

ROGER WONG DAH YEE

HIGH DENSITY HOUSING FOR  
HONG KONG, ASIA

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HIGH DENSITY HOUSING  
FOR  
HONG KONG, ASIA

Part 1 of a Terminal Project in Architecture

By

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Submitted to the School of Architecture  
as partial fulfillment of the requirements  
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at

Montana State University

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## THESIS PROPOSAL

To create a better environment for the super high density living.

I am proposing a high density housing development for the middle class families in Hong Kong. The whole project will be under the support of the Housing Authority. The Housing Authority is within the Government Housing Department. They have been financing most of the low income housing projects. What I am merely suggesting is its time to make some improvement on what they have done , to raise the standard of living.

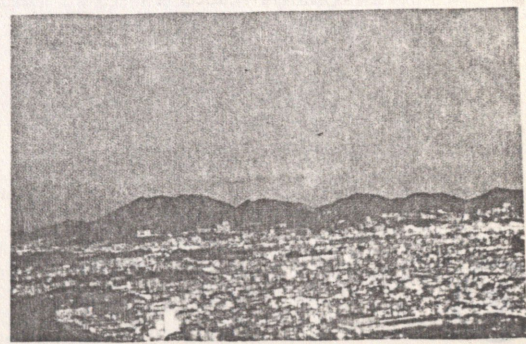
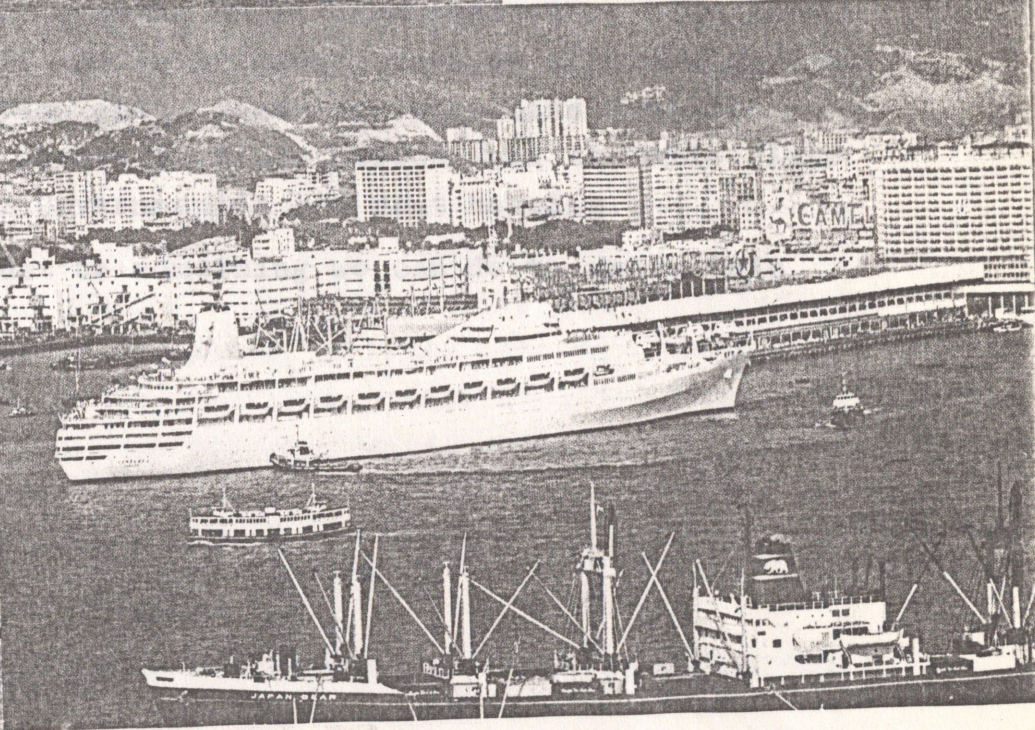
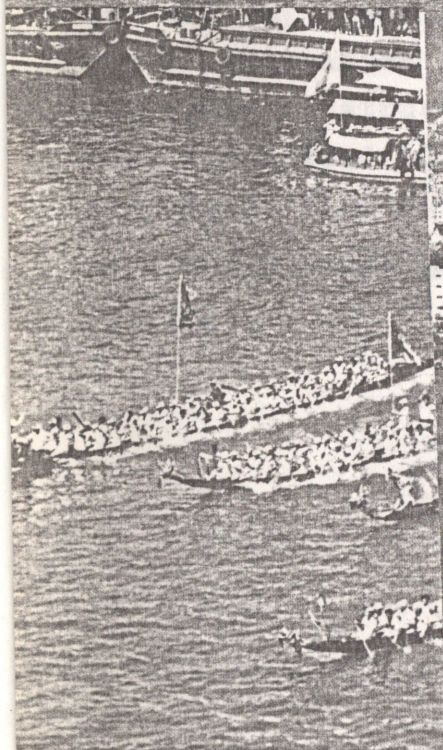




# CONDITIONS

## CREATING

### A NEED





## THE PROBLEM

Lack of houses for any class of families has been a big problem for a long time in Hong Kong. The Government has tried very hard to improve the situation. So far, they are doing a great job in building resettlement area for low-income families, By now, close to 60% of the low-income families have moved in to the buildings which provided adequate outdoor and open space. I think they are actually having a better living environment than most of the mid-income apartments. Most of the mid-income apartment are privately owned. The land owners can use any kinds of site to build highrises. They have hardly any consideration of the environment. Because of the high land value and construction cost, an average mid-class families can only afford 60 square feet per person, and the mid-class are unqualified for Government's low rent housing.

