	
HOUGANG	34	68
JALAN BESAR		20
JALAN EUNOS		741
JALAN KAYU	64	
KALLANG	420	1288
KALLANG BASIN	5943	1510
KAMPONG JAVA	180	82
KAMPONG SILAT/KIM TIAN	720	
KAMPONG TIONG BAHRU	2906	1405
KELANTAN LANE		300
KRETA AYER	432	126
LORONG LEW LIAN		154
MACPHERSON	768	3434
MADRAS STREET		3
MARINE PARADE		1350
MAUDE RD./SYED ALWI RD.		352
NEW BRIDGE /CANTOMENT RD.	432	
NORTH BRIDGE RD.	224	
CRAWFORD RD.	1008	
SUMBAWA ROAD		300
OUTRAM PARK		422
PALEMBANG ROAD	729	112
PEARL'S HILL	308	
PETAIN ROAD	408	
PUNGGOL	816	247
PRINCE CHARLES CRESCENT	1399	
PRINCESS	96	614
PRINCESS ELIZABETH		84
QUEENSTOWN	1112	2324
REDHILL		1496
REDHILL/HENDERSON	748	
SIGLAP		35

(CONTINUED ON NEXT PAGE)

discourage profiteering by owners, who may sell off any HDB flats in the open market often at more than 50 percent to 100 percent profit and repurchasing for the second time another subsidized flat from the Government while many are still awaiting for their first flat.

In view of the fact that the great housing priority has by now been quite fully met (85 percent of the total population currently stay in the HDB flats) as evidenced by the tapering off of general demand, particularly for smaller flats, it is the right time for a revision of the allocation policy, especially in as far as it affects the 1 and 2-room flats owners. This revision of the allocation policy may take immediate effect since it affects only 5,383 cases, spread around 20 older housing estates. The risk of favouring this group at the expense of others is therefore small. The proposed revision could take the form of immediate allocation of new flats, presumably larger unit types for owners of flats earmarked for immediate new town revitalization work. The HDB could purchase back these smaller units in exchange for larger units at current prices. The difference in price may be make up by buyers through the direct usage of their Central Provident Fund. In this way buyers will not face the financial difficulties of paying for the 20 percent down payment and the mortgage loan for the bigger units.

TABLE 3.11 - EXISTING 1-ROOM & 2-ROOM FLATS IN HDB NEW TOWNS(CONTINUE)

ESTATES	1-ROOM	2-ROOM
SIN MING	396	
ST. GEORGE'S ROAD	352	
ST. MICHAEL'S ESTATE	60	1484
TAMAN JURONG	2104	1500
TAMPINES	154	126
TECK WHYE		240
TELOK BLANGAH	2412	898
TIONG BAHRU		24
TOA PAYOH	11366	5415
UPPER ALJUNIED	506	
UPPER CHANGI	2016	293
UPPER PICKERING STREET		98
VICTORIA ST./ROCHOR RD.	340	
WINSTEDT COURT		162
WOODLANDS	868	260
YISHUN	16	16
YORK HILL		420
TOTAL	58893	43139

SOURCE : HDB ANNUAL REPORT 1985/86

2. SALE OF CONVERTED FLATS.

To encourage applicants and buyers for the converted flats in the older estate and new towns, the HDB will also need to revise its flats sales policy to make it attractive enough for potential buyers. In the long run, any successful revitalization program will be itself the best promotional publicity to encourage buyers. However in the short-run, preference for new flats in newer new towns will continue to lure the potential buyers away.One way to attract potential buyers is perhaps to allow a separate waiting list to be established with a considerable shorter waiting time. This would no doubt appeal to buyers who need very urgent housing or perhaps those who seek to live nearer to relatives and friends already settled in these estates. There again, the HDB could use as a strong selling point, proximity of a revitalized new town to the city center (see Figure 3.22). To encourage and support the extended family life style, these converted flats could have a wider diversity of unit types within the same block. This will encourage Multi-tier family living with different family sizes under the same roo (see Figure 3.23)f.

FIGURE 3.22: PROXIMITY OF REVITALIZED NEW TOWNS TO CITY CENTER
This is a good selling point to attract new residents to the revitalized new towns.

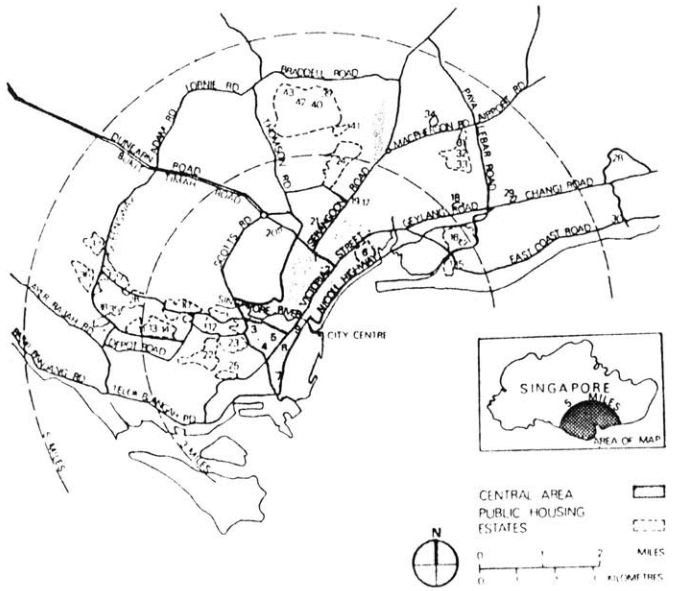


FIGURE 3.23: FLAT DESIGNS TO ENCOURAGE MULTI-TIER FAMILY
Multi-tier family should be encourage to live under one roof

3. BALANCING THE MULTI-ETHNIC COMPOSITION

In the implementation of new town revitalization programs in Singapore, conscious efforts have to be made to balance the multi-ethnic composition within each new town. Learning from bitter lessons of the past where high concentration of certain ethnic groups in certain of the older estates had posed serious threat to the harmony of Singapore's multi-racial society. Any new town revitalization program must therefore aim at balancing this multi-ethnic composition to reflect the national ethnic composition of 76.5 percent Chinese, 14.8 percent Malay and 6.4 percent Indians (see Table 3.12).

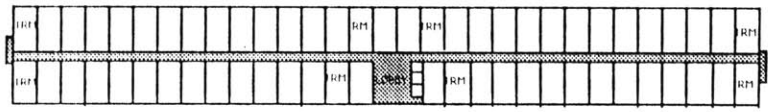
In redesigning the building blocks, all ethnic groups where allocated a flat, should be encouraged to stay in the same block within a new town with each other. This is a difficult task as each ethnic group has different household sizes, incomes and preference for different room types. For example the Chinese have an average household size of 4.4 persons with an average household income of S$2,000, could afford to stay in the larger 4 or 5-room flats while Malays averagely have household sizes of 5 persons, an average income of S$1,000, affording only to stay in 2 or 3-room flats. The redesign of the building blocks should therefore take into consideration this criteria in its replanning to provide a good mixture of different flat sizes within the same block to better encourage racial and social integration (see Figure 3.24). As it is, more than 90 percent of these existing HDB blocks are comprised of only single type of flat or a combination of either 3/4-room flats or 4/5-room flats (see Chapter Two-Figures 2.15 and 2.16). There is a need to create or convert

TABLE 3.12 : RACIAL COMPOSITION IN SINGAPORE (1986)

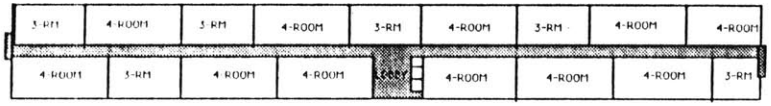
RACE	NATIONAL ETHNIC COMPOSITION(%)	HDB POP. COMPOSITION(%)	AVE. HOUSE-HOLD SIZE.(NO)
CHINESE	76.5%	77.7%	4.4
MALAY	14.8%	14.7%	5.0
INDIAN	6.4%	6.3%	4.5
OTHERS	2.3%	1.3%	4.3
TOTAL	100.0%	100.00%	4.4 (AVERAGE)

SOURCE : HDB RESIDENTS FILES

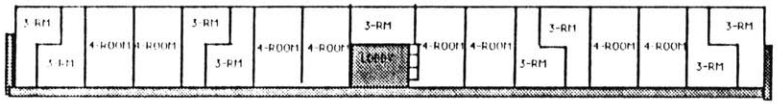
FIGURE 3.24 – BETTER COMPOSITION OF FLATS MIXED TO ENCOURAGE RACIAL INTEGRATION



TYPICAL 1-BLOCK OF 60 UNITS 1-ROOM EMERGENCY FLAT



CONVERSION TO 3/4-ROOMS FLATS-- ALTERNATIVE 1 (INTERNAL CORRIDOR)



CONVERSION TO 3/4-ROOMS FLATS -- ALTERNATIVE 2 (EXTERNAL CORRIDOR)

these old flats into a mixture of smaller and larger units mix so that different racial groups with respective income brackets may live in a harmonious environment enriching each other, rather then being polarised by virtue of their differences. (see Recommendation on blocks redesign).

In the past new towns such as Geyland East and West, Eunos and Toa Payoh have a high percentage of Malay population while other new towns such as Bukit Ho Swee, Tanglin Halt and Woodlands are predominantly Chinese. Any kind of new town developent based on ethnic or socio-economic segregation would work against the national objective of creating a multi-racial society. It is therefore important to have successful new town revitalization programs that could help to correct this mistake, in order that a true reflection of the demographic composition of Singapore's cosmopolitan society is achieved.

CHAPTER FOUR - APPLYING AND EVALUATING THE REVITALIZATION MODEL.

In this chapter, the above proposed revitalization model is applied to a sample of new town built under different phases of development to evaluate the scope, achievements and limitations of the revitalization model. The tasks will include application and evaluation of planning principles, design proposals and implementation procedures. A conprehensive checklist and new town master plan before and after the application are shown to compare the quantitative and qualitative achievements of the model.

Each evaluation of a new town is carried out in the following ways:

1. Background
2. Problem Issues
3. Application of Revitalization Model
4. Summary of Findings which includes:

* Distribution of flats
* Facilities Provision
* Evaluation on:

- Environmental Quality
- Constraints and Limitations.

4.1. PHASE ONE 'NEW TOWNS'- PRE 1960

BACKGROUND :

Four old housing estates in close proximity built before 1960 within the Central Area of Singapore are selected to demonstrate how the revitalization model could be applied to upgrade these estates into a self-contained new town. These four old estates are :

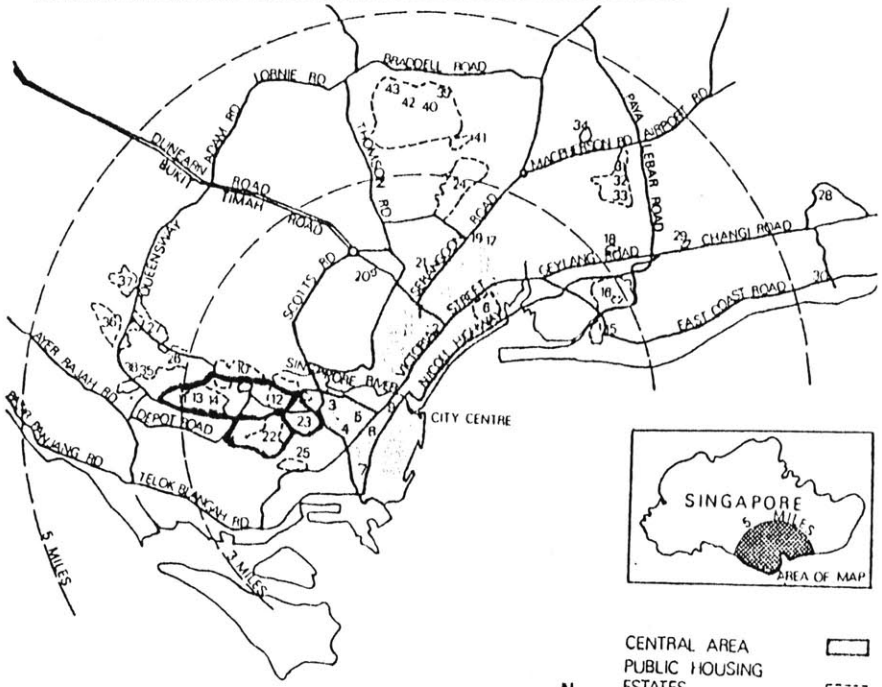
1. Bukit Merah Estate;
2. Henderson Estate;
3. Bukit Ho Swee Estate;
4. Tiong Bahru Estate.

They consist mainly of 6 to 16 story slab blocks with 1 and 2-room flats.

PROBLEM ISSUES :

The four housing estates, like many others built at the same phase, were planned in an ad-hoc and piecemeal manner at the time when housing shortage was serious and quick solution to house the squatters and homeless people are urgently needed. They were considered from the planning point of view as temporary short-sighted solutions. Besides being overcrowded with density between 200 dwelling unit to 500 dwelling per hectare; communal, recreational, institutional and commercial facilities were not provided within or near these estates.

FIGURE 4.1 : A SAMPLE OF PHASE ONE "NEW TOWN"- BUKIT MERAH, HENDERSON,BUKIT HO SWEE & TIONG BAHRU



ESTATE CODES

Centra Area
1 Stamford Estate, etc.
2 Queen Street, etc.
3 York Hill, etc.
4 Outram Road (Redevelopment)
5 Park Road, South 1
6 Palembang Road, Precinct North 1
7 Cantonment Road
8 Upper Pickering Street
9 New Bridge

Inner City
10 Alexandra (North)
11 Alexandra Hill
12 Bukit Ho Swee
13 Bukit Merah
14 Redhill
15 Tanjong Rhu/Mountbatten
16 Guillemard, etc.
17 Kallang Basin, M.2
18 Kallang Basin, Sims Av.
19 Kallang Basin, N.1
20 Kampong Java
21 Windstedt Court
22 Kampong Tiong Bahru
23 Tiong Bahru, etc.
24 St. Michael's
25 Kampong Silat

Outer City
26 Princess
27 Duchess
28 Upper Changi Road
29 Geylang Serai
30 Siglap Fire Site
31 Macpherson (S) Ext.
32 Macpherson (S) Balance
33 Macpherson Road
34 Upper Aljunied Road
35 Queenstown, N.6
36 Queenstown, N.4
37 Queenstown, N.3
38 Queenstown, N.5
39 Toa Payoh, N.1
40 Toa Payoh, N.2
41 Temple
42 Toa Payoh, N.4
43 Toa Payoh, N.3

APPLICATION OF REVITALIZATION MODEL:

Revitalization actions to these four old estates will have to take the form of conglomeration of these isolated estates into a new town of substantial size with the provision of full range of new town facilities. Figures 4.3 & 4.4 and Table 4.1 illustrate the application of proposed new town revitalization model to these old estates.

APPROACH :

1. The provision of flats, facilities and site area of each estate was first identified.

2. The locations of these four estates were then studied from the site plan to decide on the conglomeration boundary that conforms to the site area of a new towns.

3. Range of facilities for this conglomerated new town was then worked out in accordance to the proposed planning and design guidelines.

4. Suitable sites for new facilities were identified from the site plan of these estates taking into consideration the tenure and ownership of surrounding land .

5. The distributions of flats in these four estates were combined to determine how many small 1-room and 2-room flats were to be converted or demolished for bigger 3-room and 4-room flats.

