Housing, once a personal everyday activity, was carried out by individuals, families and communities. However, now that housing has been identified as a component in physical planning, considered an “industry” and become a political issue, it has come within the realm of the specialist: the architect, planner, sociologist and the economist. The basic act of creating shelter is now a complex development question.

Many governments in developing countries have attempted to solve the “housing problem” — usually as an exercise in numbers — and the important aspects of identity and community have only recently come to the forefront; and tackling these is an even more difficult task. An integration of official actions and of the real needs and aspirations of the people who are to live in the houses is necessary. In this issue’s theme we look at three examples of relatively successful attempts at this process of integration.

In Singapore we present, within a governmental institutionalized framework, a programme which houses 70% of the population — a situation unprecedented anywhere in the world. In West Africa a private group attempts to involve the very poor in building projects, in order to house people, where there is little bureaucratic or other organisational infrastructure. And lastly, a highly defined and sophisticated architect-designed housing complex in Delhi, which considers community and housing uses symbols from India’s past.

All these attempts illustrate very different ways toward new architectures and identity in the transformations of housing into community.

Editors.
Public Housing and Community Development

The Singapore Experience

Acute overcrowding in dilapidated slums; appalling conditions of squatter settlement; bedding on wooden bunks or in rented cubicles; high rate or urbanisation; grossly inadequate housing delivery system; rapid deterioration in available space standards; crime, violence and drugs: these phenomena aptly described living conditions of the urban poor in Singapore during 1950's, and they are still common conditions of the urban poor in most third world countries.

In major urban centres, the provision of public housing or at least adequate shelter is an essential service for the community. The effectiveness of the housing programme must be assessed on the basis of who pays and who benefits. Too often, public housing projects in third world urban centres are built as political showpieces and are highly subsidised by the tax-payers, or they are occupied by middle-income families and select privileged groups. These isolated showpieces are socially meaningless to the urban poor and the community, though they often get some unwarranted publicity in journals and conferences for the designers and their governments. These showpieces are beyond the financial and technical resources of most third world countries. The cruel fact is that most countries in the less advanced stage of economic development can provide little more than very basic shelters for the majority of their urban population.

The Singapore experience in Public Housing may be unique in Asia but it provides an important case study and example for rapidly urbanising countries.

Public housing in Singapore may be said to date back to the formation of the Singapore Improvement Trust (SIT) in 1927 under the British colonial government. "By then, many houses in the urban centres were in a state of decline. Shop-houses were already being let and sublet, rooms partitioned and re-partitioned until they become mere bunks — space enough for a man to lie down... But SIT was much less a housing authority than a municipal body; its work was confined largely to constructing and widening roads and creation of open spaces."

In the post-war years, SIT enlarged its scope of work and many enthusiastic young expatriate professional staff were recruited. SIT produced the first comprehensive Master Plan for Singapore in 1955. By 1959, the agency constructed 23,079 housing units, including 2,530 units completed before the War, to accommodate about 9% of the population. Space standards and density were generally similar to urban public housing development projects in the United Kingdom. Notwithstanding considerable subsidies, the rentals of the housing units were high and were well-beyond the financial capability of the average working class family in Singapore.

The decade after 1947 saw the population leap from 940,700 to 1.7 million. Housing in the central area consisting mainly of 2 or 3-storey terrace-type shophouses deteriorated rapidly. In many instances, the residential density exceeded 2,000 persons per hectare. By 1959, more than a third of the population were living in over-crowded

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shop-houses in the central area or in dismal shack on the city fringes.1


Ang Mo Kio New Town was begun in 1973, covers 730 hectares and has 49,500 housing units. National Development. The HDB had wide powers to construct and re-develop, to clear slums and resettle people and to manage new housing estates. At the time, the administrative and professional experience and capability of the housing authority was very limited, especially after the abrupt exodus of the colonial expatriates. However, aware of the appalling living conditions of the urban poor, the government launched a very ambitious five-year housing programme. Initially, flat units were small and their design and layouts were dull and unimaginative. They were built on the maximum density permissible by practical constraints on the limited supply of cleared land. Contractual procedure was streamlined, and construction cost was kept low. In the process, the HDB was able to fulfil its projected construction target and delivered large numbers of reasonably priced housing units to the public at affordable price in Singapore. By the end of the sixties, living conditions of the urban poor at last began to show visible signs of improvement.