So I think there must be something we can do to solve this problem.

Finance - Government Revenue.

### 2) Government Low Cost Housing

Income Limit - Families with assessed income below HK\$500 a month.

Purpose - Housing for low income families living in overcrowded and substandard accommodation.

Construction and Management - Build by Public Works Department managed by Housing Authority for Government.

Standard - 35 square feet for each adult. Cooking bench and water tap on private balcony, individual lavatories.

Finance - Government Revenue.



## GOVERNMENT AND GOVERNMENT-AIDED HOUSING

Income Limit - Families with assessed income between HK\$400

It can be divided into 4 main categories: \$1,250 for high rent

### 1) Resettlement

Income Limit -- No limit.

Purpose - Resettlement of families displaced from Crown land required for development; families made homeless by the demolition of dangerous buildings, compassionate welfare cases, and certain victims of natural disasters.

Construction and Management - Build by Public Works Department for Resettlement Department. Legal Authority for managing urban estates, factories and cottage areas vested in the Urban Council but day-to-day management delegated to Resettlement Department.

Standard - Mark I & II blocks with communal lavatories and washing places. Mark III blocks provides individual water supplies, private balcony, lavatories shares by two families. Mark IV & V blocks provides individual lavatories, water supplies, private balcony.

Finance - Government Revenue.

### 2) Government Low Cost Housing

Income Limit - Families with assessed income below HK\$500 a month.

Purpose - Housing for low income families living in overcrowded and substandard accommodation.

Construction and Management - Build by Public Works Department managed by Housing Authority for Government.

Standard - 35 square feet for each adult. Cooking bench and water tap on private balcony, individual lavatories.

Finance - Government Revenue.



### 3) Housing Authority

Income Limit - Families with assessed income between HK\$400 and HK\$900 a month (up to HK\$1,250 for high rent units).

Purpose - Housing for families of moderate means living in overcrowded and standard accommodation.

Construction and Management - Build and managed by Housing authority under the Housing Ordinance.

Standard - Self-contained units, 35 square feet for each adult plus kitchen, bathroom and private balcony.

Finance - Government Development Loan Fund plus self-financing from rental returns.

### 4) Housing Society

Income Limit - Families with assessed income up to HK\$1,000 a month (up to HK\$1,250 a month for high rent units).

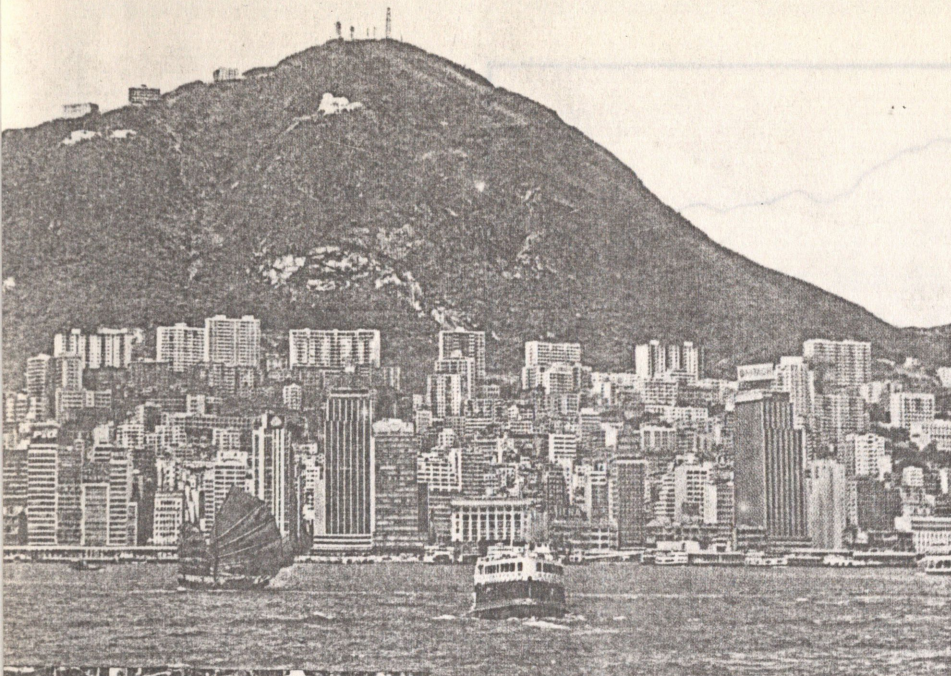
Purpose - Housing on economic basis for persons of small income.

Construction and Management - Build and managed by the Hong Kong Housing Society.

Standard - Varies, but generally as Housing Authority.