TABLE 4.1: APPLICATION OF PLANNING AND DESIGN GUIDELINES FOR THE REVITALIZATION OF PHASE ONE"NEW TOWN"

PLANNING & DESIGN GUIDELINES	PLANNING GUIDELINES	PHASE ONE "NEW TOWN" EXISTING	REVITALIZED
1. NEW TOWN SIZE	500 TO 800 HA	556 HA	556HA
2. NEW TOWN DENSITY	64 TO 69 DU/HA	99 DU/HA	64 DU/HA
3. TOTAL DWELLING UNIT	35,000 TO 55,000 DU	23,289 DU	35,584 DU
4. LAND USE			
-COMMERCIAL TC & NC.	86HA(13.7%)	13HA(2.3%)	76HA(13.7%)
-RESIDENTIAL	207HA(33.1%)	279HA(50.2%)	184HA(33.1%)
-SCHOOLS	73HA(11.7%)	51HA(9.1%)	65HA(11.7%)
-OPEN SPACE	23HA(3.7%)	51HA(9.1%	21HA(3.7%)
-SPORTS COMPLEXES	13HA(2.1%)	6HA(1.1%	12HA(2.1%)
-INSTITUTIONS	23HA(3.7%)	28HA(5.1%)	21HA(3.7%)
-INDUSTRY	120HA(19.2%)	57HA(10.3%)	107HA(19.2%)
-MAJOR ROADS	75HA(12.0%)	67HA(12..0%)	67HA(12..0%)
-UTILITIES	5HA(0.8%)	4HA(0.8%)	4HA(0.8%)
TOTAL LAND USE	625HA(100.0%)	556HA(100%)	556HA(100%)
ADDITIONAL LAND AVAILABLE			
3. FLAT DISTRIBUTION (%)			
1-ROOM	0.10%	7216DU(31%)	35(DU0.1%
2-ROOM	0.10%	5839DU(25%)	35DU0.1%)
3-ROOM	36.20%	8616%(37%)	12881DU(36.2%)
4-ROOM	44.60%	1618(6.9%)	15870DU(44.6%)
5-ROOM	12.80%	0	4555DU(12.8%)
EXEC.APT.	3.70%	0	1317DU (3.7%)
MID.INCOME APT	2.50%	0	890DU(2.5%)
TOTAL:	100%	23289 DU(100%)	355840U(100%)
4. CAR PARK/FLAT RATIO			
1-ROOM	5.5	5.5	5.5
2-ROOM	3.9	4.4	3.9
3-ROOM	1.6	NA	1.6
4-ROOM	1.4	NA	1.4
5-ROOM	0.7	NA	0.7
EXECUTIVE APT.	0.7	NA	0.7
MIDDLE-INCOME	0.7	NA	0.7
NEW TOWN AVE.	1.6	5.0	1.6
5. FACILITIES PROVISION			
COMMERCIAL FACILITIES	1 / 70 DU. 20% IN T.C. 50% IN N.C. & 30 % IN PRECINCTS	NA	274(55 IN T.C.,137 in N.C.,82 IN PRECINCTS
SHOPS (30-400SQ.M.)			
KIOSK(5-15SQ.M.)	1/600 DU. 30% IN T.C. & 70% IN N.C.	NA	32(10 IN T.C.,22IN N.C.)
EMPORIUM (4500-6500SQ.M.)	1 TO 2/NEW TOWN	1	2
SUPERMARKETS (1200SQ.M.)	1 TO 2 PER NEW TOWN	1	2
HAWKER CENTER/EATING HOUSE (450 SQ.M.)	1 E.H./750 DU.7% IN T.C. 23% IN N.C. & 70% IN PRECINCTS	NA	256(18 IN T.C.,59 IN N.C.,179 IN PRECINCT)
RESTAURANTS (90-2000SQ.M.)	1/1000 DU. 30% IN T.C. 70% IN N.C. & 2-3 FAST FOOD & 1 TO 2 BIG RESTAURANTS IN T.C.	2	19 (6 IN T.C.,13 IN N.C.)
OFFICE SPACE	60SQ.M./450 DU.70% IN T.C. & 30% IN N.C.		

(CONTINUED ON NEXT PAGE)

6. The locations of these blocks of flats were identified from the individual estate layout plan.

7. New layouts and locations of flats and facilities were determined in the conglomerated new town plan, taking land use and environmental quality into consideration, for the purpose of evaluating against proposed planning and design guidelines.

8. Limitations and problems encountered in this application were then been evaluated and put forward in the following summary.

SUMMARY OF FINDINGS:

Distribution of Flats

There are a total of 23,289 units of public housing in these four housing estates. Out of the total, 7216 units(31%) are 1-room flats and 5839units(25%) are 2-room flats in the above four old estates (see Table 4.1). They are housed in 304 independent blocks as shown in the site plan (Figure 4.2) which could be converted to approximately 1202 units of 3-room flats and 3373 units of 4-rooms flats. After this conversion, the distribution of flats in these four estates will be 9818units of 3-room flats and 4991units of 4-room flats. Other 3-room, 4-room ,and bigger 5-room flats and Middle-income housing can be planned and constructed on the surrounding sites earmarked for urban renewal. The total demarcated area for this central area conglomerated new town will be approximately 556 hectares. If we apply the recommended new town density of 64 du/ ha, and flat

TABLE 4.1: APPLICATION OF PLANNING AND DESIGN GUIDELINES FOR THE REVITALIZATION OF PHASE ONE "NEW TOWN" (CONTINUED FROM PREVIOUS PAGE)

PLANNING & DESIGN GUIDELINES

	PLANNING GUIDELINES	PHASE ONE "NEW TOWN" EXISTING	REVITALIZED
CINEMA (1800SQ.M.)	2/NEW TOWN	2	2
MINI-MARKET (450SQ.M.)	1/6000 DU.	0	3
MARKET PRODUCE SHOP (130SQ.M.)	1/3000 DU.	6	6
MARKET LOCK-UP SHOP (40SQ.M.)	1/500 DU.	20	20
MARKET/FOOD CENTER 1/5000 DU.		4	4
HDB AREA OFFICE (2000 SQ.M.)	1/15,000 DU	4	2
INSTITUTIONAL FACILITIES			
PRIMARY SCHOOL SITE	1 P.S. TO 2,300 DU. (1.8 HA)	22	8
SECONDARY SCHOOL SITE	1 S.S. TO 4,100 DU. (2.7 HA)		4
JUNIOR COLLEGE SITE (6 HA)	1 PER NEW TOWN	0	1
VOCATIONAL INSTITUTE SITE (6 HA)	1 PER NEW TOWN	1	1
LIBRARY (0.3 TO 0.4 HA)	1 PER NEW TOWN	1	1
POLYCLINIC (0.5 HA)	1 PER 30,000 DU..	1	1
COMMUNITY CENTER (0.4 HA)	1 SITE TO 4,000-5,000 DU.	4	4
MOSQUE (0.3 HA)	1 SITE PER NEW TOWN	1	1
CHINESE TEMPLE (0.2 HA)	1 SITE TO 9,000 DU	4	3
CHURCH (0.3-0.4 HA)	1 SITE TO 12,000 DU.	2	2
HINDU TEMPLE (0.2 HA)	1 SITE FOR 2 NEW TOWNS	2	1
"OTHERS -RESIDENTS CENTER,"	AS AND WHEN REQUIRED	1	4
COMMUNITY HAL	USUALLY LOCATED AT THE	1	4
N'HOOD POLICE POST	GROUND FLOOR VOID DECKS	2	4
KINDERGARTEN	OF THE APARTMENT BLOCKS.	0	4
CHILD CARE CENTER		0	4
SENIOR CITIZENS' CLUB.		0	4
SPORTS &RECREATION FACILITIES:			
SWIMMING COMPLEX (1.5 HA)	1 PER NEW TOWN	2	1
SPORTSOMPLEX (3 HA)	1 PER NEW TOWN	1	1
INDOOR STADIUM (1.2 HA)	1 PER NEW TOWN	1	1
FOOTBALL FIELD 140M X 100 M OR 95 M X 70M	1 PER N'HOOD (MIN.)	2	4
HARD COURT FOR BADMINTON & VOLLEY BALL (16.5 M X 8.5 M)	1 COURT TO 1,000 - 1,200 DU.	20	20
MULTI-PURPOSE COURT (30M X 18M)	1 COURT TO 2,500 - 3,000 DU.	5	7
PRECINCT GARDEN (0.2 HA)	1 TO 3,000 DU.	0	6
NEIGHBORHOOD PARK (1 TO 1.5 HA)	1 PER NEIGHBORHOOD	0	4
TOWN GARDEN (5 TO 10 HA)	1 PER NEW TOWN	0	1

distribution ratio, this new town should have a total of 35,584 dwelling units comprising35 units of 1-room flats,35 units of 2-room flats, 12,881units of 3-room flats,15,870 units of 4-room flats and 4,555 units of 5-room flats and 2,207units middle income housing. Therefore another 3,036 units of 3-room flats 10,879units of 4-room flats, 4,555units of 5-room flats and2,207 units of middle income housing will need to be planned into this revitalized new town.

Facilities Provision:

Since all the four housing estates were only planned with minimum supporting new town facilities, additional commercial, recreational and institutional facilities should be planned into this new town in accordance to the recommended planning guidelines. A broad land-use plan for this conglomerated new town is shown in Figures 4.3. & 4.4. Existing surrounding facilities such as schools, private commercial and industrial complexes, parks and religious buildings were taken into consideration in planning the land-use plan, such as the existing Bukit Merah Center is retained as a neighborhood center, industrial complexes along Alexandra Road are agglomerated into the proposed industrial estate, existing schools, Chinese Temples and shops are retained to serve this new town.

Evaluation:

From the application of the proposed revitalization model, it is apparent that these four old housing estates could be

the demarcated area have prevented this new town from expanding beyond 400 hectares of development area. However, this shortcoming is compensated by the rich variety of existing facilities avilable within or in close proximity to this new town. Detail planning of this new town will require a careful layout for the approximately 12,000 units of 60 new blocks of flats and a careful siting of new facilities within the urban fabrics of the existing areas.