Singapore became an independent state in 1965. The political leadership initiated various actions to establish a favourable investment climate and to generate economic growth. Immigration was strictly controlled and serious efforts were made to lower the high birth rate. Industry and tourism were encouraged. The necessity to acquire land at affordable cost was accepted as an absolute pre-requisite for effective long-term development programmes. Tough legislations were introduced to acquire land and properties for public purpose. At the time, this land acquisition policy became the subject of much criticism. In the process of land acquisition, the interest of landlords was adversely affected and when slums and squatters were cleared, considerable hardships were created. However, the continued success of delivering large numbers of housing units to the public at affordable price in Singapore is only possible, when large areas of prime land are made available at reasonable cost to the housing authority.

Within a decade, Singapore has successfully changed its economic base from a major trading and administrative out-post of the British Empire to a prime regional centre for banking, trade and commerce. Since the mid-seventies, the government has evolved a development strategy based on the concept of Singapore — the global city. Much emphasis is now given to the development of tele-communication networks, to the rapid introduction of computers and robots, to the restructuring of Singapore's industrial base towards high-skilled technology, and to the upgrading of worker's skill and education.

The rapid economic development and structural changes in the economy have great impact on the values and life-styles of Singaporeans. Job security, higher wages and improvement in education, health and housing have all contributed towards a better quality of life. The quantitative extent of the change can best be indicated by some selective statistics (see Table 1). However, it is much more difficult to identify the changing values and attitudes of young Singaporeans. Traditional values are discarded and family-relationship are modified so rapidly that the government has recently considered it necessary to propagate the importance of traditional ethnics and religious values both in schools and through the mass-media.

The success of the Singapore housing programme is now widely acknowledged. Today, Singapore has a population of 2.47 million, a land area of 618 square kilometres and per capita indigenous income in 1981 of S$8,672 (US$4,189). The public housing
### Table 1 Selective Statistics

<table>
<thead>
<tr>
<th></th>
<th>1960</th>
<th>1970</th>
<th>1980</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (thousand)</td>
<td>1,646.4</td>
<td>2,074.5</td>
<td>2,413.9</td>
</tr>
<tr>
<td>Population growth rate</td>
<td>3.5%</td>
<td>1.7%</td>
<td>1.2%</td>
</tr>
<tr>
<td>*Indigenous GNP (S$M)</td>
<td>not available</td>
<td>4,990</td>
<td>18,108</td>
</tr>
<tr>
<td>*Indigenous GNP growth rate</td>
<td>not available</td>
<td>11.6%</td>
<td>14.2%</td>
</tr>
<tr>
<td>**Per capita indigenous income (S$)</td>
<td>not available</td>
<td>2,405</td>
<td>7,501</td>
</tr>
<tr>
<td>Exchange rate of US$1.00</td>
<td>3.0612</td>
<td>3.0942</td>
<td>2.1412</td>
</tr>
<tr>
<td>Domestic telephone per thousand population</td>
<td>not available</td>
<td>29.64</td>
<td>159.30</td>
</tr>
<tr>
<td>Television per thousand population</td>
<td>Television was first introduced in 1963</td>
<td>76</td>
<td>164</td>
</tr>
<tr>
<td>Average life span</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>not available</td>
<td>65.1</td>
<td>68.9</td>
</tr>
<tr>
<td>Females</td>
<td>not available</td>
<td>70.0</td>
<td>74.2</td>
</tr>
</tbody>
</table>

* The aggregate value of output produced by Singaporeans.
** Indigenous income excludes the foreigners' contribution i.e. income accruing to foreign workers and foreign enterprises which are residents in Singapore.

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After over two decades of experience, the HDB has substantially enlarged its development objectives from a single-minded housing agency providing acceptable living accommodation for the large majority of Singaporeans to the challenge of building a total environment suitable for community development and the continuous improvement in the quality of life.