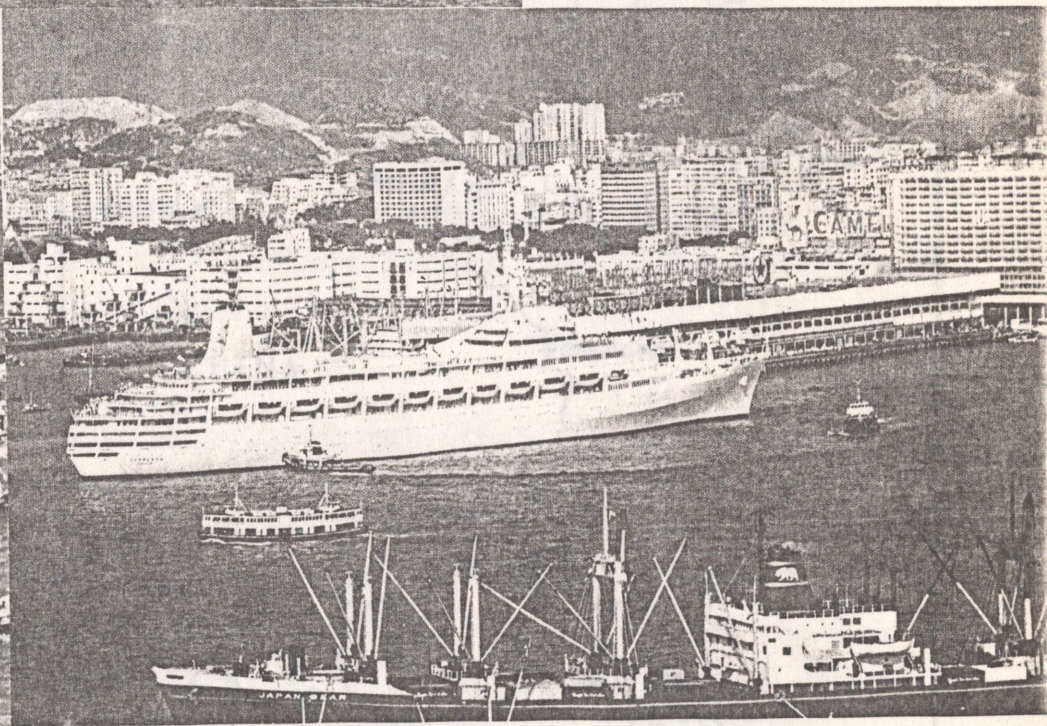
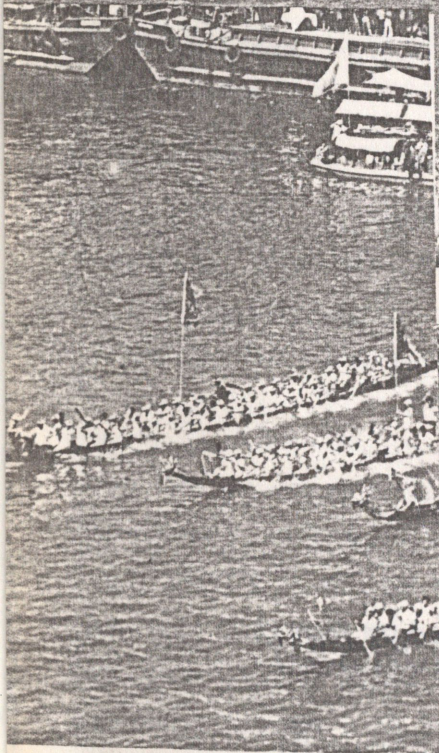
Finance - Government Development Loan Fund plus Self-financing from rental returns.