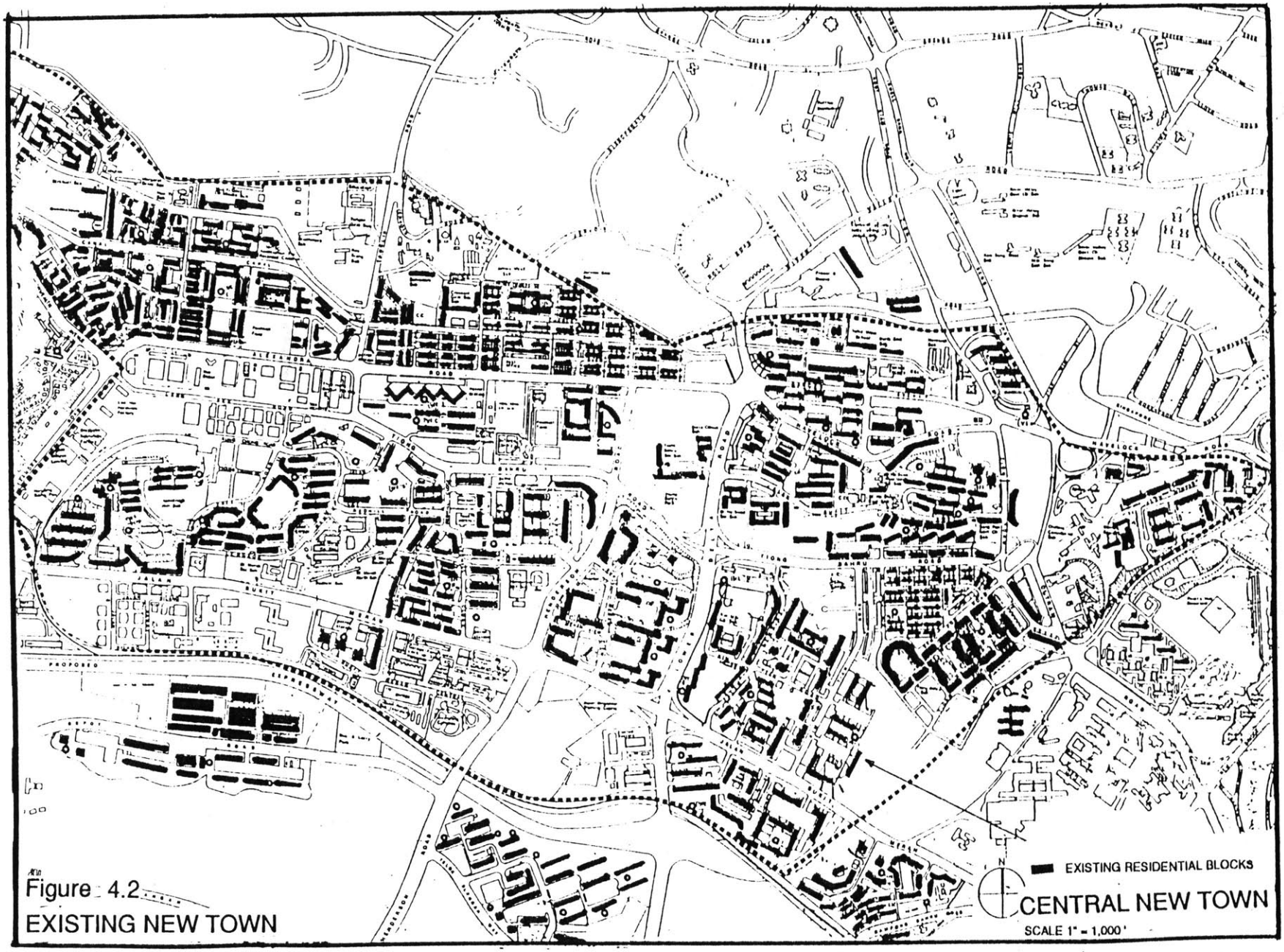


Figure 4.2
EXISTING NEW TOWN

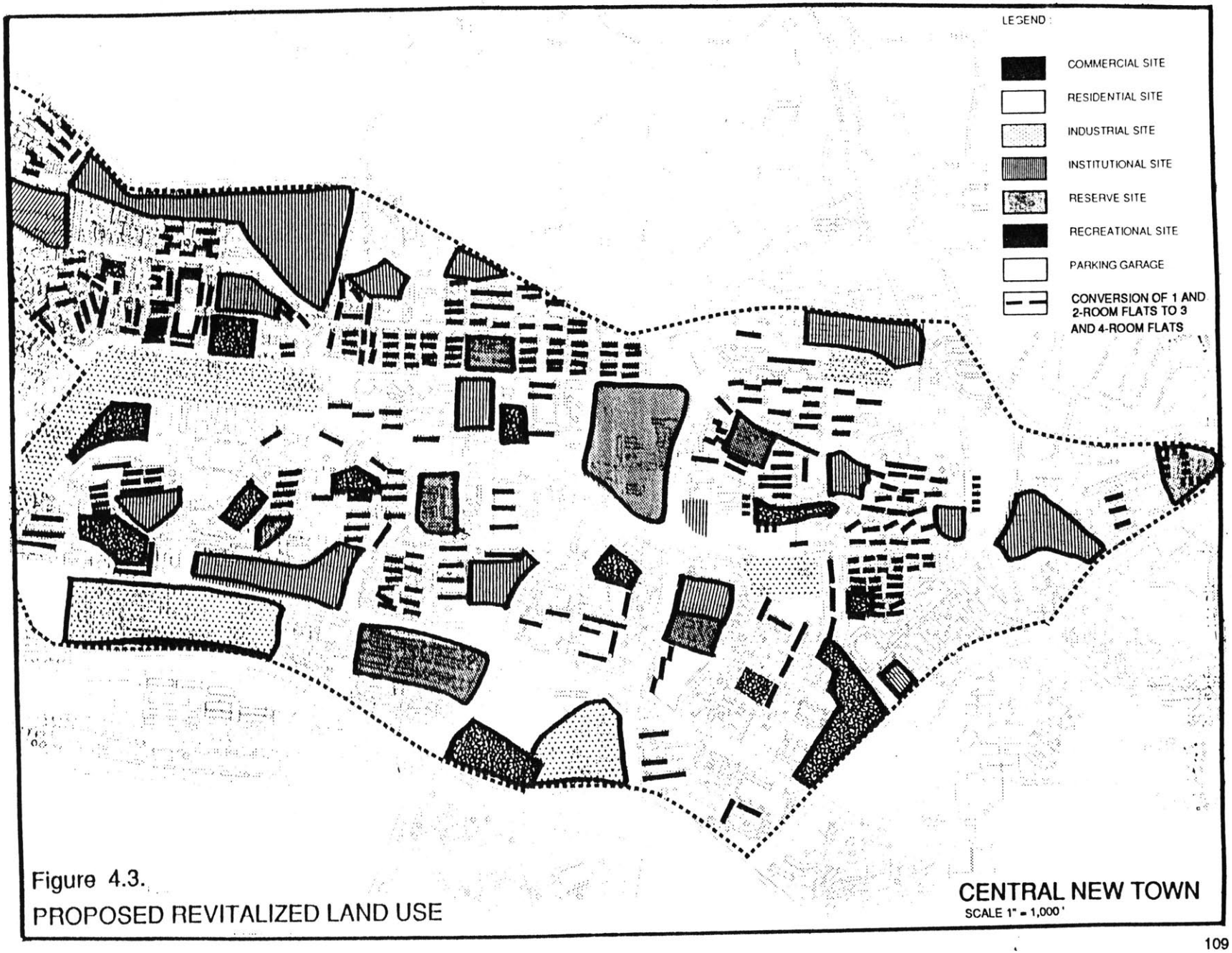


Figure 4.3.
PROPOSED REVITALIZED LAND USE

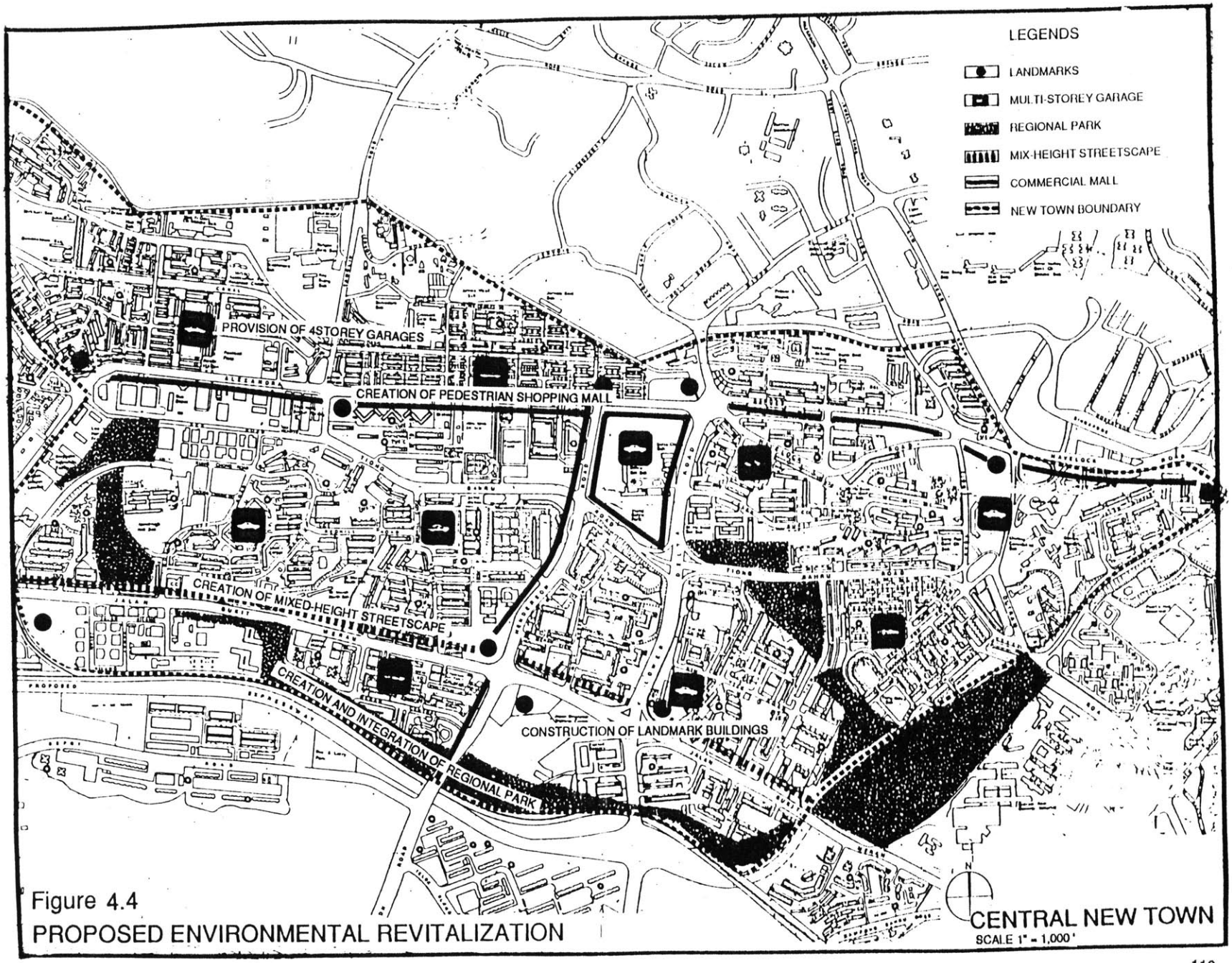
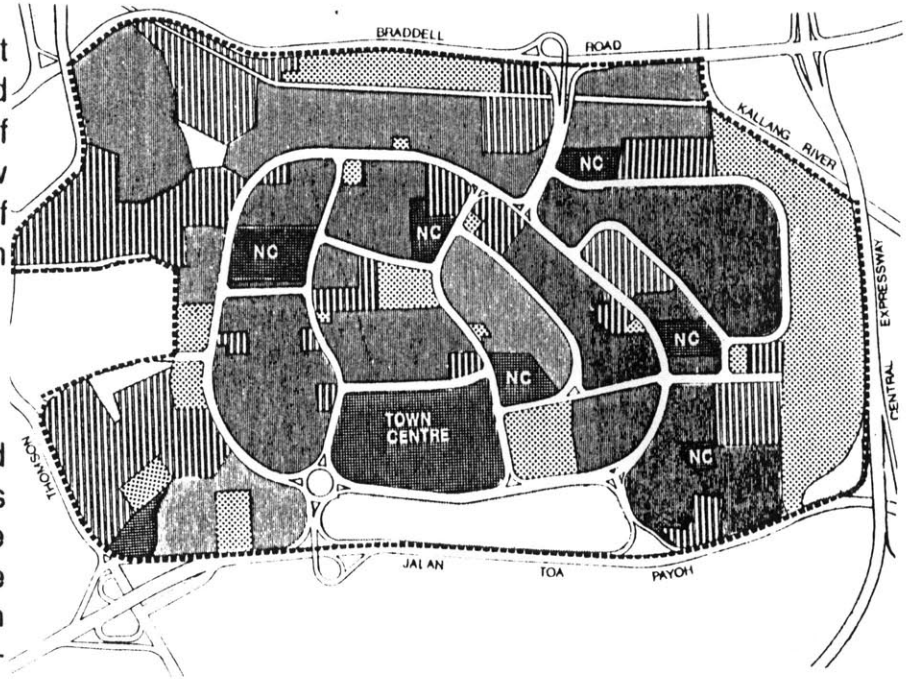


Figure 4.4
PROPOSED ENVIRONMENTAL REVITALIZATION

4.2. PHASE TWO NEW TOWNS - 1960 TO 1969

FIGURE 4.5 : A SAMPLE OF PHASE TWO NEW TOWN - TOA PAYOH NEW TOWN



BACKGROUND :

Toa Payoh New Town is the first new town in Singapore that was planned by a self-contained new town structure and neighborhood planning concept with a target population of 36,758 dwelling units, a town center and a full range of new town facilities. A concentric ring road concept with series of internal loops connect all the neighborhoods to the town center.

PROBLEM ISSUES :

While school and institutional sites are well distributed within the new town, commercial, and recreational facilities tend to concentrate around the town center. (see Figure 4.5). This new town like many others built during this phase of new town development, is characterized by a high density (98.5 Du/Ha) with large proportion of very small 1-room and 2-room flats. In Toa Payoh New Town alone, the small flats constitute about 46% (or 17,039 units) of the total number of 36,758 flats within this new town.

APPLICATION OF REVITALIZATION MODEL :

Priority for the application of proposed Revitalization Model for this new town should therefore be focussed on the reduction and conversion of these less popular small 1-room and 2-room flats to bigger and more popular 3-room and 4-room flats; the re-distribution of commercial and recreational facilities and the strengthening of major

Legend	Land Area (ha)	Percentage
Residential	150	40
Commercial	34	9
Industrial	47	13
Open Space, Sports & Recreational	24	6
School & Institutional	69	19
Roads & Others	49	13
Town Boundary		
Total	373	100

approaches to this New Town.

APPROACH :

1. The distribution of various types of flats in Toa Payoh New Town was carefully looked into to identified the number of small 1-room and 2-room units that need to be converted to the larger 3-room and 4-room units, and the number of bigger units that could be achieved from this conversion.

2. Checklist on the propose planning and design guidelines is used to identify the provision of facilities in Toa Payoh New Town. Additional facilities that are needed in this new town were also identified by the checklist.

3. Locations of blocks of flats to be converted were identified from the site layout plan to determine which blocks will be converted and which will be demolished.

4. Sites on the layout plan were selected for the provision of new facilities.

5. New blocks of flats or facilities were planned for these sites.

6. Environmental design guidelines were used to evaluate the position of the existing and proposed facilities in terms of achieving the visual qualities and identities of nodes, axes, edges, landmarks and districts for each important entrance and approach to this new town.

6. Limitations and problems encountered in this application are analyzed and put forward for discussion.

TABLE4.2 : APPLICATION OF PLANNING AND DESIGN GUIDELINES FOR THE REVITALIZATION OF PHASE TWO NEW TOWN

NEW TOWN ELEMENTS	REVITALIZATION MODELPHASE II NEW TOWN PLANNING GUIDELINES TOA PAYOH NEW TOWN	EXISTING	REVITALIZED
1. NEW TOWN SIZE	500 TO 800 HA	373HA	373HA
2. NEW TOWN DENSITY	64 TO 69 DU/HA	98.5 DU/HA	68DU/HA
3. TOTAL DWELLING UNIT	35,000 TO 55,000 DU	36758DU	25400DU
4. LAND USE (HA)			
-COMMERCIAL TC & NC.	86HA(13.7%)	33.5HA(9.0%)	MAINTAIN THE
-RESIDENTIAL	207HA(33.1%)	150.4HA(40.3%)	SAME LAND USE
-SCHOOLS	73HA(11.7%)	49.8HA(13.4%)	
-OPEN SPACE	23HA(3.7%)	12.7HA(3.4%)	
-SPORTS COMPLEXES	13HA(2.1%)	11.3HA(3.0%)	
-INSTITUTIONS	23HA(3.7%)	19.0HA(5.1%)	
-INDUSTRY	120HA(19.2%)	47.0HA(12.6%)	
-MAJOR ROADS	75HA(12.0%)	44.5HA(11.9%)	
-UTILITIES	5HA(0.8%)	4.8HA(1.3%)	
TOTAL LAND USE	625HA(100.0%)	373.0HA(100%)	
ADDITIONAL LAND AVAILABLE		55HA	
3. FLAT DISTRIBUTION (%)			
1-ROOM	0.10%	11366DU.(30.92%)	25DU.(0.10%)
2-ROOM	0.10%	5673DU.(15.43%)	25DU.(0.10%)
3-ROOM	36.20%	15422DU.(41.9%)	15422DU.(60.59%)
4-ROOM	44.60%	2691DU.(7.32%)	5531DU.(21.75%)
5-ROOM	12.80%	936DU.(2.55%)	3776DU.(14.83%)
EXEC.APT.	3.70%	196DU.(0.53%)	196DU.(0.77%)
MID.INCOME APT	2.50%	474DU.(1.29%)	474DU.(1.86%)
TOTAL:	100%	36758DU.(100%)	25449DU.(100%)
4. FLAT/CAR PARK RATIO			
1-ROOM	5.5	5.5	5.5
2-ROOM	3.9	2.1	3.8
3-ROOM	1.6	1.5	1.5
4-ROOM	1.4	1	1.4
5-ROOM	0.7	1	0.7
EXECUTIVE APT.	0.7	NA	0.7
MIDDLE-INCOME	0.7	NA	0.7
NEW TOWN AVE.	1.6	3.8	1.5
5. FACILITIES PROVISION			
COMMERCIAL FACILITIES			
SHOPS (30-400SQ.M.)	1 / 70 DU. 20% IN T.C. 50% IN N.C. & 30 % IN PRECINCTS	480	363 (73 IN T.C., 181 IN N.C.,109 IN PRECINCTS.
KIOSK(5-15SQ.M.)	1/600 DU. 30% IN T.C. & 70% IN N.C.	NA	42 (13 IN T.C.,29 IN N.C.)
EMPORIUM (4500-6500SQ.M.)	1 TO 2/NEW TOWN	2	2
SUPERMARKETS (1200SQ.M.)	1 TO 2 PER NEW TOWN	1	
EATING HOUSES (450 SQ.M.)	1 E.H./750 DU.7% IN T.C. 23% IN N.C. & 70% IN PRECINCTS	21 FOOD STALLS 40 2 E.H./N'HOOD	2
RESTAURANTS (90-2000SQ.M.)	1/1000 DU. 30% IN T.C. 70% IN N.C. & 2-3 FAST FOOD & 1 TO 2 BIG RESTAURANTS IN T.C.	1	25 (8 INT.C.,17 IN N.C.)
OFFICE SPACE	60SQ.M./450 DU.70% IN T.C. & 30% IN N.C.	2400 SQ.M.	34000 SQ.M. (23800 IN T.C.,10200 IN N.C.
CINEMA	2/NEW TOWN	2	2
MINI-MARKET (450SQ.M.)	1/6000 DU.	NO PROVISION	4
MARKET PRODUCE SHOP (130SQ.M.)	1/3000 DU	1 MARKET PER N.C.	8

SUMMARY OF FINDINGS:

Distribution of Flats:

Toa Payoh New Town has a total of 11,366 units of 1-room flats, 5,673 units of 2-room flats, 15,422 units of 3-room flats, 2691 units of 4-room flats, 936 units of 5-room flats and 670 units of Middle-Income Housing, which represent a flat distribution ratio of 30.9%, 15.4%,41.9%,7.3%, 2.5% and 1.8% respectively (see Table 4.2). As compared to the recommended flat ratio for the revitalization of new town, 1-room and 2-room flats are 17,000 units over-provided, 4-room, 5-room and middle-income Housing are under-provided by 12,000 (50%), while the 3-room flats are about 4%(1,000 units) over-provided. Revitalization action should therefore be concentrated on converting the existing 96 blocks totalling 17039 units of 1 and 2-room flats to approximately 5680 units of 4-room and 5-room flats. The projected total number of dwelling units after the conversion will be approximately 25,400 flats which represent a revised new town density of 68 du/ha on the 373 ha new town site.

Facilities Provision:

As compared to the newer new towns and the recommended revitalization guidelines, Toa Payoh New Town lacks some commercial facilities like supermarkets, convenient stores, laundrettes and pharmacies which will cater for the changing life-style of its residents. Several outdated commercial facilities such as Wet-market, Chinese herbal shops and provision stores could be allowed to

TABLE 4.2: APPLICATION OF PLANNING AND DESIGN GUIDELINES FOR THE REVITALIZATION OF PHASE TWO NEW TOWN
(CONTINUED FROM PREVIOUS PAGE)

NEW TOWN ELEMENTS	REVITALIZATION MODELPHASE II NEW TOWN PLANNING GUIDELINES	TOA PAYOH NEW TOWN EXISTING	TOA PAYOH NEW TOWN REVITALIZED
WET MARKET/FOOD CENTER	1/5000 DU.	1	5
HDB AREA OFFICE (2000 SQ.M.)	1/15,000 DU	3	2
PETROL STATION	8 PER NEW TOWN	7	8
INSTITUTIONAL FACILITIES:			
PRIMARY SCHOOL SITE	1 P.S. TO 2,300 DU. (1.8 HA)	12	12
SECONDARY SCHOOL SITE	1 S.S. TO 4,100 DU. (2.7 HA)	7	6
JUNIOR COLLEGE SITE (6 HA)	1 PER NEW TOWN	0	1
VOCATIONAL INSTITUTE (6 HA)	1 PER NEW TOWN	0	1
LIBRARY (0.3 TO 0.4 HA)	1 PER NEW TOWN	1	1
POLYCLINIC (0.5 HA)	1 PER 30,000 DU.	1	2
COMMUNITY CENTER (0.4 HA)	1 SITE TO 4,000-5,000 DU	5	6
MOSQUE (0.3 HA)	1 SITE PER NEW TOWN	1	1
CHINESE TEMPLE (0.2 HA)	1 SITE TO 9,000 DU.	6	4
CHURCH (0.3-0.4 HA)	1 SITE TO 12,000 DU	2	3
HINDU TEMPLE (0.2 HA)	1 SITE FOR 2 NEW TOWNS	1	1
OTHERS - RESIDENTS' CENTER,	AS AND WHEN REQUIRED	0	8
COMMUNITY HALL	USUALLY LOCATED AT THE	4	4
N'HOOD POLICE POST	GROUND FLOOR VOID DECKS	4	4
KINDERGARTEN,	OF THE APARTMENT BLOCKS.	8	8
CHILD CARE CENTER		2	8
SENIOR CITIZENS' CLUB.		4	8
SPORTS & RECREATION FACILITIES:			
SWIMMING COMPLEX (1.5 HA)	1 PER NEW TOWN	1	1
SPORTS COMPLEX (3 HA)	1 PER NEW TOWN	1	1
INDOOR STADIUM (1.2 HA)	1 PER NEW TOWN	1	1
FOOTBALL FIELD 140M X 100 M OR 95 M X 70M	1 PER NEIGHBORHOOD (MIN.)	1	8
HARD COURT FOR BADMINTON &	1 COURT TO 1,000 - 1,200 DU.	23	25
VOLLEY BALL (16.5 M X 8.5 M)	0.6 - 0.9 HA PER 1,000) PERSONS DEPENDING ON) SURROUNDING OPEN SPACE	0	12
MULTI-PURPOSE COURT (30M X 18M)	1 COURT TO 2,500 - 3,000 DU	12	12
PRECINCT GARDEN (0.2 HA)	1 TO 3,000 DU.	0	8
NEIGHBORHOOD PARK (1 TO 1.5 HA)	1 PER NEIGHBORHOOD	0	8
TOWN GARDEN (5 TO 10 HA)	1 PER NEW TOWN	1	1

convert to the above modern functions. The high concentration of commercial and recreational facilities around the town center should be redistributed to the neighborhoods as shown in Figures 4.7 & 4.8 of the revised land-use plan for Toa Payoh New Town. Additional major access to this New Town from the Central Expressway should be considered to relieve the traffic congestion along Braddell Road and Jalan Toa Payoh during peak hour. Multi-storey parking garages should be considered to supplement the already crowded surface parking throughout the entire new towns (see Figure 4.8).