At the head of the HDB is the Minister of National Development, Mr Teh Cheang
Table 2 New Towns

<table>
<thead>
<tr>
<th>New Town</th>
<th>Year of constrn</th>
<th>Area allocated (ha)</th>
<th>Projected total population</th>
<th>Distance from city centre (km)</th>
<th>Housing units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queenstown</td>
<td>1952</td>
<td>285</td>
<td>140</td>
<td>150,000</td>
<td>5 — 8</td>
</tr>
<tr>
<td>Toa Payoh</td>
<td>1965</td>
<td>325</td>
<td>170</td>
<td>190,000</td>
<td>6 — 8</td>
</tr>
<tr>
<td>Woodlands</td>
<td>1971</td>
<td>1000</td>
<td>330</td>
<td>290,000</td>
<td>22 — 25</td>
</tr>
<tr>
<td>Telok Blangah</td>
<td>1972</td>
<td>365</td>
<td>85</td>
<td>70,000</td>
<td>5 — 7</td>
</tr>
<tr>
<td>Bedok</td>
<td>1973</td>
<td>690</td>
<td>300</td>
<td>237,500</td>
<td>10 — 14</td>
</tr>
<tr>
<td>Ang Mo Kio</td>
<td>1973</td>
<td>730</td>
<td>310</td>
<td>245,000</td>
<td>10 — 14</td>
</tr>
<tr>
<td>Clementi</td>
<td>1974</td>
<td>425</td>
<td>140</td>
<td>122,500</td>
<td>11 — 13</td>
</tr>
<tr>
<td>Yishun</td>
<td>1976</td>
<td>910</td>
<td>243</td>
<td>200,000</td>
<td>19 — 21</td>
</tr>
<tr>
<td>Hougang</td>
<td>1979</td>
<td>500</td>
<td>160</td>
<td>120,000</td>
<td>9 — 13</td>
</tr>
<tr>
<td>Jurong</td>
<td>1979</td>
<td>390</td>
<td>82*</td>
<td>67,000*</td>
<td>14 — 19*</td>
</tr>
<tr>
<td>Tampines</td>
<td>1980</td>
<td>960</td>
<td>350</td>
<td>225,000</td>
<td>14 — 18</td>
</tr>
<tr>
<td>Bukit Batok</td>
<td>1981</td>
<td>750</td>
<td>180</td>
<td>130,000</td>
<td>14 — 17</td>
</tr>
</tbody>
</table>

*Jurong East #Jurong West

Source: Housing & Development Board

Mr. Teh Cheang Wan (left), Minister for National Development, has been involved with the HDB since its inception in 1960, first as Chief Architect and then as its Chief Executive Officer. Mr. Liu Thai-Ker (right), HDB’s present Chief Executive Officer, joined in 1969 after his postgraduate studies at Yale University.

Mr. Teh joined the HDB in 1960 and became its Chief Architect and subsequently its Chief Executive Officer (CEO) for 18 years. He retired from HDB and stood for election in 1978. His dedication and organisational ability enabled him to fulfil the difficult task of the early years. As CEO, he needed and had the political backing of the Government. He also enjoyed the cooperation and support of Mr Howe Yoon Chong, who was then the Permanent Secretary of the Ministry of National Development.

HDB and its subsidiaries has 12,162 employees, including 5,189 daily rated workers.1 The Housing & Development Board today employs 624 professional and academically qualified persons including architects, planners, engineers and other senior and intermediate officers.

The scope of HDB activities include the planning of new towns and town centres as well as the design and construction of offices, shops, industrial buildings and sports facilities, and the provision of parks, playgrounds and community facilities. Considerable emphasis has recently been given to up-grade the physical environment of the older estates. HDB is also involved in the production of basic building material and undertakes large reclamation projects.