LOCAL

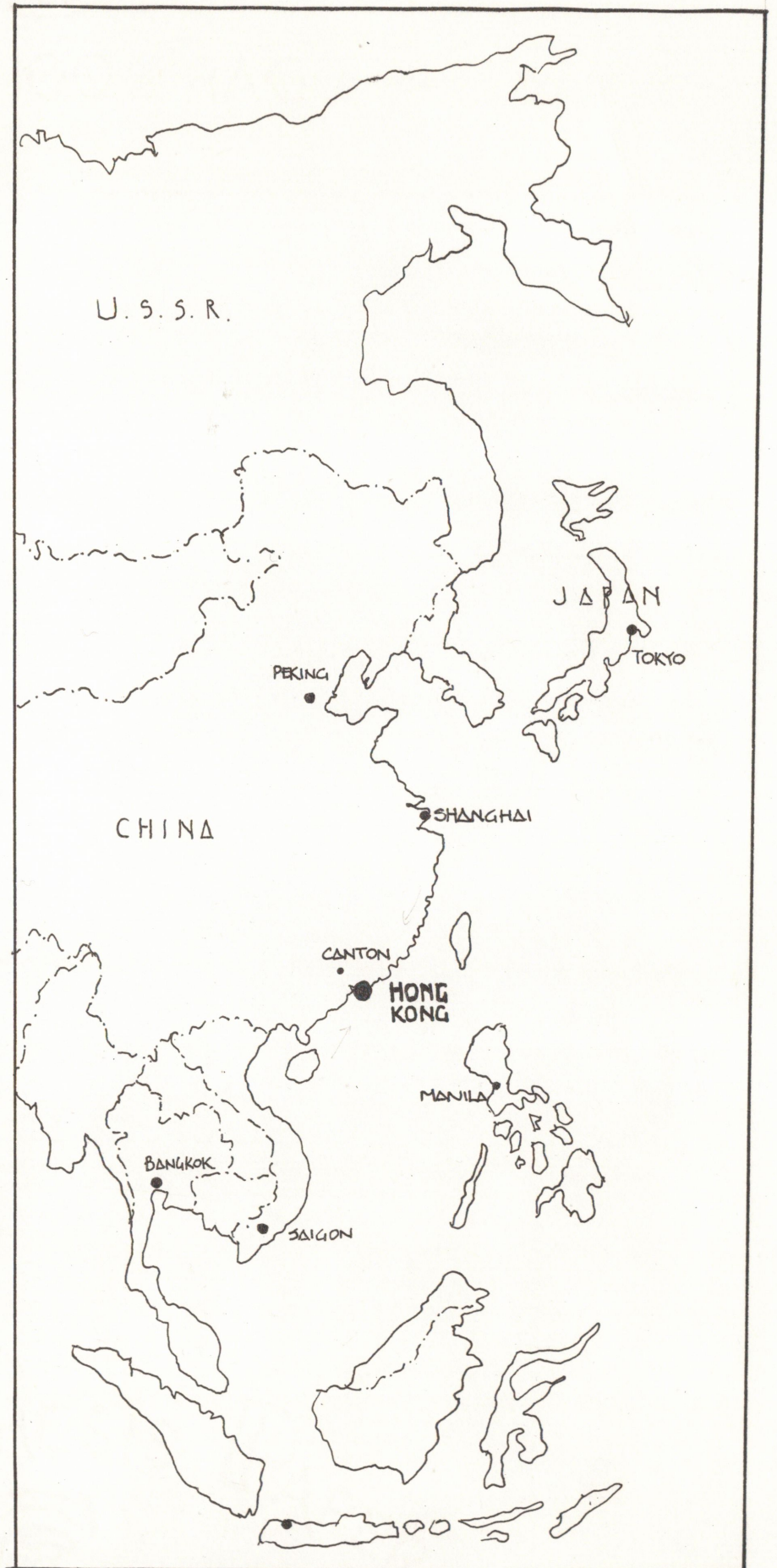
CONDITION





LOCATION  
OF  
HONG KONG

0 200 400 600  
MILES





## LOCATION AND SIZE

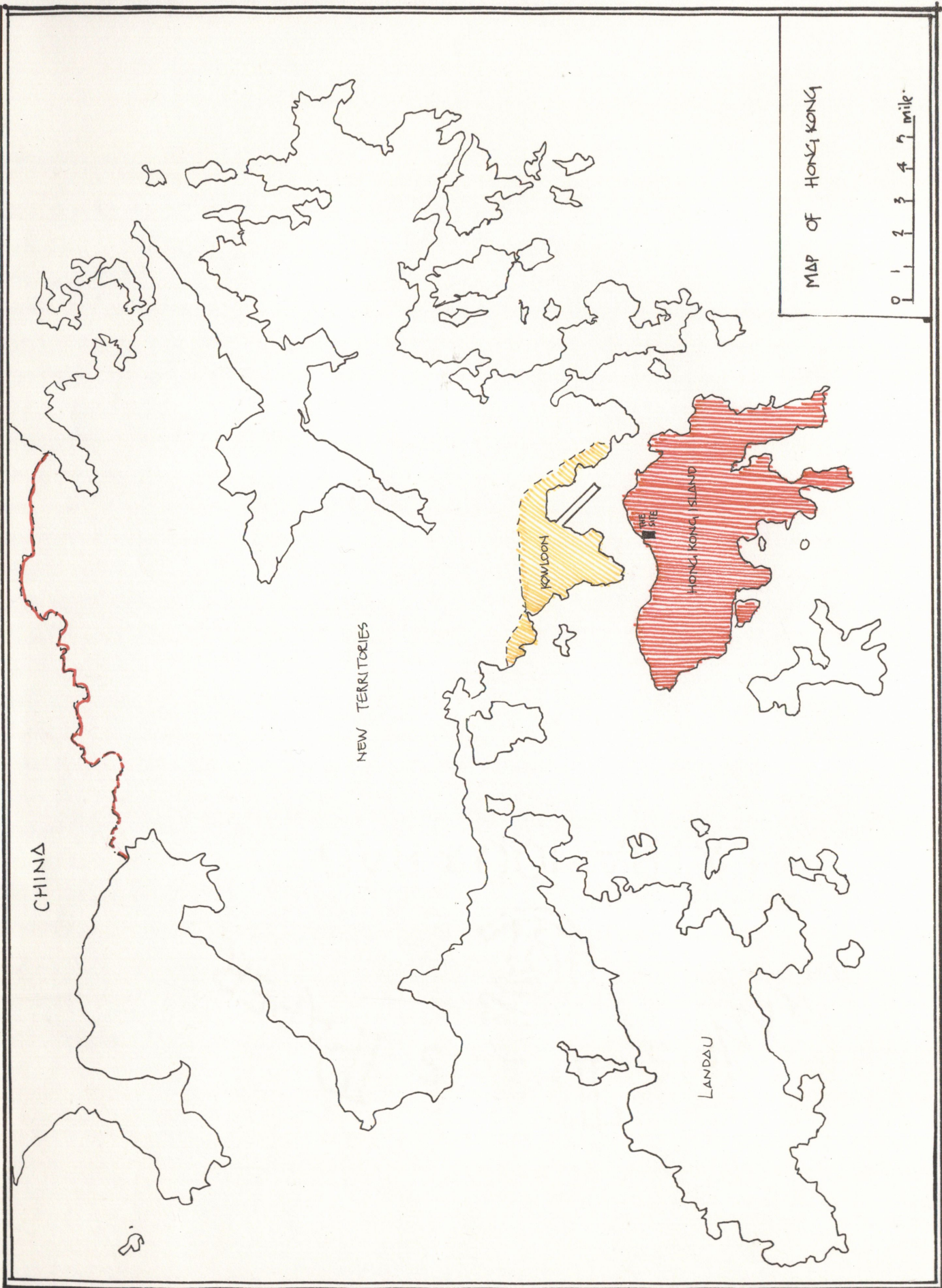
H.K. adjoins the province of Kwangtung and is situated on the southern coast of China. It is close to the Tropic of Cancer and lies between latitudes  $22^{\circ}9'N$  and  $22^{\circ}37'N$  and longitudes  $113^{\circ}52'E$  and  $114^{\circ}30'E$ . Canton is about 90 miles northwest of Kowloon whilst Macau is 40 miles west by sea. Tokyo is 1,787 miles distant by air whilst the most direct air route to San Francisco is 6,940 miles.