Evaluation:

Except in some prominent locations, such as the junction of Toa Payoh East and Lorong 6, most of the 1-room and 2-room flats are located inwards and could be readily converted to the 4-room and bigger flats without major face-lift to enhance the new town character and identity. However, for those prominent sites that house the existing flats and facilities, additional revitalization efforts will have to be provided to create better streetscapes, landmarks and foci for these locations. Redistribution of commercial facilities to each neighborhoods and precincts could be achieved by locating these facilities at the ground floor of many blocks which have ground floor free-spaces. As for the redistribution of recreational facilities, sufficient small open spaces between blocks are available within each neighborhood for children playgrounds and ball courts. However, larger facilities such as football fields and parks, there is hardly any reserve site or open space that is big enough to accomodate these facilities. It seems necessary to reserve some sites in each new town to accommodate any future needs.

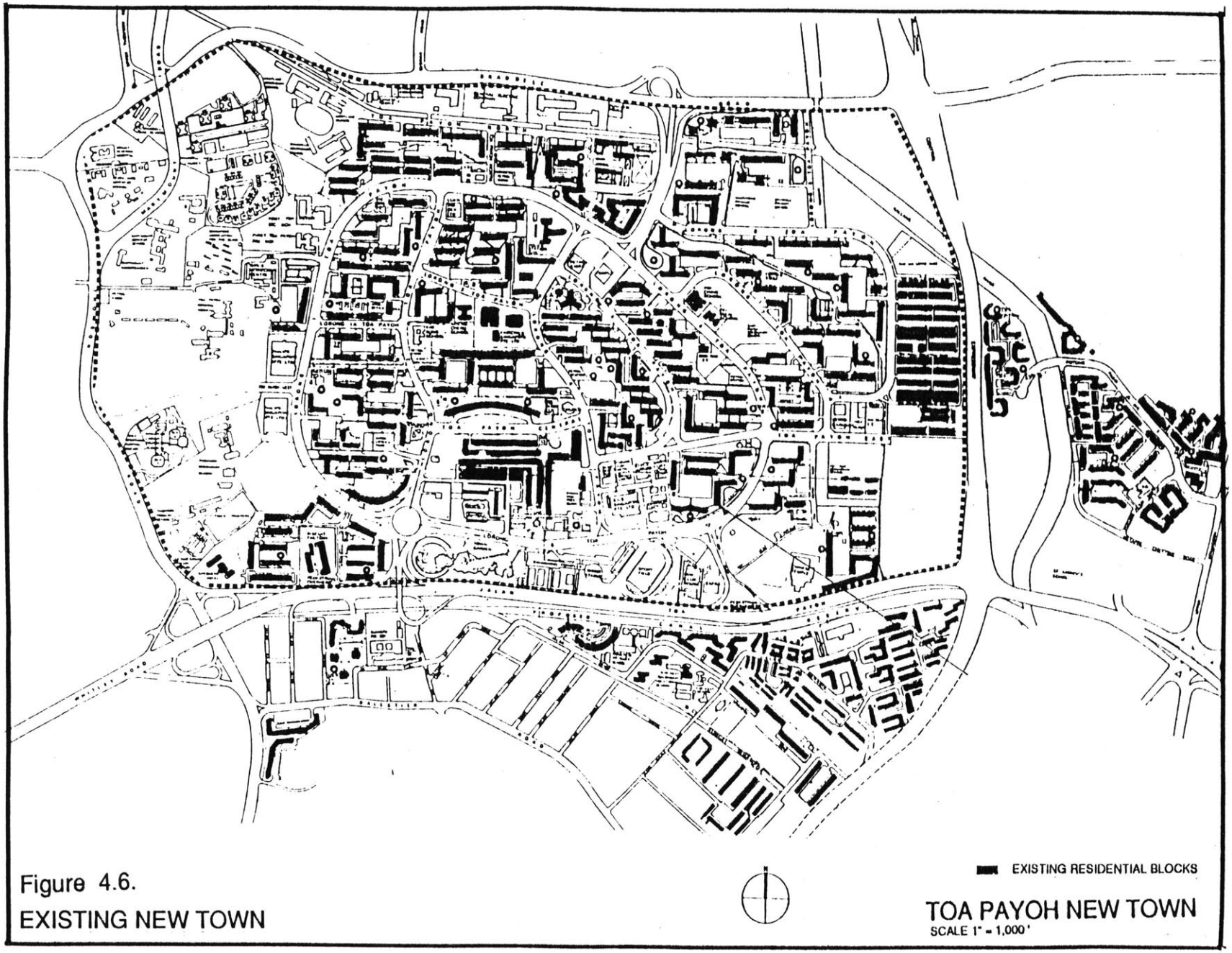


Figure 4.6.
EXISTING NEW TOWN

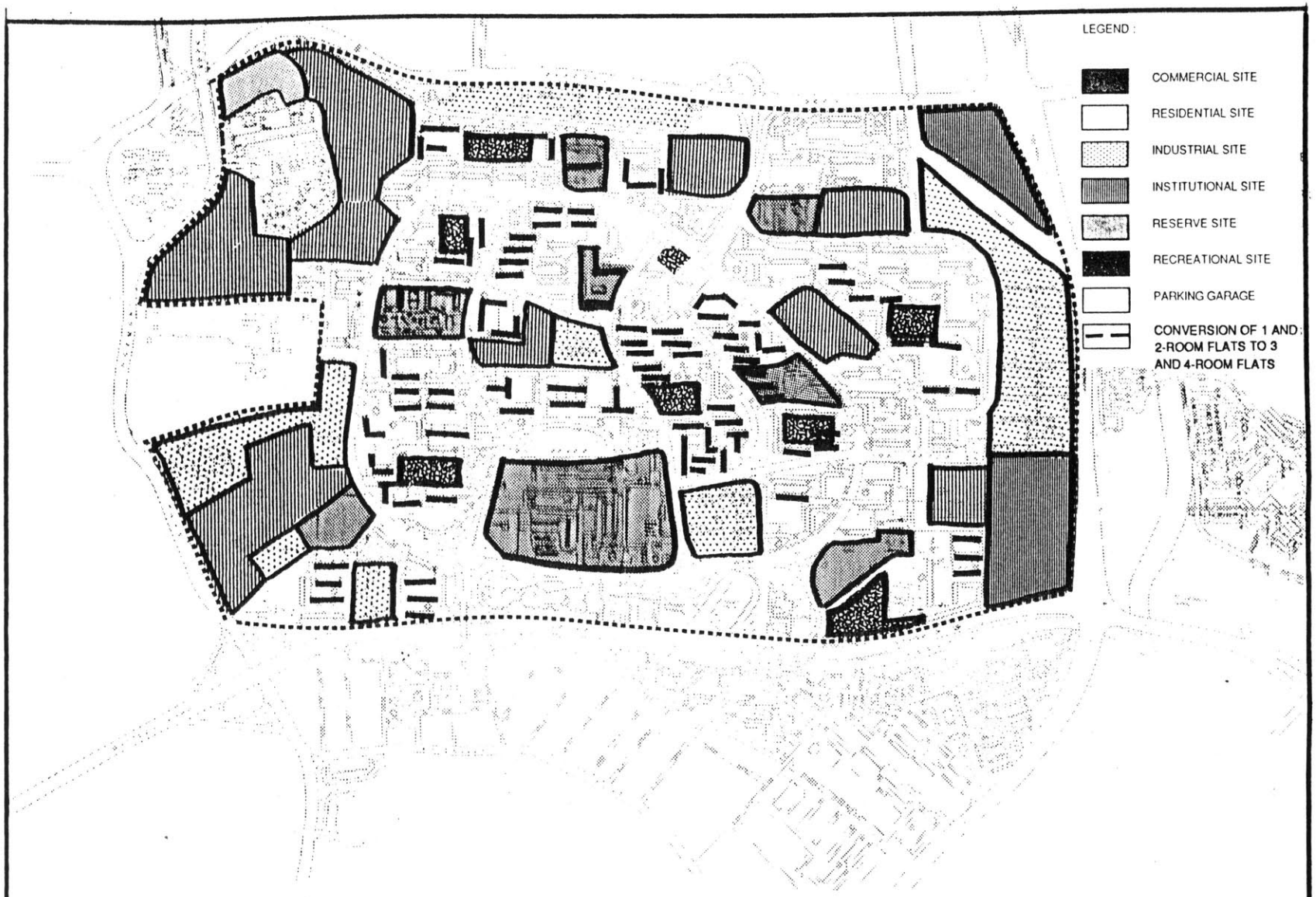


Figure 4.7
PROPOSED REVITALIZED LAND USE

TOA PAYOH NEW TOWN
SCALE 1" = 1,000 '

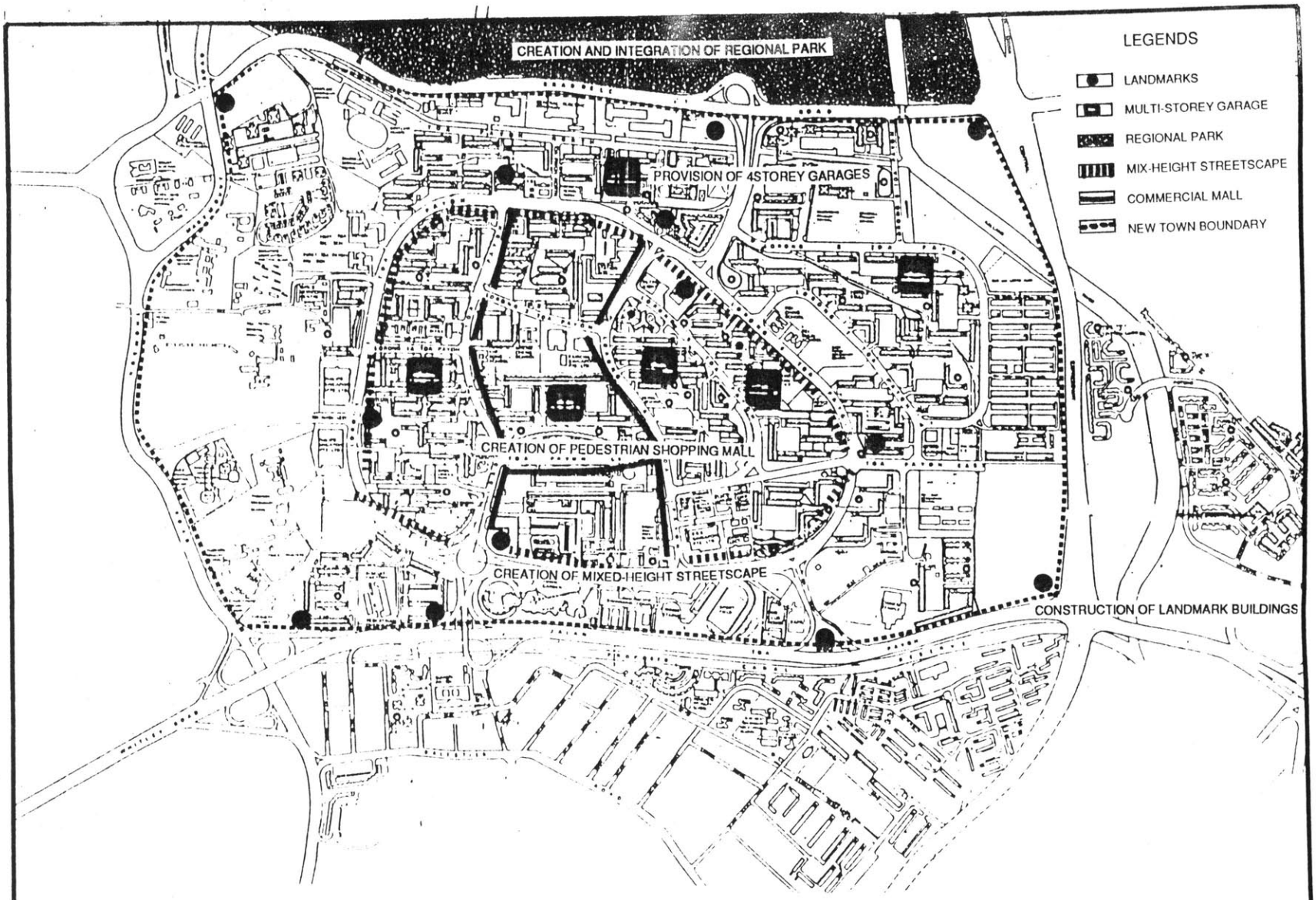


Figure 4.8
PROPOSED ENVIRONMENTAL REVITALIZATION

TOA PAYOH NEW TOWN
SCALE 1" = 1,000'

4.3. PHASE THREE NEW TOWNS - 1970 TO 1979

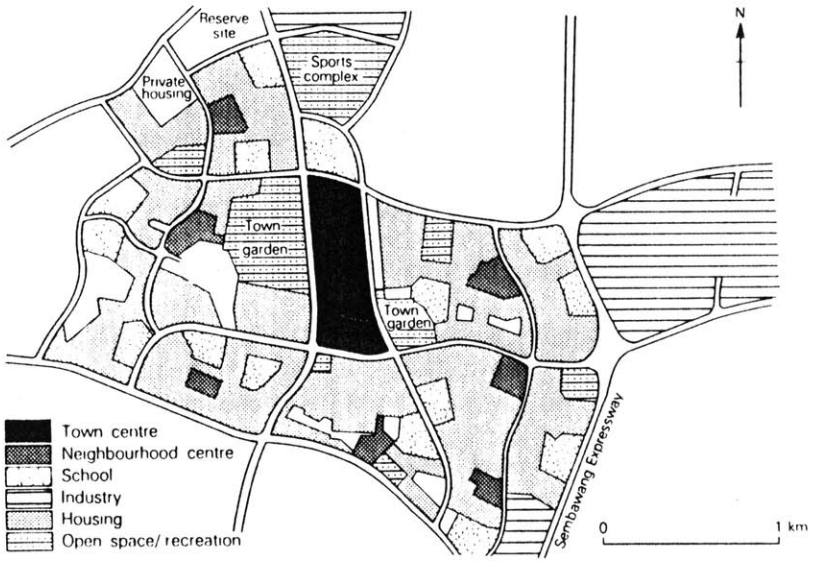
BACKGROUND:

The third stage of new town development was executed in a more systematic approach as exemplified by the Ang Mo Kio New Town. Ang Mo Kio New Town is slightly larger in population size (49483 Dwelling units) than Toa payoh but appreciably larger in land area (713.1 Ha). New Town density is 69.4 Du/Ha with 16.4 percent 1-room and 2-room smaller flats and 76.9 percent of larger 3-room and 4-room flats. It may be seen that not only the industrial land in Ang Mo Kio New Town has increased threefold from the 47 ha in Toa Payoh New Town to 128 ha, the other supporting new town facilities such as recreational, commercial and institutional facilities have also significantly increased. The hierarchy and distribution of these facilities were rigidly spelt out and applied to An Mo Kio New Town.