Maintenance and estate management services are provided for its 350,000 housing units. Over the years, HDB has also undertaken the design and execution of numerous housing and mixed-use developments all over the island. Recently, it has announced the intention to concentrate its activities within the New Towns and outside the Central area. In the year 1980/81, the total expenditure of HDB constitutes about 5% of Singapore GNP i.e. S$1,061 million with 81% for building, 14% for land and 5% for resettlement.1

The recent in-house social surveys and research and the recent establishment of the organised residents’ committees should provide the much-needed feedback information in formulating decisions for more effective policies in community development. “Being physically close together does not automatically generate community feelings ... Architectural design and planning layout can obstruct, but cannot in themselves produce, social interaction.” wrote Dr Chua Beng-Huat, ex-Head, Social Research Unit, HDB in 1981. He continued to discuss the complex issue of community development: “A community may be said to exist if people living within a geographical location are familiar with each other without invading other’s privacy, are concerned with other’s well-being and stand together. As of 1981 was divided as follows: Admin & Finance 540, Building & Development 2,460, Estates & Land 8,787, Resettlement 346, and Internal Audit 29.

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t is mainly in the new towns that public housing developments take place. Hence, new towns are growing rapidly. At present, six new towns have been substantially completed, and six others are simultaneously under construction. Their sizes range from 25,000 to 50,000 residential units with a population range of 100,000 to 250,000 (see Table 2). Each new town is sub-divided into neighbourhoods of around 4,000 to 6,000 dwelling units housing about 20,000 to 30,000 people. Each neighbourhood has its own centre with local shopping facilities. The centre is usually located within five minutes average walking time from the residential blocks. Because of the small physical size of Singapore, the most distant of the new towns are located only less than 25 km from the Central Business District (CBD). They are sometimes in close physical proximity to each other. Though the new towns are generally self-contained, having their own economic, educational and social supporting infrastructure, they are still closely integrated towns within the framework of the metropolis. This relationship is particularly obvious in relation to: firstly, the importance of public transportation arrangement linking each new town to the CBD, for example the location of bus interchanges and the future Mass Rapid Transit (MRT) stations in the new towns; secondly, the absence of autonomous local administration; and thirdly, the centralised political representation with elected members of parliament similar to all other residential areas in the island state.

The land allocated to each new town is about 600 hectares. Of this, about 40% of the area is reserved for residential purposes (see Table 3). The net residential densities are high — between 110 to 220 units per hectare. The theoretical basis of the new towns and much relevant data is available in two recent articles written by senior staff members of HDB.

Considerable effort is made to incorporate in the new development some low-rise buildings and to keep most buildings between 9-13 storeys high, with the exception of a few point-blocks. New projects will have a higher plot ratio as the result of the construction of larger flats while maintaining the same population density.

There is no short-cut to solving the housing problems. Providing the correct physical environment for community development is a very complicated process. It is necessary to tackle the most urgent problems one step at a time," said HDB’s Chief

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Table 3 Land use for a Typical New Town
for 40,000 Dwelling Units

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Area (hectares)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Town Centre</td>
<td>30</td>
<td>4.5</td>
</tr>
<tr>
<td>Residential</td>
<td>270</td>
<td>41.0</td>
</tr>
<tr>
<td>Schools</td>
<td>65</td>
<td>9.8</td>
</tr>
<tr>
<td>Open Space</td>
<td>25</td>
<td>3.8</td>
</tr>
<tr>
<td>Sports Complex</td>
<td>20</td>
<td>3.0</td>
</tr>
<tr>
<td>Institutions</td>
<td>25</td>
<td>3.8</td>
</tr>
<tr>
<td>Industry</td>
<td>130</td>
<td>19.7</td>
</tr>
<tr>
<td>Roads</td>
<td>80</td>
<td>12.1</td>
</tr>
<tr>
<td>Others</td>
<td>15</td>
<td>2.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>660</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Source: Housing & Development Board

### HDB's approach to Housing

The HDB's basic design criteria are based on three dimensions: social, environmental and visual.

On the social dimension, HDB considers it more important to provide affordable and appropriate housing rather than good architecture. Most buildings are limited to 12-stories which keeps construction costs down and unforeseen lift breakdown manageable. A precinct concept is being introduced with each precinct consisting of 500-1000 housing units grouped around a land-saced square which has communal facilities to encourage social interaction.

On the environmental dimension, the public housing is structured on a hierarchy of communal spaces which HDB describes as a "flow from the courtyard-in-the-sky, to precinct square, to neighbourhood centre, and lastly, to the town centre."