The total land area of Hong Kong is  $398\frac{1}{2}$  square miles comprising:

- a) Hong Kong Island and a number of immediately adjoining islands covering 29 square miles altogether;
- b) Kowloon and Stonecutters Island covering  $3\frac{3}{4}$  square miles; and
- c) New Kowloon and the New Territories covering  $365\frac{3}{4}$  square miles. The New territories include Lantau, the largest island in the Colony, and over 200 other islands of which only 35 are inhabited.

There is one thing we should pointed out, that is, the major area in category c) belongs to the Colony of Hong Kong in a temporary basis, it is supposed to be returned to China by the year 1997. Most of the developments are located in Kowloon and the island of Hong Kong instead of scattering evenly through out the whole area of Hong Kong. This is due to the Treaty signed bewteen China and Britain after the Opium War in 1840. Under such situation, Hong Kong has developed into a city with the most concentrated urban area.







DEMOGRAPHIC BACKGROUND

Almost the entire area of Hong Kong is covered by igneous rocks.

The population of Hong Kong fluctuated frequently in the past because of wars and political disturbances in China. In 1901, the population stood at 284,000 persons. It grew steadily until 1938 when there were 1,028,600 persons. Following the Japanese invasion of Kwangtung Province in October 1938, there was a continuous movement of refugees into Hong Kong so that by 1939, the population had reached 1.8 million. During the Japanese occupation, the population decreased rapidly and by 1945 it was down to approximately 600,000. However, due to natural growth and the influx of people back to Hong Kong from China after the Second World War, the population rose rapidly to 1.8 million by 1947. As a result of political upheavals in China, the population was swollen by a further influx of refugees and in April 1950 it stood at 2,360,000. The population was thought to have increased by 150,000 each year between 1950 and 1956 so that by 1956 it was estimated to have been 2.5 million. In 1957 there was another influx of refugees into Hong Kong and in 1961 the Census of that year recorded a resident population of 3,129,648 persons. More refugees came to Hong Kong in large numbers in 1962. Subsequently, the rate of the overall population increase stabilized at about 2-3 % per annum. The 1966 By-Census established that the population of Hong Kong was 3.7 million. The 1972 Census showed the population increased to 4.2 million.

As we all understood, the land of Hong Kong is limited, and this is why Hong Kong has become one of the most populated cities in the world.