PROBLEM ISSUES :

It is clear from Ang Mo Kio and other new towns developed under this phase that the demands for small 1-room and 2-room flats had dropped and the demands of 3-room and bigger flats had picked up considerably. The major problems with Phase Three New Towns have therefore been shifted from that of wrong match of quantitative provision to that of lack of qualitative provision of identity and character. The attributes to this identity crisis is the strict adhesion to a rigid set of planning and design standards that were introduced during this phase of new town development.

FIGURE 4.9 : A SAMPLE OF PHASE THREE NEW TOWN- ANG MO KIO NEW TOWN



APPLICATION OF REVITALIZATION MODEL:

Revitalization model will therefore have to recreate visual identity and character to this new town. The designation of prominent sites and locations in Ang Mo Kio New Town for the creation of foci, nodes, axes, landmarks, streetscapes, and districts by facilities and residential building blocks will have to be first identified. These sites will then be used to generate special visual identity either by distinctive architectural treatments on the facade and roofscape of the existing flats or by the construction of new facilities such as community centers and religious buildings in these prominent locations.

APPROACH :

1. The checklist on the proposed planning and design guidelines is used to identify the provision of flats and facilities in Ang Mo Kio New Town.

2. The deficient or unsuitably located flats and facilities are then recorded in the checklist as shown in Table 4.3 .

3. Suitable prominent sites for these additional flats and facilities are selected from the site layout of Ang Mo Kio New Town, and unsuitable sites for existing flats and facilities are simultaneously reclaimed for other uses (see Figure 4.11).

4. A comprehensive network of linkages are planned to strengthen the visual qualities and experience of a sense of identity or place.

TABLE 4.3 : APPLICATION OF PLANNING AND DESIGN GUIDELINES FOR THE REVITALIZATION OF PHASE THREE NEW TOWN

	GUIDELINES	ANG MO KIO NEW TOWN EXISTING	REVITALIZED
1. NEW TOWN SIZE	500 TO 800 HA	713.1HA	713.1HA
2. NEW TOWN DENSITY	64 TO 69 DU/HA	69.39DU/HA	63.1DU/HA
3. TOTAL DWELLING UNIT	35,000 TO 55,000 DU	49483DU	44990DU.
4. LAND USE			
-COMMERCIAL TC & NC.	86HA(13.7%)	54HA(7.6%)	MAINTAIN CLOSE
-RESIDENTIAL	207HA(33.1%)	248.2HA(34.8%)	TO EXISTING
-SCHOOLS	73HA(11.7%)	58.6HA(8.2%)	
-OPEN SPACE	23HA(3.7%)	42.2HA(5.9%)	
-SPORTS COMPLEXES	13HA(2.1%)	11.7HA(1.7%)	
-INSTITUTIONS	23HA(3.7%)	32.3HA(4.5%)	
-INDUSTRY	120HA(19.2%)	128.5HA(18.0%)	
-MAJOR ROADS	75HA(12.0%)	116.7HA(16.4%)	
-UTILITIES	5HA(0.8%)	20.9HA(2.9%)	
TOTAL LAND USE	625HA(100.0%)	713.1HA(100%)	
ADDITIONAL LAND AVAILABLE		21HA	
3. FLAT DISTRIBUTION			
1-ROOM	0.10%	2696DU.(5.45%)	45DU(0.1%)
2-ROOM	0.10%	5432DU.(10.98%)	45DU(0.1%)
3-ROOM	36.20%	26714DU.(53.98%)	27614(61.4%)
4-ROOM	44.60%	11355DU.(22.95%)	14000(31.1%)
5-ROOM	12.80%	3286DU.(6.64%)	3286(7.3%)
EXEC.APT.	3.70%	0DU.(0%)	
MID.INCOME APT	2.50%	0DU.(0%)	
TOTAL UNITS COMPLETED:	100%	49483(100%)	44990(100%)
4. CAR PARK/FLAT RATIO			
1-ROOM	5.5	10	5.5
2-ROOM	3.9	5	3.8
3-ROOM	1.6	3	1.5
4-ROOM	1.4	1.5	1.4
5-ROOM	0.7	1	0.7
EXECUTIVE APT.	0.7	1	0.7
MIDDLE-INCOME	0.7	1	0.7
NEW TOWN AVE.	1.6	3	1.5
5. FACILITIES PROVISION			
COMMERCIAL FACILITIES			
SHOPS (30-400SQ.M.)	1 / 70 DU. 20% IN T.C. 50% IN N.C. & 30 % IN PRECINCTS	759	642 (128 INT.C., 321 IN N.C., 193 IN PRECINCTS)
KIOSK(5-15SQ.M.)	1/600 DU. 30% IN T.C. & 70% IN N.C.	NA	75 (23 INT.C.,52 IN N.C.)
EMPORIUM (4500-6500SQ.M.)	1 TO 2/NEW TOWN	2	2
SUPERMARKETS (1200SQ.M.)	1 TO 2 PER NEW TOWN	2	2
HAWKER CENTER/EATING HOUSE 450 SQ.M.)	1 E.H./750 DU.7% IN T.C. 23% IN N.C. & 70% IN PRECINCTS	60	60 (4 IN T.C.,14 IN 42 IN PRECINCTS)
RESTAURANTS (90-2000SQ.M.)	1/1000 DU. 30% IN T.C. 70% IN N.C. & 2-3 FAST FOOD & 1 TO 2 BIG RESTAURANTS IN T.C.	2	45 (14 IN T.C., 31 IN N.C.)
OFFICE SPACE	60SQ.M./450 DU.70% IN T.C.	N.A.	6000 SQ.M. (4200 SQ.M.IN T.C.,1800 SQ.M. IN N.C.
CINEMA	2/NEW TOWN	2	2
MINI-MARKET (450SQ.M.)	1/6000 DU.	NO PROVISION	8
MARKET PRODUCE SHOP (130SQ.M.)	1/3000 DU	1 MARKET PER N.C.	16

(CONTINUED ON NEXT PAGE)

5. Environmental design guidelines are then used to evaluate the position of the existing and propose facilities in terms of achieving the visual qualities and identities of nodes, axes, edges, landmarks and districts of each important entrance and approach to this new town (see Figure 4.12).

6. Limitations and problems encountered in this application are analyzed and put forward for discussion:

SUMMARY OF FINDINGS:

DISTRIBUTION OF FLATS

Ang Mo Kio New Town has a flat distribution of 2696 units of 1-room flats, 5432 units of 2-room flats, 26,714 units of 3-room flats, 11,355 units of 4-room flats and 3,286 units of 5-room flats. About 8,038 units of small 1-room and 2-room flats have to be converted to about 900 units of 3-room and 2700 units of 4-room flats, while the 3-room flats are slightly over-provided. With this conversion , the total dwelling units in this new town will be reduced to 44,990 units which represent a revised new town density of 63.1du/ha which is slightly lower than the recommended 64 du/ha.

Orientation of residential blocks complied very rigidly to the north-south and arranged in a very regimental manner. Blocks generally faced the North-south Avenue with unsightly blank walls, and do not respond well to the streetscapes along these avenues. Certain open spaces along these avenues may provide opportunities for the addition of buildings and landscape to screen or soften these tall blank walls. The straight regimental blocks also do not respond

TABLE 4.3: APPLICATION OF PLANNING AND DESIGN GUIDELINES FOR THE REVITALIZATION OF PHASE THREE NEW TOWN
(CONTINUED FROM PREVIOUS PAGE)

	GUIDELINES	ANG MO KIO NEW TOWN EXISTING	REVITALIZED
MARKET/FOOD CENTER	1/5000 DU.	8	8
HDB AREA OFFICE (2000 SQ.M.)	1/15,000 DU	4	3
PETROL STATION	8 PER NEW TOWN	4	8
INSTITUTIONAL FACILITIES			
PRIMARY SCHOOL SITE	1 P.S. TO 2,300 DU. (1.8 HA)	15	19
SECONDARY SCHOOL SITE	1 S.S. TO 4,100 DU. (2.7 HA)	8	11
JUNIOR COLLEGE SITE (6 HA)	1 PER NEW TOWN	1	1
VOCATIONAL INSTITUTE (6 HA)	1 PER NEW TOWN	1	1
LIBRARY (0.3 TO 0.4 HA)	1 PER NEW TOWN	1	1
POLYCLINIC (0.5 HA)	1 PER 30,000 DU.	1	1
COMMUNITY CENTER (0.4 HA)	1 SITE TO 4,000-5,000 DU.	5	9
MOSQUE (0.3 HA)	1 SITE PER NEW TOWN	1	1
CHINESE TEMPLE (0.2 HA)	1 SITE TO 9,000 DU.	4	5
CHURCH (0.3-0.4 HA)	1 SITE TO 12,000 DU.	3	4
HINDU TEMPLE (0.2 HA)	1 SITE FOR 2 NEW TOWNS	0	1
OTHERS -RESIDENTS' CENTER	AS AND WHEN REQUIRED	NA	8
COMMUNITY HALL,"	USUALLY LOCATED AT THE	2	4
N'HOOD POLICE POST	GROUND FLOOR VOID DECKS	2	4
KINDERGARTEN,"	OF THE APARTMENT BLOCKS.		8
CHILD CARE CENTER			8
SENIOR CITIZENS' CLUB.			8
SPORTS &RECREATION FACILITIES:			
SWIMMING COMPLEX (1.5 HA)	1 PER NEW TOWN	2	2
SPORTS COMPLEX (3 HA)	1 PER NEW TOWN	1	1
INDOOR STADIUM (1.2 HA)	1 PER NEW TOWN	1	1
FOOTBALL FIELD 140M X 100 M OR 95 M X 70M	1 PER NEIGHBORHOOD (MIN.)	4	8
HARD COURT FOR BADMINTON & VOLLEY BALL (16.5 M X 8.5 M)	1 COURT TO 1,000 - 1,200 DU	NA	44
MULTI-PURPOSE COURT (30M X 18M)	1 COURT TO 2,500 - 3,000 DU.	NA	15
PRECINCT GARDEN (0.2 HA)	1 TO 3,000 DU	0	15
NEIGHBORHOOD PARK (1 TO 1.5 HA)	1 PER NEIGHBORHOOD	5	8
TOWN GARDEN (5 TO 10 HA)	1 PER NEW TOWN	2	1

well with many road intersections, demolition of some blocks at these insection to make way for better designed blocks may be necessary.

FACILITIES PROVISION:

Facilities provision complied closely to the quantitative planning standards of the newer new towns, though the quality of provision such as locations and types of facilities could be further improved. Unbalanced concentration of certain facilities such as a town garden and a neighborhood park next to each other caused the lack of open spaces in some neighborhoods that need these facilities. A revised land-use plan is shown in Figure 4.12.

EVALUATION:

Besides a high concentration of monotonous straight blocks in this new town, there are insufficient reserve sites at prominent locations for the creation of new town identity. Revitalization action may involve the demolition of some ugly buildings at important locations to make way for better design building. There is also a general inadequacy in the provision of parking facilities. Some multi-storey parking garages may be added at the existing spaces for surface parking to resolve the general shortage of parking provision in this new town (see Figure 4.12).