A conscious effort is made to provide more external communal spaces. For example, the placing of 4-storey blocks perpendicular to the roads defines space and also serves as traffic noise barriers for the high-rise buildings: this is now widely used.

A large number of residential slab blocks are used as back-ups for the high-rise density urban environment rather than as design statements in themselves. This is because a large proportion of the HDB's architects are still young and inexperienced and the objective is to constantly and gradually raise the design standard. More important than architectural consistency, is the necessity to provide a sense of growth over time in the new towns. The town and neighborhood centres are not conceived as finite pieces but one with a sense of growth in time with the introduction of a mixture of architecture styles, scales and forms. Within new towns, some plots of strategically located land are deliberately reserved for future infill developments.

### Executive Officer, Mr Liu Thai-Ker

Executive Officer, Mr Liu Thai-Ker. Liu aged 44, joined the HDB in 1969.

I was shown around Bedok New Town, by Mr Loh Choon-Tong, Senior Principal Architect, HDB, aged 34, a graduate in 1973 from the local university. Loh pointed to a blue-tiled building: "This is a swimming pool complex completed last year. It is part of the sports complex which includes a small grand-stand overlooking an olympic-size running track and a football field as well as a large indoor gymnasium to be built later." With considerable pride, he stressed that in each new town centre, there will be a sports complex. In the hot afternoon, the two pools were well-used.

I have mixed feelings about the Bedok New Town Centre. The intimate scale of low-rise buildings, the introduction of pedestrian shopping, the plants and landscape, the informal atmosphere, the roofed wet-market, the food centre, the restaurants and traditional coffee shops and the spaces allocated for informal activities contribute towards a busy and responsive centre for the community. A park is located immediately adjoining the shopping centre. So is the Area Office for residents and the large bus interchange. Like many places of this nature, it lacks focal points and the buildings are not great works of architecture. In contrast, Bukit Merah Town Centre is more urban and the spaces are better defined. The architecture is more controlled and exciting. According to HDB, these town centres have evolved from the Toa Payoh Town Centre built in 1970.

Between 1960 and 1980, HDB constructed 372,158 housing units. Judging from the number of units annually constructed, the Singapore experience is modest compared to larger countries, however, it is a creditable performance in relation to the size of her population and the allocated financial resources. The HDB provides more than 70% of the total housing for the population today. By 1985, this will increase to about 80%. Along with the quantitative improvement, there will also be qualitative improvements in flat design and in the quality of the overall environment (see Table 4).

The process of up-grading HDB housing during the last two decades is only possible with the rapid development of the national economy and the improvement in family income as well as the priority given by the government to the housing programme and improvement of the residential environment. Increasingly, larger units are being constructed (see Table 5).

The smallness of Singapore has necessitated the large scale clearance of slums and squatters to provide land for new development as well as for roads and other supporting services. During this period, 138,800 clearance cases of all kinds have been activated. Without the large housing programme, rapid economic development and full employment, the slum and squatter clearances would have been politically impossible and socially disastrous. At present, about 15% of the population lives in squat-ter areas. It is envisaged that they will nearly
all be resettled in the eighties.1

As the largest construction agency in the country, the HDB is also the biggest consumer of both construction labour and building materials. All the HDB's housing units are designed by their own professional staff. However, the construction work is tendered out competitively to the private sector. Since its inception, the HDB accounts for between one third to one half of the annual investments in construction in the country and will continue to do so in the projected future.

By the mid-seventies, the HDB had sufficient man-power and confidence to produce housing projects in a variety of designs. Production schedules were maintained and construction cost was under control mainly due to the introduction of modular co-ordination and the depressed private construction market. In the process, the standard slab-block image of the early years has been changed. Not all the non-standard projects are architecturally successful. Yet, given the cost and quality constraints, there are many schemes which have achieved a design quality comparable to the better schemes produced by the private sector. However, as in many HDB projects, basically good design concepts somehow fail to realise their full visual and architectural potential particularly on the ground level, because of the lack of care and sensitivity in good detailing and micro-spatial treatment.