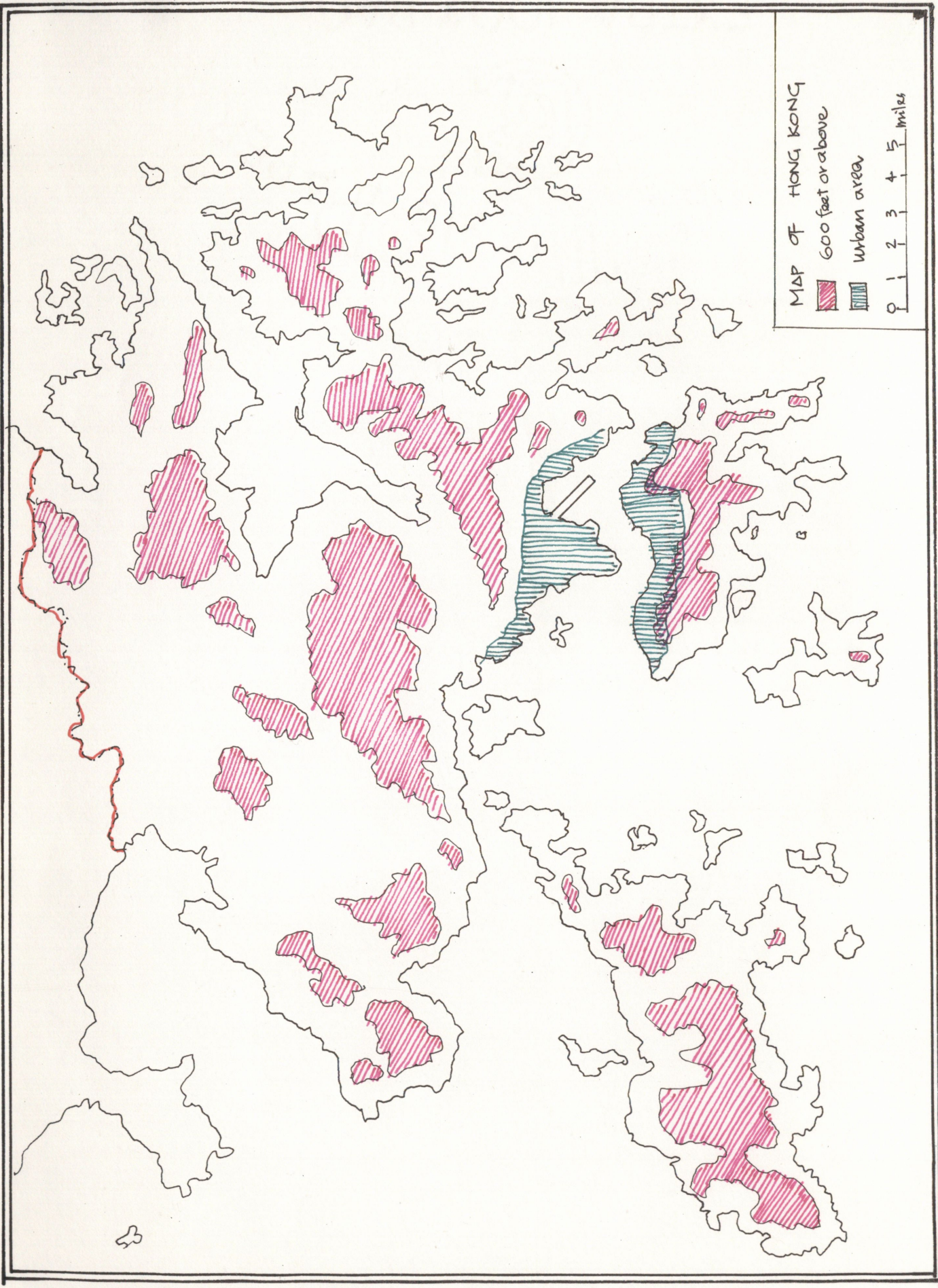
## GEOLOGY

Almost the entire area of Hong Kong is covered by igneous rocks. These rocks are associated with a series of granitic dome intrusions of southeastern China formed during the mountain-building movements of the Jurassic, Laramide and Alpine revolutions. The highest peaks and many prominent hill-ranges are composed of either porphyries or fine-grained volcanics. The lower hills are composed mainly of more coarsely grained granite and granitic rocks.

Sedimentary rocks occur to a relatively limited extent. The largest area comprises the plains in the northern and north-western parts of the New Territories. These plain are composed of alluvial and marine deposits. The other major area of sedimentary rocks is in the northeastern part of the Colony and falls within the Tolo Channel series.

Generally, the soils of Hong Kong are thin in hill-country areas and deep in the valleys and alluvial plains. The deepest soils are found in the plains in the northern parts of the Colony. On the hill slopes, soils may be as thin as two or three inches. The natural residual soils are generally acidic and of low fertility.





MAP OF HONG KONG

600 feet or above

Urban area

0 1 2 3 4 5 miles



## TOPOGRAPHY

Generally, the landscape of Hong Kong is rugged. The highest peaks reaches heights of about 3,000ft. From the uplands and hill ranges, steep slopes descend to the sea and lowland plains. The only extensive flat land is found in the northern and north-western parts of the New Territories. Elsewhere, it occurs mainly in small pockets in inland and coastal valleys.

Hong Kong has a submergent coastline as indicated by the many deeply indented bays, numerous offshore islands, projecting headlands and peninsulas, dismembered streams, and submerged, weathered-rock surfaces overlain by peat deposits. However, the coastline along the western part of the New Territories has been greatly modified by recent alluvial deposits which reach depths of over 100 ft. in many localities. Rejuvenated streams, raised beaches and uplifted wave-cut platforms are found on many places and show that Hong Kong has also undergone emergence.



## THE HONG KONG ECONOMY

As an economic, if not national, entity Hong Kong would rank as medium sized in both population and income. Situated on the doorstep of a giant country and drawing its many supplies from that country, Hong Kong also has a highly dependent economy. The postwar political and economic developments in the neighbouring giant have been a major contributing factor to the phenomenal growth that the British Crown Colony has enjoyed. This, together with the fact that changes on the Chinese mainland have been both convulsive and impulsive, underscores the dependent character of Hong Kong whose prospects are also to be seen against the background of its colonial status and the tenure problem of the leased portion of its domain.

Two main features characterized the evolving pattern of the Hong Kong economy in the last two decades. First, the influx of capital, management and labour laid the groundwork for Hong Kong's rapid industrialization. Second, the change in the pattern and content of trade facilitated its transition from an entrepot to an industrialized society. The resulting changes in the economic structure of Hong Kong are far-reaching and may be summarized as follows:

- 1) Immigration into Hong Kong boosted population growth from a natural rate of about 3 per cent to an actual rate of 5 per cent over the entire postwar period. Data on industrial employment, although incomplete, showed a striking growth of over 11 per cent annually during the same period, indicating a definite shift of employment toward the industrial sector. The 1968 Census already showed the predominance of the manufacturing sector at 50 per cent of the total working population, against the shrinking primary-production sector (agriculture mainly) which then employed only 6 per cent of the working population and has since experienced further declines.



2) Exports had grown from about a quarter of total exports in 1955 to above three-quarters in 1965. At the same time, a clear indication of the diminishing importance of entrepot trade was the changing ratio of total trade against gross domestic output. While in the year 1955, at the peak of the Korean war, Hong Kong's total trade was about three times that of gross domestic product, the ratio gradually diminished to less than one and a half times in the 1960's.

3) A very important trade in the commodity trade balance of Hong Kong also occurred during the last decade or so. While the deficit ( import balance ) before 1952 was never very much over 30 per cent of total exports and re-exports, after that it increased sharply and levelled off at about 50 per cent until 1965. The mounting commodity trade deficits were accompanied by increased "invisible" earnings from the tourist trade and other "current account" service items and by increased capital inflows during the last decade or so.