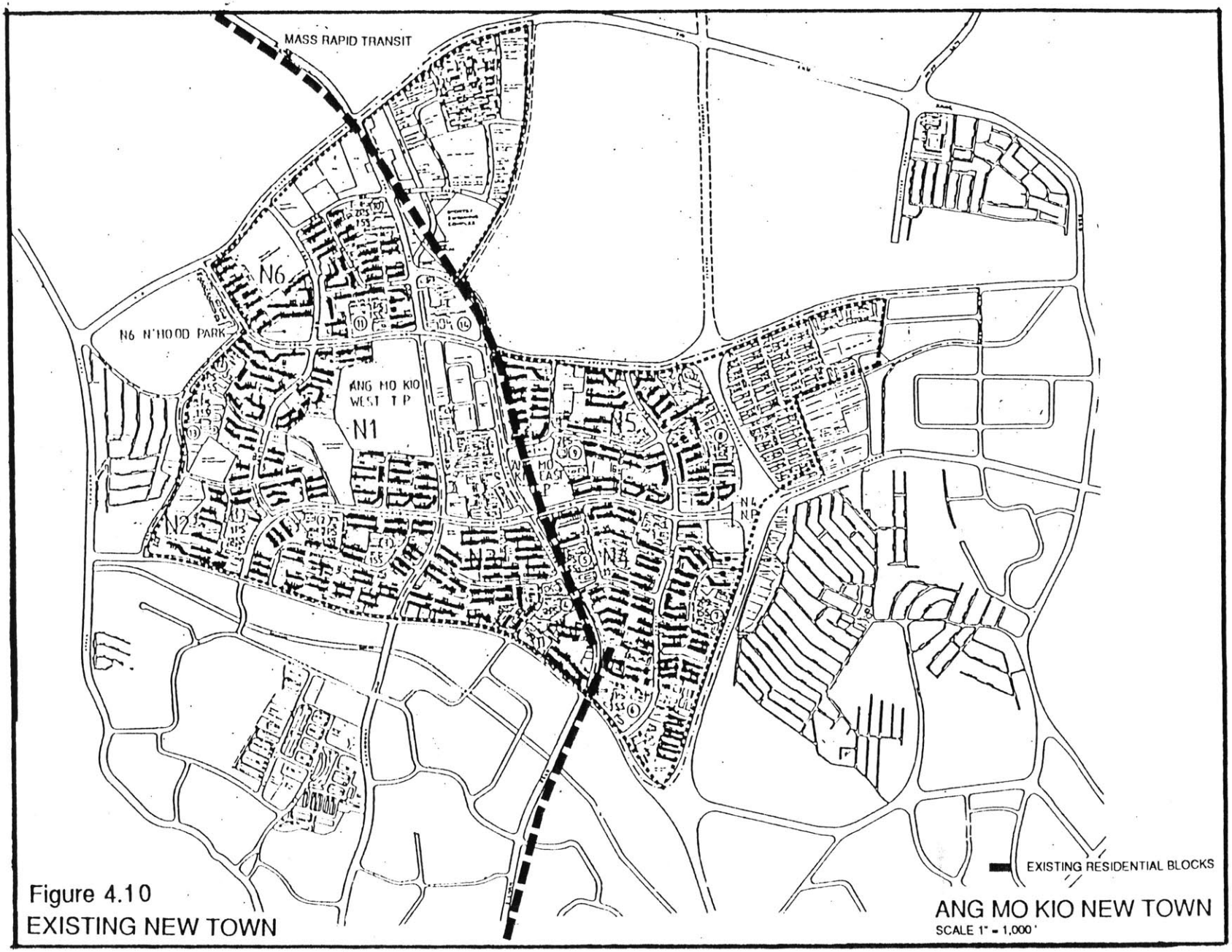


Figure 4.10
EXISTING NEW TOWN

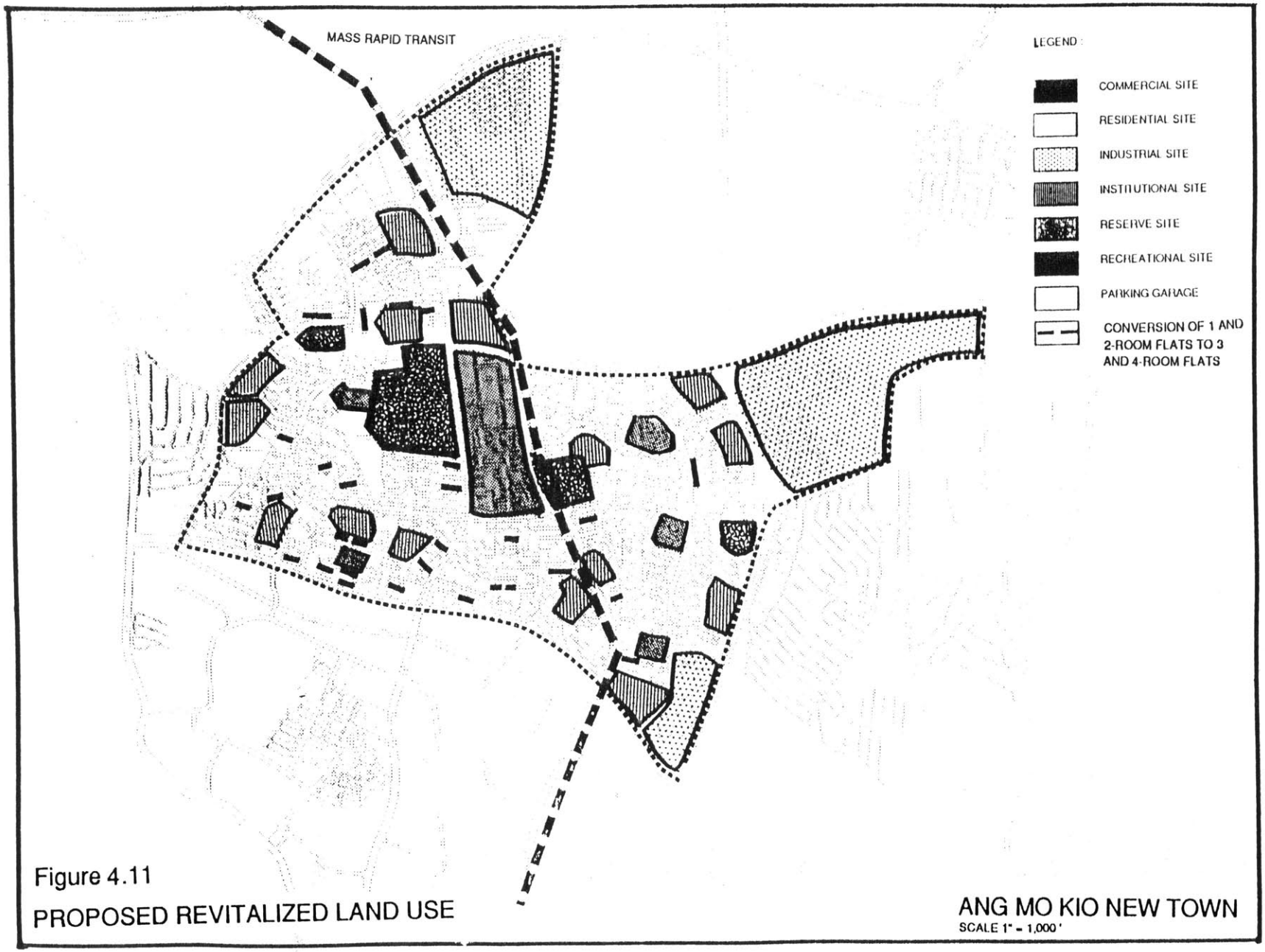


Figure 4.11

PROPOSED REVITALIZED LAND USE

ANG MO KIO NEW TOWN

SCALE 1" = 1,000 '

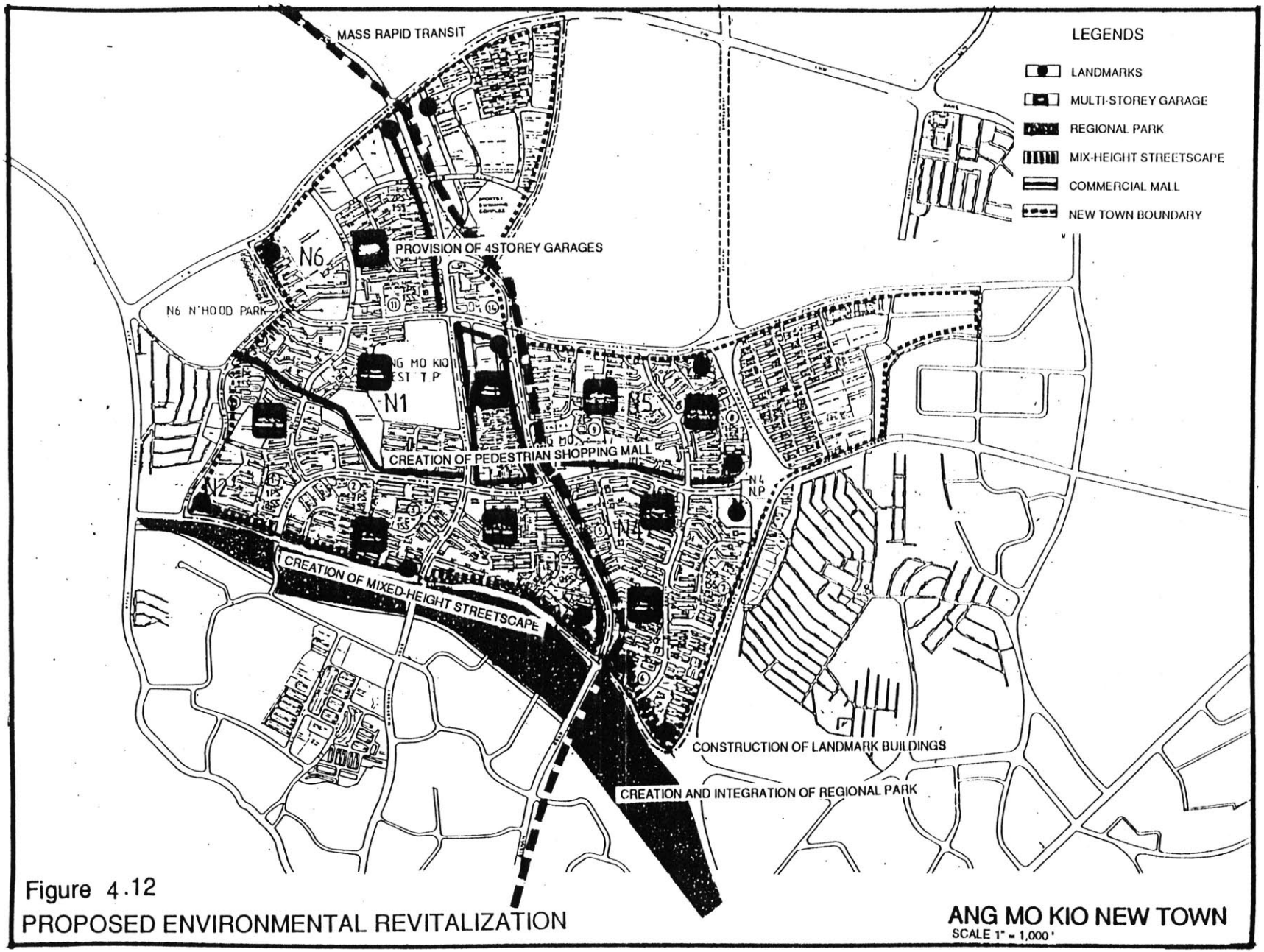


Figure 4.12

PROPOSED ENVIRONMENTAL REVITALIZATION

ANG MO KIO NEW TOWN

SCALE 1" = 1,000'

4.4. PHASE FOUR NEW TOWNS - 1980 TO 1989

BACKGROUND:

Phase Four New Towns marked the introduction of the precinct concept. This Precinct Model, as used in the development of Tampines New Town, focussed on the use of the precinct of 400 to 800 dwelling units as the basic planning units. This basic precinct repeats itself in clusters of 4 ha (200m x 200m) or half this size and can be interlocked and combined to create checker-board land use pattern that relieve the high-rise, high-density environment.

This Precinct Model is intended to provide direct pedestrian linkages between precincts and facilities throughout Tampines New Town, and it also marks the beginning of an attempt by the HDB to improve the environmental quality of this new town.

PROBLEM ISSUES:

However, in the actual physical planning of Tampines New Town, the precinct model was not used to the original objective of checker-board pattern to relieve the high-rise and high-density environment. Differentiation of precincts with reserve sites, neighborhood centers and facilities, and linkages between precincts and other facilities are not clearly demarcated and provided. In addition, the long pitched roofs that were used indiscriminately over the high-

FIGURE 4.13 : A SAMPLE OF PHASE FOUR NEW TOWN - TAMPINES NEW TOWN

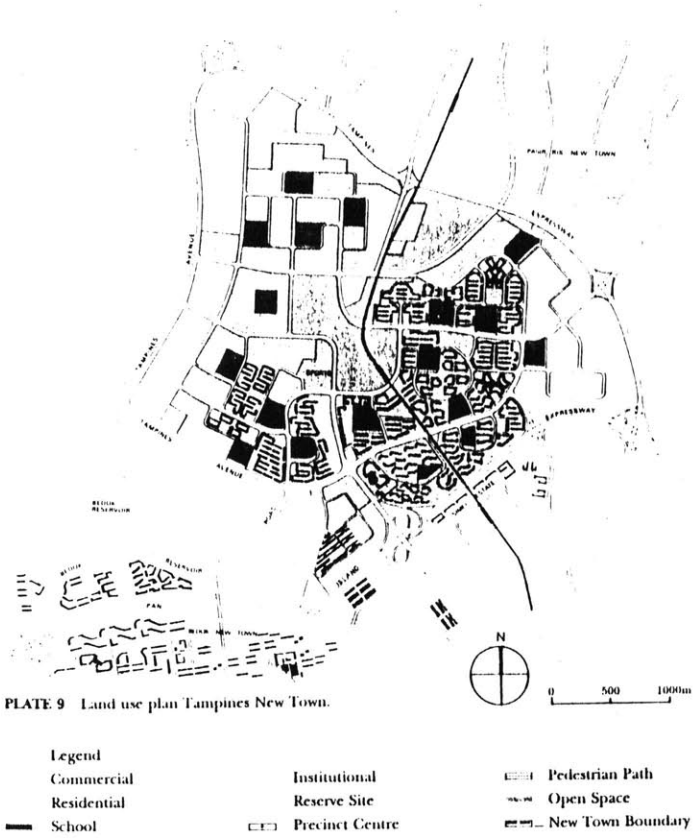


PLATE 9 Land use plan Tampines New Town.

rise blocks in Tampines are not effective in creating visual identity for the precinct as view from the ground.

APPLICATION OF REVITALIZATION MODEL:

The application of revitalization model in Tampines New

Town must therefore help to express the precinct concept more clearly. At Tampines, greater ingenuity in developing precinct models with vivid visual quality in relation to the ground is necessary. Future sites should be reserved for the application of good precinct models while remedial actions such as the demarcation of existing precincts with comprehensive and integrated linkage plan and the provision of accompanying precinct facilities such as precinct shops, gardens, games courts, playgrounds and landscaping as listed in the planning and design guidelines could be used to strengthen the precinct concept on those loosely planned precincts.

APPROACH:

1. The existing new town was first subdivided into precincts of 400 to 800 dwelling units.

2. Those precincts that were found to be sub-standards or did not conform to the precinct concept of checker-board layout pattern were identified.

3. Facilities provided in this new town were then, in accordance to the planning and design guidelines, proposed in the revitalization model.

TABLE 4.4 : APPLICATION OF PLANNING AND DESIGN GUIDELINES FOR THE REVITALIZATION OF PHASE FOUR NEW TOWN

		PHASE IV TAMPINES NEW TOWN	
	GUIDELINES	EXISTING	PROPOSED
1. NEW TOWN SIZE	500 TO 800 HA	925 HA	925 HA
2. NEW TOWN DENSITY	64 TO 69 DU/HA	60.54DU/HA	64 DU/HA
3. TOTAL DWELLING UNIT	"35,000 TO 55,000 DU	"56,000 DU	59200 DU
4. LAND USE			
-COMMERCIAL TC & NC.	86HA(13.7%)	79HA(8.6%)	127HA(13.7%)
-RESIDENTIAL	207HA(33.1%)	406HA(43.9%)	307HA(33.1%)
-SCHOOLS	73HA(11.7%)	63HA(6.8%)	108HA(11.7%)
-OPEN SPACE	23HA(3.7%)	67HA(7.2%)	34HA(3.7%)
-SPORTS COMPLEXES	13HA(2.1%)	8HA(0.8%)	19HA(2.1%)
-INSTITUTIONS	23HA(3.7%)	13HA(1.4%)	34HA(3.7%)
-INDUSTRY	120HA(19.2%)	171HA(18.5%)	178HA(19.2%)
-MAJOR ROADS	75HA(12.0%)	111HA(12.0%)	111HA(12.0%)
-UTILITIES	5HA(0.8%)	7HA(0.8%)	7HA(0.8%)
TOTAL LAND USE	625HA(100.0%)	925HA(100%)	925HA(100%)
ADDITIONAL LAND AVAILABLE		0HA	
3. FLAT DISTRIBUTION (%)			
1-ROOM	0.10%	154(0.53%)	59 (0.1%)
2-ROOM	0.10%	126(0.43%)	59(0.1%)
3-ROOM	36.20%	11670(39.90%)	21430(36.2%)
4-ROOM	44.60%	12265(41.93%)	26403(44.6%)
5-ROOM	12.80%	3330(11.39%)	7577(12.8%)
EXEC.APT.	3.70%	1287(4.40%)	2190(3.7%)
MID.INCOME APT	2.50%	416(1.42%)	1480(2.5%)
EXISTING TOTAL(TILL MARCH 1986):100%		29248(100%)	
FUTURE TOTAL(AFTER MARCH 1986)		26752	59200(100%)
4. CAR PARK/FLAT RATIO			
1-ROOM	5.5	7.7	5.5
2-ROOM	3.9	5.2	3.8
3-ROOM	1.6	2.1	1.5
4-ROOM	1.4	1.7	1.4
5-ROOM	0.7	0.9	0.7
EXECUTIVE APT.	0.7	0.9	0.7
MIDDLE-INCOME	0.7	0.9	0.7
NEW TOWN AVE.	1.6	2.7	1.5
5. FACILITIES PROVISION			
COMMERCIAL FACILITIES			
SHOPS (30-400SQ.M.)	1 / 70 DU. 20% IN T.C. 50% IN N.C. & 30 % IN PRECINCTS		846(169 IN T.C. 423 IN N.C.,254 IN PRECINCTS
KIOSK(5-15SQ.M.)	1/600 DU. 30% IN T.C. & 70% IN N.C.		99 (30 IN T.C., 69 IN N.C.)
EMPORIUM (4500-6500SQ.M.)	1 TO 2/NEW TOWN	2	2
SUPERMARKETS (1200SQ.M.)	1 TO 2 PER NEW TOWN	2	2
EATING HOUSES (450 SQ.M.)	1 E.H./750 DU.7% IN T.C. 23% IN N.C. & 70% IN PRECINCTS		79 (6 IN T.C., 18 IN N.C. 55 IN PRECINCTS
RESTAURANTS (90-2000SQ.M.)	1/1000 DU. 30% IN T.C. 70% IN N.C. & 2-3 FAST FOOD & 1 TO 2 BIG RESTAURANTS IN T.C.		59(18 IN T.C., 41 IN N.C.)
OFFICE SPACE	60SQ.M./450 DU.70% IN T.C. & 30% IN N.C.		7900 SQ.M.(5530 SQ.M. IN T.C. 2370 SQ.M. IN N.C.

(CONTINUED ON NEXT PAGE)

4. Surplus or deficient facilities and the appropriateness of locations were recorded in the checklist.

5. Suitable prominent sites for additional facilities , and unsuitable sites that housed the existing facilities were identified from the layout plan of Tampines New Town (see Figure 4.14).

6. A hierarchy of linkages between existing and new precincts and facilities was also provided in the layout plan (see Figure 4.16).

7. The improvements made so far and the limitations and constraints encountered during the application process were then summarized .