Since 1979, Singapore has an unprecedented boom in the construction industry. There was and is an acute shortage of building workers and until recently, basic building materials. Contractors are very busy and construction cost has increased substantially. For the first time in HDB history, the number of flats completed was considerably below its target. Furthermore, the number of applicants greatly increased, as the price of private residential property escalated beyond the financial capability of the upper-middle income group.

To quote Minister Teh "For HDB, the choice is either to pay the higher costs or substantially reduce the building programme. As the majority of Singaporeans rely on HDB to provide them housing, HDB's choice is obvious — it has to pay more."

First, the government decided on a 38% increase in the sale price of flats. There was a heated debate in Parliament on this issue.2 The selling price of a typical 3-room flat of 69 square metres is now $88,100/- in a New Town and $83,900/- in Outer Suburban areas, ie $407/- to $449/- per square metre. However, the increased prices are still only about a quarter of the prices in the private sector.

Second, increasing standardisation of design and the introduction of prefabrication are being applied to some major housing contracts. However, many non-standard design projects still continue. "The reality now is that even if the HDB is prepared to pay high wages, it may not be able to get the required number of workers to build the flats." Consequently, major contracts have been awarded to several well-known international contractors. Local contractors are encouraged to mechanise and to provide better management in order to meet the challenge of the increasingly sophisticated demands of the building industry.

In the process, new design standards and guide-lines have been established after intensive studies and research. Construction cost is now under control and innovative planning ideas have been introduced. In the new generation of new towns, each neighbourhood is further sub-divided into precincts, comprising 500 to 1,000 dwelling units and housing around 2,500 to 5,000 people. To maximise interaction among residents, some deliberate efforts are being made in the new housing blocks to provide "planned spaces that have potential usage for social activities such as the void decks, courtyards-in-the-sky, and other recreational facilities."3

Within the constraints of standardisation, the HDB is now paying more attention to urban design and layout planning. Attempts are made to use open spaces between and around buildings, to juxtapose the three-dimensional relationship, to contrast in scale between the standardised slab-blocks and the lower buildings and selective point-blocks, and to approve the locations and design of planted areas and playgrounds. At present, it is too early to assess their architectural design and environmental implication.

HDB has a excellent record in the maintenance of its buildings and common areas, such as parks, landscaped gardens and playgrounds. The maintenance functions are varied and include (1) day-to-day repairs, (2) emergency repairs and maintenance of essential services, and (3) programmed periodic maintenance and redecoration. It is recognised that good design and specification are fundamental for economic maintenance, and savings at the initial construction stage must not result in subsequent increased maintenance costs.

The up-grading of old estates includes the rewiring of old flats, better insulation of markets and food centres, additional lifts in existing buildings, the installation of anti-crime and automatic rescue devices in lifts, etc. HDB has also started to demolish or substantially modify some of the 1-room unit blocks constructed during the early years. With increasing affluence and higher expectation, these blocks are now considered sub-standard. They are being replaced by new residential development and additional communal facilities such as parks, jogging tracks and playgrounds.

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Any presentation of the Singapore public housing programme is incomplete without some explanation about how the programme is being financed and who are qualified to benefit from it. The HDB development programme is entirely financed from government loans. In recent years, the development loans to HDB approximates 4% to 5% of Gross Domestic Product (GDP) and more than 30% of Government Estimates. This is possible as Singapore has a very high saving rate and the government has healthy reserves. Furthermore, the required percentage of contribution to the Central Provident Fund (CPF) — a compulsory pension fund — has increased substantially over the years. At present, CPF’s contribution is 45% of salary, with 23% from employees and 22% from employers up to a monthly ceiling income of $83,000.00.

Surprisingly, the gross deficit is relatively modest. In the last few years, the deficit ranges from $40 million to $68 million, i.e. 4% to 7% of budgeted capital expenditure. Most of the subsidies are allocated to the small dwelling units which are usually occupied by poorer families.

Since the beginning, government loans for construction properties for rent are repayable over 60 years with interest at 7 3/4% per annum. Loans for constructing flats for sale are repayable over 10 years with interest at 6% per annum. This arrangement is very important to stabilise the financing cost, especially when interest rates are high and fluctuating.