4) Concerning the inflow of capital, nothing is more suggestive than the enormous increase in bank deposits during recent years - at an annual average of about 12 per cent on demand deposits and 36 per cent in savings and "fixed" deposits during the 9 years 1964. It is believed that the savings of overseas Chinese contributed substantially to the capital inflow, the bulk of which would have gone to China were it not for the political situation there.

5) Cheap supply of foodstuffs and of a wide range of less sophisticated consumer goods from China has created a very favourable terms-of-trade effect for the promotion of Hong Kong industrial growth. Hong Kong is now in a privileged position for increasing its exports of quality and skill-intensive goods to markets in Western countries and for commanding favourable prices in exchange for cheap imports of daily necessities from China.



The advantages of such multilateral trade will be more fully revealed when the Hong Kong Government compiles its terms-of-trade indices. It is roughly estimated that Hong Kong currently exporting 80 - 90 per cent of its total industrial output, while taking in 70 - 80 per cent of its food supplies from abroad.

6) Consequently, Hong Kong's gross domestic product grew at a rate of 12 - 18 per cent annually from 1959 to 1966. If we first deduct depreciation allowances from the gross domestic product, then adjust it in terms of the retail price index and again reduce it to per capital terms, the resultant value of real net output per head would show an annual increase of over 6 per cent between 1959 and 1966. This performance is rare by any contemporary standards of comparison. The rate of economic growth in Hong Kong had apparently slowed down in 1965, due to the so-called "banking crisis" and also in the period between 1966 to 1968,, due to the "Chinese Cultural Revolution". But the recovery can be termed as strong and encouraging. The question now is whether the recent period of rapid economic expansion has approached a plateau.



## THE FUTURE OF HONG KONG'S ECONOMY

For reasons stated earlier, the gauging of the factors for projecting future growth of Hong Kong's economy must take account of China's relations with this Colony. Has the Colony reached the stage of "self-sustained" growth after this fairly long period of influx of production factors from China and neighbouring countries? Will China's foreign economic relations maintain the current position, in which she has to rely on Hong Kong as her major export market, at very favourable terms of trade to the latter in the multilateral sense?

These are questions that lend themselves to speculations rather than firm answers. The most unpredictable factor is obviously political. Anything may happen to change the relationship between China and the outside world, and consequently China's relations with Hong Kong. For purpose of projection, we can only assume a continuation of the current situation.



## CLIMATE

Because of the monsoons, Hong Kong enjoys a varied climate. From mid-April to September, the summer monsoon prevails over China, bringing to Hong Kong warm and humid air masses from the ocean areas to the south and southwest. The winter monsoon dominates from October to mid-March, bringing cold and dry air masses from the continental land masses in the north and northeast. Spring and autumn occur during the transitional periods between the monsoons. Fog occurs frequently in spring, due to the cooling of warm moist air from the east over the cold coastal waters.

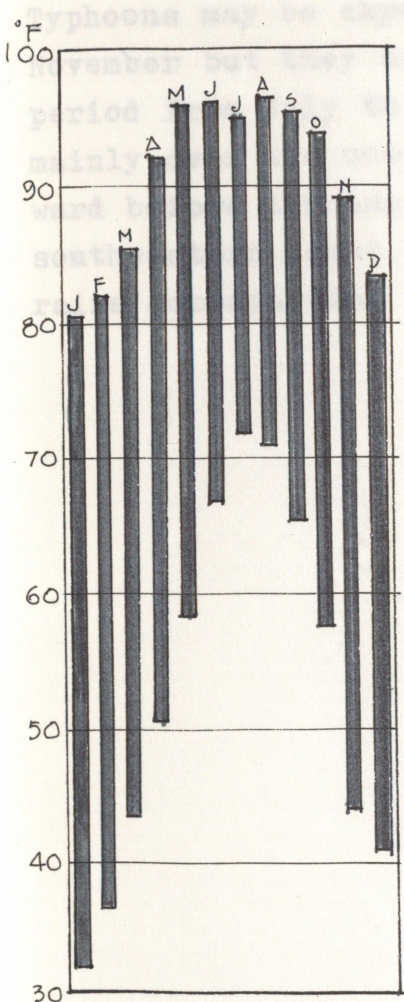
The yearly mean temperature ranges from about  $15.2^{\circ}\text{C}$  in February, the coldest month of the year, to  $27.9^{\circ}\text{C}$  in July, the warmest month. In summer time, the temperature often reaches  $32^{\circ}\text{C}$  ( $90^{\circ}\text{F}$ ) or higher.

The mean annual rainfall of Hong Kong is 85.39 inches. Most of the rain comes from prolonged heavy downpours brought by typhoons and from high-intensity, short-duration showers and thunderstorms during the summer months. Consequently, about 90% of total annual rainfall normally occurs in the period from April to October. Rainfall in the other seasons is in the form of light drizzle lasting for relatively long periods.