TABLE 4.4 : APPLICATION OF PLANNING AND DESIGN GUIDELINES FOR THE REVITALIZATION OF PHASE FOUR NEW TOWN (CONTINUED FROM PREVIOUS PAGE)

	GUIDELINES	PHASE IV TAMPINES NEW TOWN EXISTING	PROPOSED
CINEMA (1800SQ.M.)	2/NEW TOWN	2	2
MINI-MARKET (450SQ.M.)	1/6000 DU.		10
MARKET PRODUCE SHOP (130SQ.M.)	1/3000 DU		20
MARKET LOCK-UP SHOP (40SQ.M.)	1/500 DU.		120
MARKET/FOOD CENTER	1/5000 DU.		12
HDB AREA OFFICE (2000 SQ.M.)	1/15,000 DU	4	4
PETRO STATION	8 PER NEW TOWN	8	8
INSTITUTIONAL FACILITIES			
PRIMARY SCHOOL SITE	1 P.S. TO 2,300 DU. (1.8 HA)	18	26
SECONDARY SCHOOL SITE	1 S.S. TO 4,100 DU. (2.7 HA)	14	14
JUNIOR COLLEGE SITE (6 HA)	1 PER NEW TOWN	1	1
VOCATIONAL INSTITUTE SITE (6 HA)	1 PER NEW TOWN	1	1
LIBRARY (0.3 TO 0.4 HA)	1 PER NEW TOWN	1	1
POLYCLINIC (0.5 HA)	1 PER 30,000 DU.	1	2
COMMUNITY CENTER (0.4 HA)	1 SITE TO 4,000-5,000 DU.	4	12
MOSQUE (0.3 HA)	1 SITE PER NEW TOWN	1	1
CHINESE TEMPLE (0.2 HA)	1 SITE TO 9,000 DU	4	6
CHURCH (0.3-0.4 HA)	1 SITE TO 12,000 DU.	2	5
HINDU TEMPLE (0.2 HA)	1 SITE FOR 2 NEW TOWNS	1	1
*OTHERS - RESIDENTS' CENTER,	AS AND WHEN REQUIRED		8
COMMUNITY HALL,	USUALLY LOCATED AT		4
N'HOOD POLICE POST	GD. FLOOR VOID DECKS		4
KINDERGARTEN,	OF THE APT. BLOCKS.		8
CHILD CARE CENTER			8
SENIOR CITIZENS' CLUB.			8
SPORTS & RECREATION FACILITIES:			
SWIMMING COMPLEX (1.5 HA)	1 PER NEW TOWN	1	1
SPORTS COMPLEX (3 HA)	1 PER NEW TOWN	1	1
INDOOR STADIUM (1.2 HA)	1 PER NEW TOWN	1	1
FOOTBALL FIELD 140M X 100 M OR 95 M X 70M	1 PER N'HOOD (MIN.)	4	8
HARD COURT FOR BADMINTON & VOLLEY BALL (16.5 M X 8.5 M)	1 COURT TO 1,000 - 1,200 DU.	23	50
MULTI-PURPOSE COURT (30M X 18M)	1 COURT TO 2,500 - 3,000 DU	12	20
PRECINCT GARDEN (0.2 HA)	1 TO 3,000 DU.		
NEIGHBORHOOD PARK (1 TO 1.5 HA)	1 PER NEIGHBORHOOD	4	8
TOWN GARDEN (5 TO 10 HA)	1 PER NEW TOWN	1	1

SUMMARY OF FINDINGS:

DISTRIBUTION OF FLATS:

Tampines New Town has a total of only 154 units of 1- room and 126 units of 2-room flats, which represents respectively only 0.5% and 0.4 % of the total number of 29,248 units of housing completed as in March 1986. With the ultimate projected development of 59,200 dwelling units in this new town. The issue of over-provision of 1-room and 2-room small units of flats does not exist in this new town and all other new towns built during this phase of new town development.

EVALUATION:

The immediate issue confronting improvements this new town seems to be the strengthening of the precinct concept. In applying the new town , neighborhood and precinct structures recommended in Chapter Three, the identity of Tampines New Town can be reinforced by selecting prominent sites along major avenues such as Avenue 1 and Avenue 10 to create distinct urban spaces, streetscapes, landmarks and vistas. Building scales and heights along both sides of these avenues may be kept as low as the density permits to shield internal high-rise buildings from excessive traffic noise and in turn they are buffered by landscape and plantings. The inter-mixing of low and high buildings will also create more intimate and varied spaces within the high-rise high-density environment. Major approaches to this new town and at important intersections such as the junctions between Tampines Avenue 10 / Tampines Expressway, Tampines Avenue 10 / Island Expressway, and Island Expressway / Tampines Expressway should be reserved for either special residential buildings or non-residential landmarks.

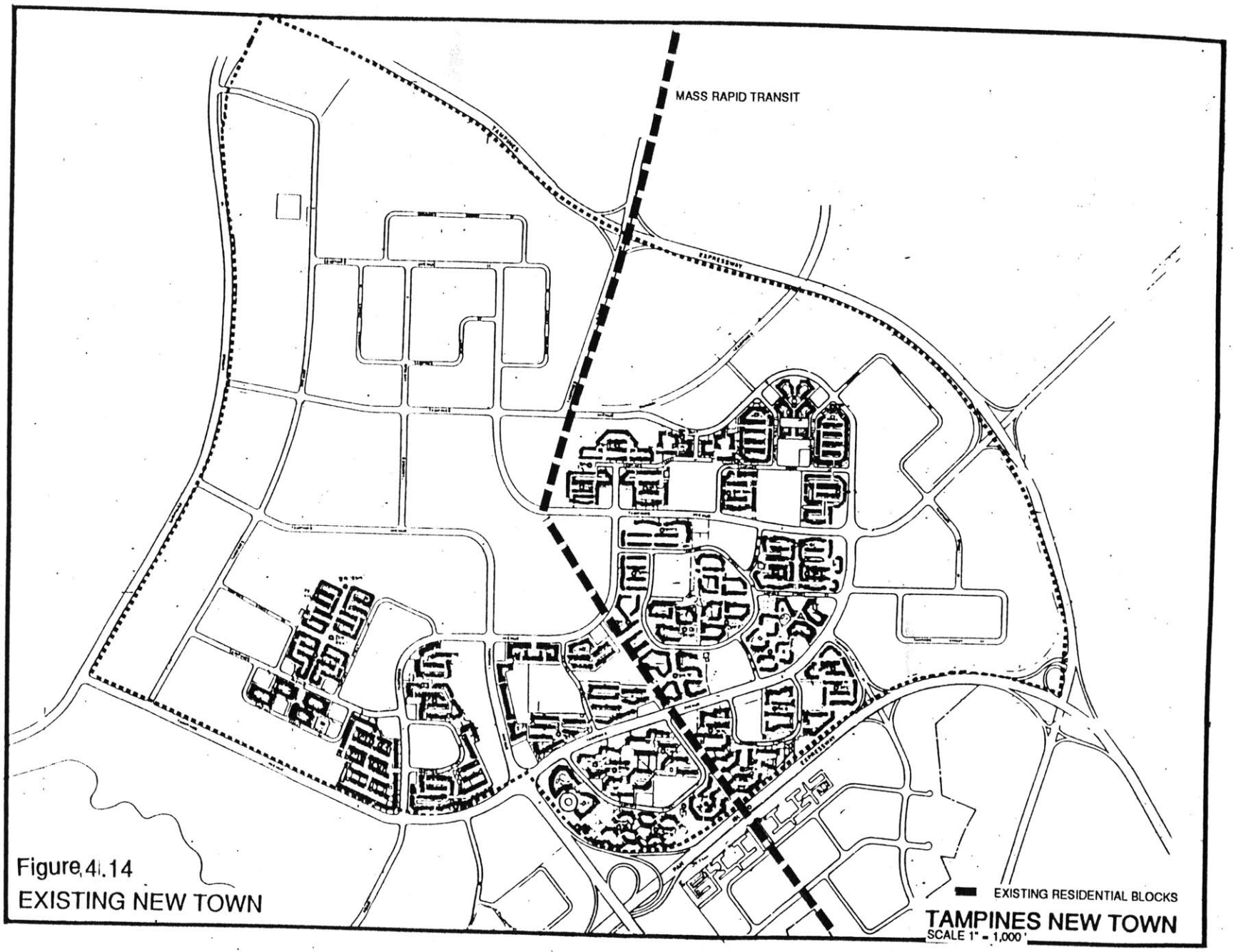


Figure 4.14
EXISTING NEW TOWN

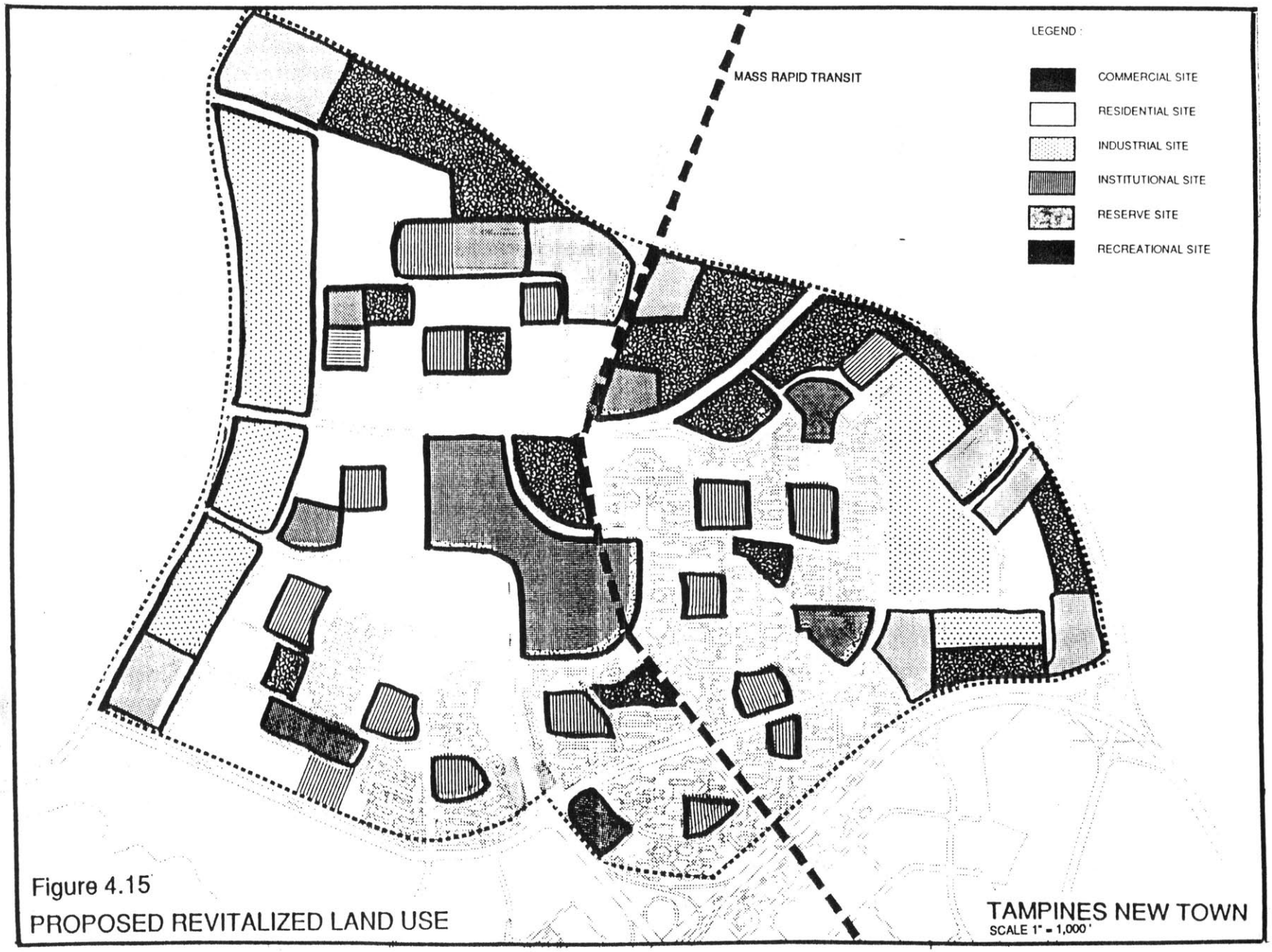
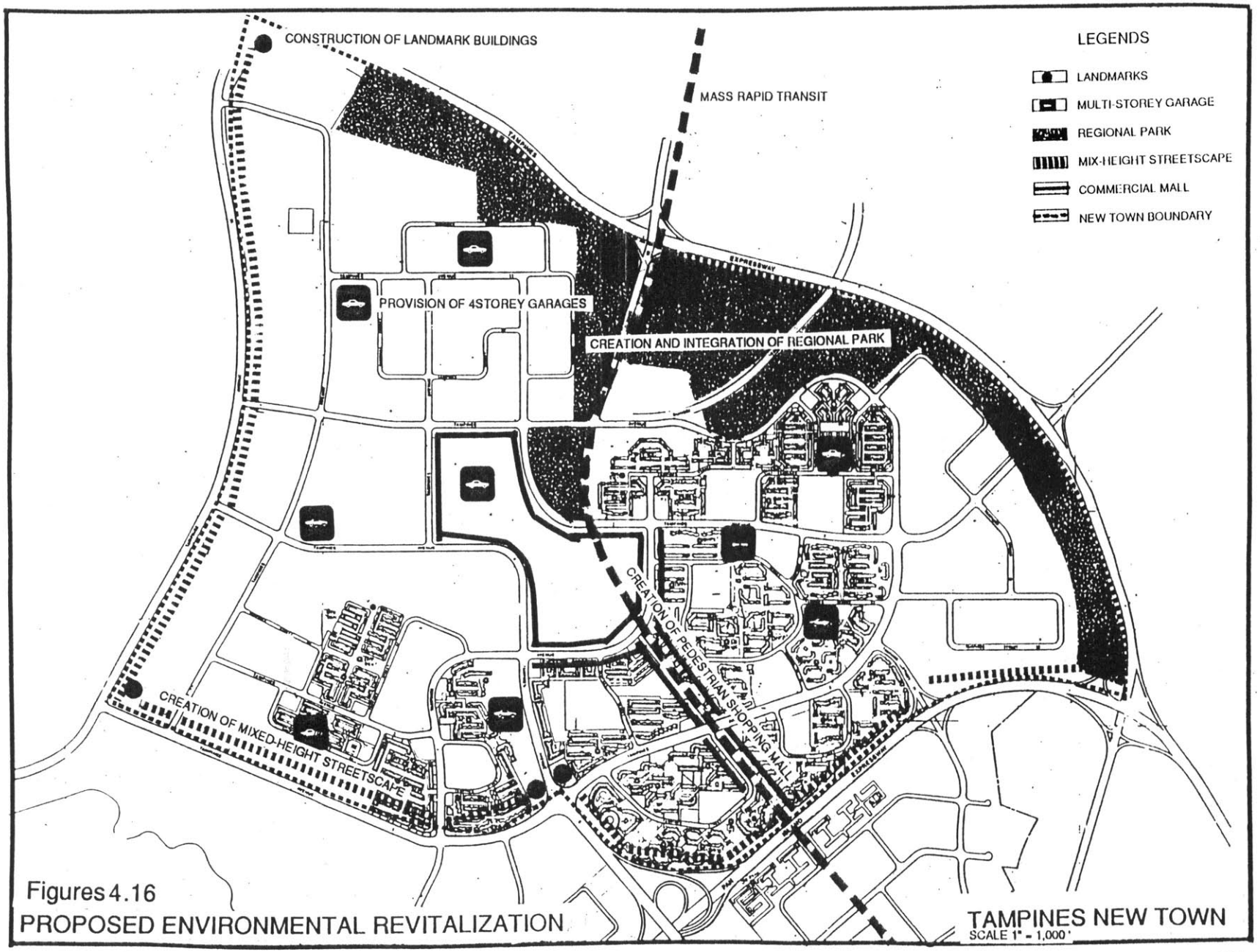


Figure 4.15
PROPOSED REVITALIZED LAND USE



Figures 4.16
PROPOSED ENVIRONMENTAL REVITALIZATION

CHAPTER FIVE - CONCLUSION

The Singapore New Town experience has provided a good reference for the study of public housing in both the developing and the developed countries. The achievements of its public housing and new town development program could be attributed to the government strong support, the HDB unique planning and delivery system and the corresponding economic progress that raised the income and standards of living throughout the population of the entire nation. The development of its own brand of new town and public housing appeared to have served the country well. However, there have been areas of dissatisfaction too. Most of them have been raised in this dissertation. The HDB's past endeavour to meet the massive scale and urgent housing demands had left many of these areas of concerns unattended. Its basic approach to the problem seemed to have been dictated by liberal doses of pragmatics and intuition and not based on a sound thorough study. Pragmatic approach on timely actions based on intuition would lead to problems which will surface in the years to come. The task ahead for the HDB is therefore to better understand and search for the appropriate answers for the future of its new towns. While it has in the past developed a creditable reputation in developing new towns, it now needs to concentrate more in the qualitative non-material issues of a sociological dimension. As the growth of new town development slows down, the constant haste to meet demand at the expense of quality planning would no longer be so pressing. All constructive feedbacks and criticisms should be carefully sieved for good ideas. An appropriate approach based on intuitive understanding of indigenous physical, social, cultural, economical and political implications will help to tailor an useful comprehensive new town revitalization policies for Singapore. Such a policy should be redirected towards continuously upgrading the quality of the new town environment, from the upgrading of facilities to the refinement of the new town models; and from improving services to providing more facilities in the new town environment.