The Singapore government owns over 70% of the land in the island-state and the government is legally empowered to acquire private land at 1973 prices. A critical factor which helps the HDB to keep cost to affordable prices is the availability of large areas of land at a very reasonable cost from the Land Office of the Ministry of Law. It is therefore academic to argue whether the HDB should base its land cost on market prices — thus receiving a hefty subsidy from the government, or whether the HDB should base its land cost on the values agreed with the Land Office for land assigned for public purposes. The important issue is that the HDB presently needs only to pay a relatively small percentage of the Capital Budget for land and resettlement. If land cost is increased and the direct government subsidy remains at the present level, the budget available for construction will be adversely and seriously affected, and
the quality and space-standards of affordable housing will suffer correspondingly.

Only Singapore citizens are eligible for public housing. When the housing programme was first started in 1960, a criteria of a maximum household income of $S1,000.00 was implemented. Progressively, income ceilings have been increased in response to increasing household income and to serving a larger percentage of the population. The present household income ceiling is $S3,500.00 per month. Applicants are assigned flats on a first-come-first-serve basis. Available flats are balloted to ensure there is no favouritism or queue-jumping. An applicant may reject the flat assigned to him. In which instance, he or she will have to wait for the next ballot but is allowed a maximum of two rejections.

In 1964, the HDB initiated the home ownership scheme. Buyers could obtain loans at 6 1/4% repayable over a period of 5 to 20 years. Response was poor, as the scheme was beyond the financial resources of most HDB tenants. From 1968, CPF contributions could be utilised for the initial down payment as well as subsequent instalment payments for HDB housing. To date, 62% of all HDB units are owner-occupied. In September 1982, there are 119,000 applicants on the waiting list and 86% of the applicants registered for the home ownership arrangement.

The present monthly rental expenditure including service and conservancy charges is 10% to 19% of household income. The monthly rental of a typical 3-room flat is $S111.50 (i.e. approx US$50). The corresponding monthly instalment expenditure for those who purchase their units are higher, about 24% to 27% of household income. The monthly instalment payment of a typical 3-room flat is $S166.00. However, in most cases, a considerable portion of the instalment payments is paid from CPF's account. The compulsory savings of the purchasers have therefore been effectively utilised to provide financial stability for the families. These purchases are also good long-term investments against the inevitable inflation of housing cost. Furthermore, owners are more likely than tenants to respond to community activities which will provide better maintenance services, community welfare and living environments. Indeed, the home ownership scheme has been a great success.

No assessment of HDB housing can ignore the central issue of high-rise high-density living, especially in Singapore when high-rise living has become 'a way of life' for the large majority of the population.

The HDB has frequently argued its case for high-rise living on the basis of limited land available in the island-state. The present HDB's housing density is very high and unsuitable for low-rise high-density housing. Another possible reason for such high density development is to keep the apportioned cost of land to each flat unit at an acceptable level.

According to Liu Thai-Ker, the key elements that make high-rise living in Singapore acceptable are that "residents are by and large adaptable to change ... The cooperation and discipline of our people also help keep human conflict and vandalism to a very low level ... The tropical weather in fact makes high-rise living desirable and the open-to-sky courtyard usable." The excel-

Bedok

Top: The public swimming complex for the residents of Bedok New Town is well planned. The architecture is exciting and the scale well considered and appropriate for a public building.

Left: The Bedok stadium is conveniently located adjacent to the swimming complex. Photograph: Richard Ho.

Above: A typical HDB apartment building of the mid-1970's, in Bedok. Photograph: Richard Ho.
Above: The Bukit Merah Town centre has better defined urban spaces than Bedok.
Right: The main staircase of the HDB Area Office in Bukit Merah. Photograph: Richard Ho.

Lent maintenance services are also an important factor, especially services which see to the breakdown of lifts. There are three other major factors: first, the majority of the residents are owners of the flat units; second, the good space-standards averaging about 14 square metres per person together with increasing provisions of supporting facilities, satisfy the various needs of the residents, and third, there is in Singapore little adverse social and class-stigma attached to living in public housing.

Surveys on public housing have shown a high level of satisfaction among residents. The complaints are generally directed to specific issues, such as lack of lifts, vandalism in public areas, noise levels, etc. However, the implied acceptance of high-rise living by Singaporeans should be qualified, as no viable alternative housing has been offered. In the longer term, future improvement of income, changing life styles and higher expectations will need to be taken into consideration.

The new towns and public housing estates with comprehensive supporting facilities will eventually accommodate over 80% of the population. I estimate that they occupy about 15% of total land area, with the nett residential areas occupying about half the land. In the next decade, Singapore's economy will mature and the frantic pace of development will slow-down. The demand for land for new development will also be moderated. A continuous study of land-use allocation on an island-basis is both important and necessary, otherwise, the possibility of allocating more land for public housing and the desirability of low-rise high density housing will continue to remain an academic exercise.1

A more complex problem is the loss of personal identity in relation to the physical environment and the community. It is necessary to have some understanding about the psychological impact of visual images and perception and its relationship to the individual's own value system of a particular cultural environment. In an industrial urban society, environmental identity is crucial to the well-being of the population. When public housing is provided in infilled development or in small numbers, the identity problem is not serious. The relationship of housing to the surrounding environment is generally well-defined, though there can still be the serious problem of environmental identity within the housing estate.

In the sixties, when the housing programme in Singapore was concentrating its efforts to providing minimum housing for the urban poor, the issues of identity and visual quality of the environment were sadly neglected.

In the seventies, the HDB gave more attention to planning the layout of housing estates and the design of housing blocks. This is particularly obvious in the late seventies, when experiments of considerable scale provided a variety of building forms and design solutions. However, only a few projects consciously and successfully contributed towards environmental identity. Many projects became just exercises of architectural form-generation.

The change to prefabrication and standardisation in the eighties has greatly curtailed individual design experiments. At the same time, HDB is now more aware of the need to provide environmental identity as an important ingredient for community development. In design terms, the scope and constraints of prefabrication have to be understood, digested and effectively utilised. The traditional image of prefabricated housing is deadly, dull and boring. When similar housing blocks are repeated many hundreds times, despite minor variations, they become stereotypes. With the first generation of prefabricated contracts awarded, it should now be possible to focus on visual image creation in subsequent projects. This exercise will require innovative design ability and an understanding of the problems and personal commitment.

In the high-rise environment, it is necessary that much more attention is given to the visual image and perception generated on ground level. Spatially exciting plan-layouts deliberate change of scale with low-rise buildings, introduction of well-located

point-blocks, the effective use of tree-planting, landscape and playgrounds are all important inter-related elements. Their careful design treatment can collectively generate more exciting spaces.

In addition, colours should be used more positively. Careful consideration of light and shade in the day and lighting in the night can contribute to better visual impact. The sensitive siting of buildings in relation to each other is important, as this can provide better spaces between buildings. Scales, form, colour and texture of buildings, particularly on the lower floors, can provide a more distinctive identity to their immediate environment.

To achieve a creative environmental identity is a very difficult task. However, it is a vital ingredient for viable community development. To provide adequate housing and the necessary supporting facilities for a large majority of the population is a laudable achievement and the present serious attempts by the HDB to enlarge its scope to include community development is admirable. However, the degree of its success in the future can no longer be measured just in quantitative terms or even by social surveys. Its task is formidable, but the challenge is exciting and can be really worthwhile.
**Tampines**

Left: Layout plan of a typical neighbourhood designed with the precinct concept.

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**Toa Payoh**

Below: Layout plan of Toa Payoh Town Centre, designed in 1965.

Right: The Toa Payoh Town Centre, built in 1970 is the forerunner of today's new centres. The pedestrian shopping mall in the town centre has a 25-storey point-block flat as its focus.

Right, below: Aerial view of Toa Payoh taken in 1975.
Leiji: Rowell Court at Rowell Road is a large infill development surrounded by low-rise mixed use two and three storey shop-houses. The change of scale from the tall point blocks to the 10-storey slab blocks is quite successful, particularly when approached from the older shop-houses.

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Born in 1932, William Lim is a citizen of Singapore. Until recently he was a principal in DP Architects and now practises under William Lim Associates. He is a member of MIMAR's Board of Advisors and has lectured widely and written several books on Housing and Planning.