Broadly, there are three alternatives that Singapore can choose for its new town revitalization. The government can decide to continue providing direct goods and services ; or it can induce the private sector to provide goods and services; or it could coproduce goods and services with the active involvement of the citizen groups and the private sector. Consider the advantages and disadvantages of each alternative. The present entire direct supply of goods and services by the government puts heavy burden on the government, and will soon reach its limits of manpower and resources. The inducement strategy for full private sector involvement may be less costly, but it requires a more active and competent private sector than is present in Singapore. The coproduce alternative saves some financial and implementation burden for the government, but it requires both the active cooperation of the citizen and the private sector and also a flexible policy on the part of the government to grant a significant role to the public. It seems that he coproduce strategy deserves more attention than it often receives in Singapore, particularly its implications for new town revitalization process. The government can stimulate the public to increase its share by providing the public with financial access and technical expertise, and let the supply

and demand of services and goods determined by the market forces.

In the past twenty-eight years, there has been slow and insignificant process of upgrading the physical environment of the existing new towns to respond to the changing socio-economic needs of the residents. The HDB has been in the past continuously expanding the scope and volume of its new construction work to meet the demand for more public housing. As eighty-five per cent of the total population has now already been housed in public housing, the HDB should now concentrate its efforts to deal more effectively in upgrading the quality of its existing new town environment to reduce the perception gaps between new towns built under different phases of development. It is also vital for the HDB to consider prolonging the life of the buildings and facilities and improving the functional needs and visual qualities of its new towns. Issues and means to revitalize these new towns have been discussed by the author in details in this dissertation. As to the tasks ahead, Singapore will soon have to recognize its need for new town revitalization. The Housing and Development Board should accept the ramifications of the shift from its role as a developer of public housing to that of a developer cum manager of existing new towns, and conscientiously strives to improve the various aspects of its past works and to explore the opportunities for future improvements. It will however take some time to complete the process of upgrading or revitalizing existing new towns with old dwelling units and facilities unsuitable by present-day standards and to inject improved or new dwelling units and facilities at suitable locations so that planning and design opportunities of each new town could be continuously optimized.

This conclusion should not close without a brief reference to major lessons learnt and future tasks ahead. The first lessons concerns the key issues for the implementation of a new town revitalization action. The government continuing political and financial support, the HDB efficient delivery systems, a good revitalization policy and plan, a timely program, and the community supports and drives towards a successful revitalization action are key ingredients to the success of any revitalization action; Secondly, the emphasis on timely actions based on comprehensive planning should be stressed. A sensible timely action is often easier and cheaper to execute than a delayed action. In an unique political and bureaucratic delivery system in Singapore, central statutory planning plays an important role in implementing a successful timely revitalization program. New town development is a demanding and an engrossing challenge to any organization; it is more so in developing countries like Singapore with large population size, rapid economic growth, very small development areas with exceptionally high density. Singapore has demonstrated well the challenges of the first twenty-eight years of new town developments. It is hoped that the future years ahead will see greater achievements in new town developments.

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FOOTNOTES:

1.The building of new town in Singapore to decongest the inner city areas was first conceptualized in the Master Plan (MP) prepared by the Housing Committee of the Singapore Improvement Trust in 1948, and was improved in the 1960s by the Housing and Development Board of Singapore under the guidance of a new indicative plan, called the Concept Plan (CP).

2. The Housing and Development Board (HDB), established on 1 Februaty 1960 by the Housing and Development Act Chapter 271, is a Statutory Board under the portfolio of the Minister for National Development. It is resposible for the design ,implementation and maintenance of all public housing in Singapore.

3. Singapore has a gross new town density of slightly over 2,500 persons per sq. kilometer(HDB's figure),Korea over 3,000 persons per sq. km(Korea National Housing Corporation's figure); Hong Kong over 4,000 persons per sq. km (Hong Kong Housing Authority data)and Japan over 2,000 persons per sq. km.(Ministry of Construction's figure)

4.The Housing and Development Board of Singapore introduced a new town model in the earl1960s. This model has subsequently been improved and used as the basic conceptual structure for new town development in Singapore. See Chapter Three for more details on this new town model.

5.See Chapter Threefold more details on flat designs.

6. HDB Annual Report 1986.

7.Singapore has a population of 2.6 million in 1987 represents a 56 per cent growth over the population of 1.6 million in 1959 when Singapore attained self-government. Of these, about 82 percent (2.1 million) live in HDB flats in 1987 as compared to about 9% (0.1 million) in 1959. (HDB's data)

8.The waiting time for flats has improved from more than 5 years in 1960 to 11/2 year in 1986.(HDB Computer Dept. statistics.

9.Average Household size (persons) has reduced from more than 7 persons in 1960 to 4 persons in 1987. (HDB Computer Dept. statistics

10.The traditional extended 3 generation family unit consists of grandparents, parents and children living under one roof.

11.A nuclear family is initially defined by the HDB as married couple with children and was subsequently revised in August 1967 to include married couple without children. This definition forms one of the basis for the eligibility of public housing in Singapore

12.HDB's statistics 1987.

13.HDB's statistics.

14.Economic Survey of Singapore 1960-1987

15.Report Of The Economic Committee , Feb. 1986, Ministry of Trade & Industry Singapore.

16.HDB carries out Repairs and Redecoration works for its estates in a 5-year cycle.

17.This program is to reclaim lands for new flats and facilities.

18.HDB Annual Report 1985/86

19.The report of the Housing Committee set up in 1947 to study the housing situation in Singapore revealed that out of a population of 938,000 persons, 680,000 or 72 per cent were housed within Central Area of about 1,000 acres with densities up to 1,000 or more to the acre.

20.See Chapter Two on plans and details of early block designs.

21.Economic Survey of Singapore, 1960s, Ministry of Finance.

22.Public sector divestment report March 1987.

23.HDB annual reports 1977 to 1985.

24.The Central Area in Singapore, covers about 688 hectares (1,700 acres ,excluding the recent reclaimed Marinal South), is or 1.2 per cent of the total land area of the island and is located approximately 1.6 and 2.4 kilometres (1 and 11/2 miles) north and south of the Singapore River respectively.

25. The early new town structure consists of 200,000 inhabitants and is made up of five or six neighborhoods each covers an area of 40 hectares with a neighborhood center and 4,000 to 6,000 dwelling units .
26. With the assistance of the United Nations Development Program, a Concept Plan was formulated in 1967 to provide a lon-range land-use plan, with a transport plan as an integral component. This plan identified a ring-cum-linear pattern of development with an integrate system of expressways and mass rapid transit arranged in an inverted 'T' network on the island.
27. The precinct Concept further divides each neighborhood to several precincts of 400 to 800 dwelling units, each with its precinct center to help foster community development.
28. These six new towns are : Yishun,Hougang,Jurong East and West, Tampines and Bukit Batok.
29. In 1981/82, the HDB introduced industrialised methods of construction to speed up its housing construction, to reduce construction cost and to improve productivity and quality of workmanship. Six contracts were awarded for a total of 65,000 units of 3-room and 4-room flats spread over a period of six to seven years.
30. These are the names coined by the HDB for all of its different type of flats.
31. The Singapore Improvement Trust was established in 1927 to provide for the improvement of the Town and Island of Singapore. It was replaced by the Housing and Development Board in 1960.
32.The heights of the building blocks varies from 4-storey to 25-storey with majority maintain at 12 storey, while the length of each block ranged from a point block of 24 meters to a long slab block of 150 meters with majority maintain at around 100 meters.
33. All HDB commercial facilities are for rental only.
34 .This is a prerequisite of tender for commercial property.
35. HDB does not have business consultant advice on its commercial properties.
36. Light Industries refer to pollution free industries.
37. Although no other detail survey on industrial facilities was conducted after 1972, all other subsequent industrial premises built in the HDB new town are similar for small-size operation of less than 100 workers.
38. HDB Annual Report 1985/86.
39. The Pan-Island Expressway is an expressway linking east and west sectors of Singapore Island.
40. The Central Expressway is an expressway linking the north sector to the city center.
41 .HDB's statistics 1984
42. HDB annual report 1984/85
43. The average life span of lifts is less than 30 years.
44. HDB's 1984 tender figure for the addition of 1 lift each for its 280 blocks of emergency flats.
45. They were made of lead, cast iron and unlined galvanized steed.
46. It is the HDB's policy to repair and replace only items within the common property.
47.HDB Annual Reports 1960 to 1987.
48.HDB Annual Report 1986/87.
49. HDB projected building programs.
50. HDB carries out Repairs and Redecoration Works for its estates in a 5-year cycle.
51. HDB Annual Report 1985/86.
52;.About half of the Singapore Island is for water catchment and military installation.
53.The remaining buildable urbanized area are located within the commercial City Center.
54.Singapore government statistics.
55.This is based on the government statistics on the percentage of very low income population in Singapore.

APPENDIX 1 POLICIES ON COMMERCIAL AND INDUSTRIAL PROPERTIES

In addition to residential properties, the HDB is also responsible for more than 22,000 units of commercial and industrial properties, comprising about 13,000 shop units, 1,000 office units and 8,000 industrial units.

Unlike public housing where there is a Home Ownership Scheme, there is no equivalent where an applicant can purchase a shop or office space or a market stall. All HDB commercial properties and most HDB industrial properties are only available on monthly tenancies, the exception being vacant industrial land which may be offered on leases of up to 99 years.

To the uninitiated, it may appear that tenants of such properties would not have security of tenure. Normally, however, the HDB would not revoke the tenancy unless the tenant has committed a serious infringement of the covenant.

Eligibility

The eligibility rules and allocation policies for these commercial and industrial properties are quite different from those for residential properties. Any person above the age of 21, regardless of his nationality, is eligible to rent HDB commercial and industrial properties. The reason is that these HDB properties, unlike public housing, are not subsidized by the government.

Allocation

The mode of allocation for shops and office space has not changed significantly since the days of the Singapore Improvement Trust. At that time, applications were invited through advertisements in the press and applicants submitting tenders above the minimum rent assessed and fixed by the valuer from the Trust would be considered. This system of public tender is still in use today.

Generally, the public tender system can be considered a fair system of allocation as it allows the free interaction of the market forces of demand and supply. The first-come-first-served system which requires the fixing of rental rates is not feasible in this case because there is no equitable way of determining a schedule of rents that would apply consistently to all shops and offices of varying design, orientation and location throughout Singapore.

An exception to the tender system occurs where shops have been left vacant for a long period. The Shops Committee, the authority in the HDB that approves shops allocation, may at its discretion let out such shops at fixed rents without calling for tenders. This usually happens to shop units which are in poor locations and hence have a very low demand. Such premises can be offered to applicants on a first-come-first-served basis without any complications.

The general mode of allocation for industrial premises does not differ much from commercial properties though slight variations are applicable to different types of industrial premises.

Terrace workshops are allocated through a public tender system while prototype factories and flatted factories are allocated on a first-come-first-served basis. In the case of industrial shops, the first-storey units are let out through public tender while those on the second-storey upwards are currently allocated at fixed rental on a first-come-first-served basis. This modification is possible because the units are standardized and upper storey units are less sensitive to locational factors. All these premises are usually let out on monthly tenancies.

In contrast, vacant industrial land is usually offered on leases of 30 or 60 years. As industrialists who build their own factory premises are expected to inject a considerable amount of money into a project, long-term leases provide them with greater security of tenure. Generally, industrial land is allocated to the public through tender or application.

Apart from the provision of commercial and industrial facilities, the HDB also provides facilities for special services and uses. Examples are the Waterloo Complex which is purposely built for the trading and service of spare parts, Pasir Panjang Wholesale Centre, which caters for the sale of fresh vegetables, fruits and dried foodstuffs, and Bras Basah Shopping Complex. Allocation of such special facilities is generally in line with the HDB policies for commercial shops and industrial premises.

The HDB also takes upon itself the additional task of providing premises for use by non-profit making organisations and other public bodies. Since 1973, HDB has contributed to the community in the form of providing shops, void decks and vacant sites for such organisations to run their community services at concessional rents. Common users of such spaces include community centres and sub-centres, education centres, branch libraries, youth clubs, residents' committee centres, homes for the aged and police posts. Such spaces are allocated to applicants on a case-by-case basis, according to guidelines.

One form of commercial space that is not allocated by the HDB is stalls in market and food centres in HDB estates. These are governed by

the Hawkers Co-ordinating & Licensing Committee which is chaired by the Parliamentary Secretary, Ministry of the Environment, together with representatives from statutory bodies such as Jurong Town Corporation, Port of Singapore Authority and Housing & Development Board itself. Those eligible for allocation include small-time traders and marginal farmers affected by government clearance schemes, licensed street hawkers and those proven hardship cases which require assistance. Public applicants are generally not entertained unless there are available vacant hawker stalls not taken up by those mentioned earlier and also provided the applicant is a citizen between the age of 35 and 60 without any gainful employment. These relatively stringent rules are necessary because market hawker stalls in housing estates are primarily reserved to assist those hardship cases who cannot obtain other means of gainful employment for subsistence.

Change of Trade/Mode of Business and Subletting

Generally, requests from shop tenants to introduce an additional trade to their approved trade are permitted provided the additional trade is compatible with the existing approved trade, e.g., ladies' hairdressing and men's hairstyling. Prior consent, however, must be obtained from HDB and the terms and conditions of the tenancy including rent would remain unchanged.

However, with the emergence of new market trends and demand for new services, it was recognised that restrictive tenancy conditions would only stifle the upgrading and expansion of operations into more viable businesses. Thus, in September 1984, HDB further relaxed its controls on shop tenancy to permit more liberal changes of trade without rent review provided such change does not contravene existing health regulations or other standing provisions. In addition, assignment of the shop premises by the registered tenant to another party will no longer be subject to an increase of rent to 130 per cent of the prevailing market rate. Rents in such cases would only be adjusted to the prevailing market rate. This relaxation of the rules points to the HDB's efforts to respond to changing trends and needs of the economy.

Nevertheless, restrictions on change of trade continue to be enforced on a small number of premises which are designed for specific trades. For example, shops set aside for specific trades such as sale of books, or shops specifically designed for certain uses, such as emporiums/supermarkets and eating houses. To allow for change of trade in these cases would defeat the purpose of specifying the trade or specifically designing such units. Neither will change of trade be allowed if the new trades are considered unsuitable or obnoxious as in the case of coffin shops, sale of charcoal or wholesale trading in dried fish and spices.

As part of the overall policy to relax controls, changes in mode of business, say from sole proprietorship to partnership, are also granted without adjustment to the existing rent if the original tenant retains 51 per cent or more of the shareholding in the business. However, if the original tenant retains less than such percentage of shares, the existing rent will only be revised to the prevailing market rate, instead of 130 per cent of this as required in the previous policy. This is indicative of the HDB's willingness to encourage the injection of capital investment of business ventures provided they do not amount to an assignment of interest from the original tenant to new parties.

Subletting when permitted is also made easier — large emporiums and supermarkets are allowed to sublet a maximum of 35 per cent of the trading area as compared to the previous 20 per cent. Eating houses and canteens are also permitted to sublet up to the maximum area prescribed by the Ministry of the Environment. The rationale is to encourage the maximization of scarce shop space in housing estates.

Broadly, the same policies on the change of trade, mode of business and subletting apply to industrial premises. The HDB's policies on commercial and industrial properties differ substantially from those governing public housing. Housing is seen as a basic need and right of Singaporeans. Thus, the eligibility and allocation rules for residential units are all designed to ensure that the majority of Singaporeans who are genuinely in need of housing will be allocated a flat on a first-come-first-served basis, at subsidized rates, within a reasonable waiting period. Shops and factories, on the other hand, are supporting facilities which also give entrepreneurs a chance to make money. Therefore, the HDB tries as far as possible to allow free market forces to reign in determining allocations, rentals, trade mix and mode of operation. They do however have to ensure that environmental standards are kept and special uses beneficial to the community are given assistance in obtaining premises.