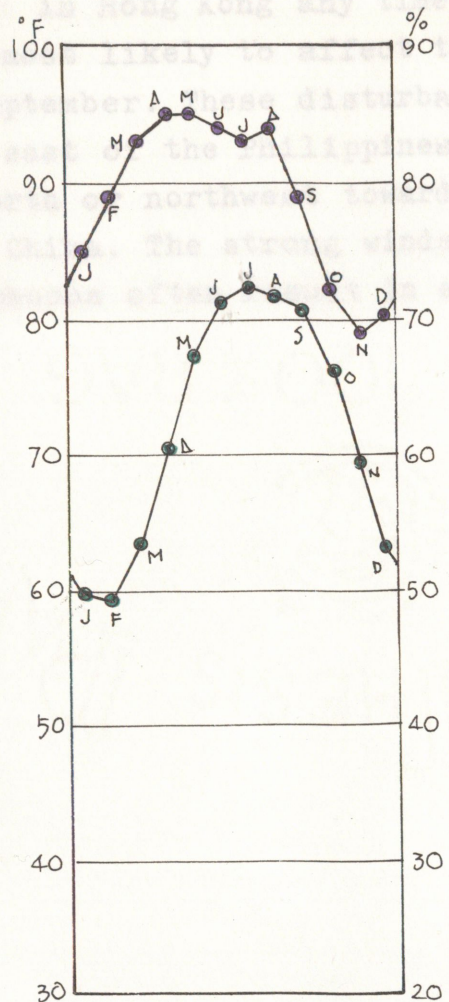
The relative humidity is highest in summer, the mean reaching a maximum around April and May. The winter months have a much lower humidity with the lowest monthly mean of the year (69%) occurring in November.

The mean yearly duration of bright sunshine is 1963 hours. The shortest duration occurs in the months of February, March and April and is due to shorter daylight hours as well as to the prevalence of extensive low cloud. The lowest monthly mean of 95 hours is in October.

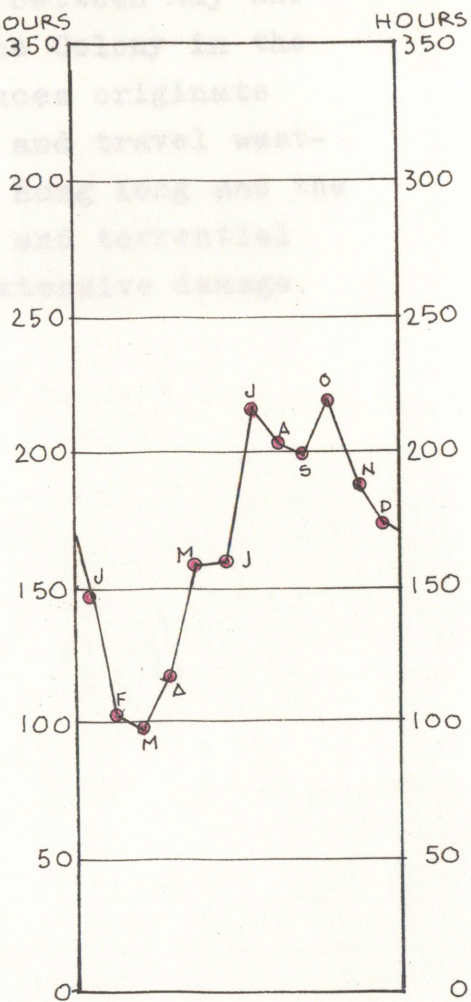




MONTHLY ABSOLUTE  
MAXIMUM & MINIMUM  
TEMPERATURE



MONTHLY MEAN TEMPER-  
ATURE &  
RELATIVE HUMIDITY



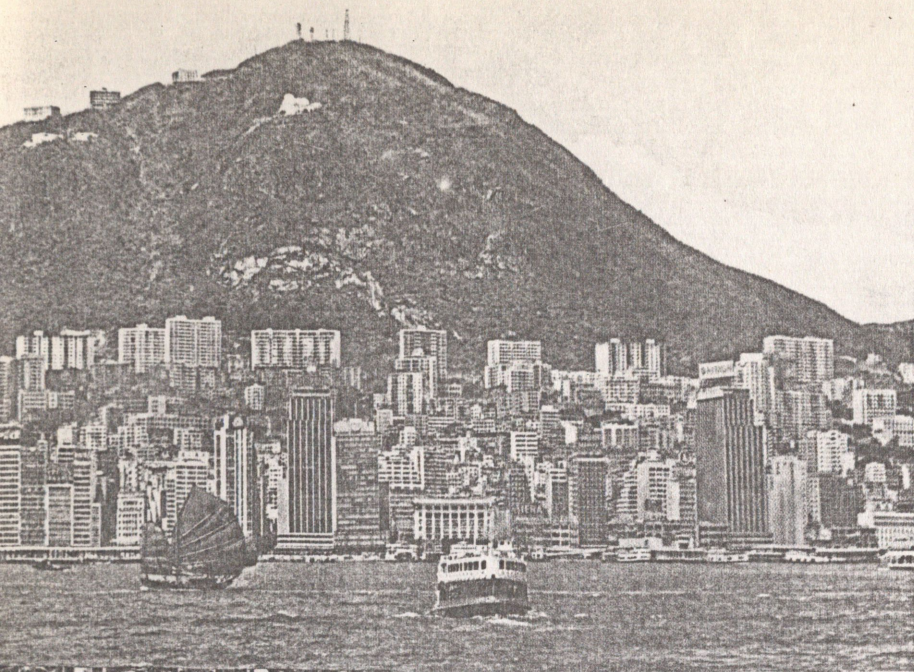
MONTHLY MEAN  
DURATION OF  
BRIGHT SUNSHINE

# TEMPERATURE , RELATIVE HUMIDITY AND SUNSHINE IN HONG KONG



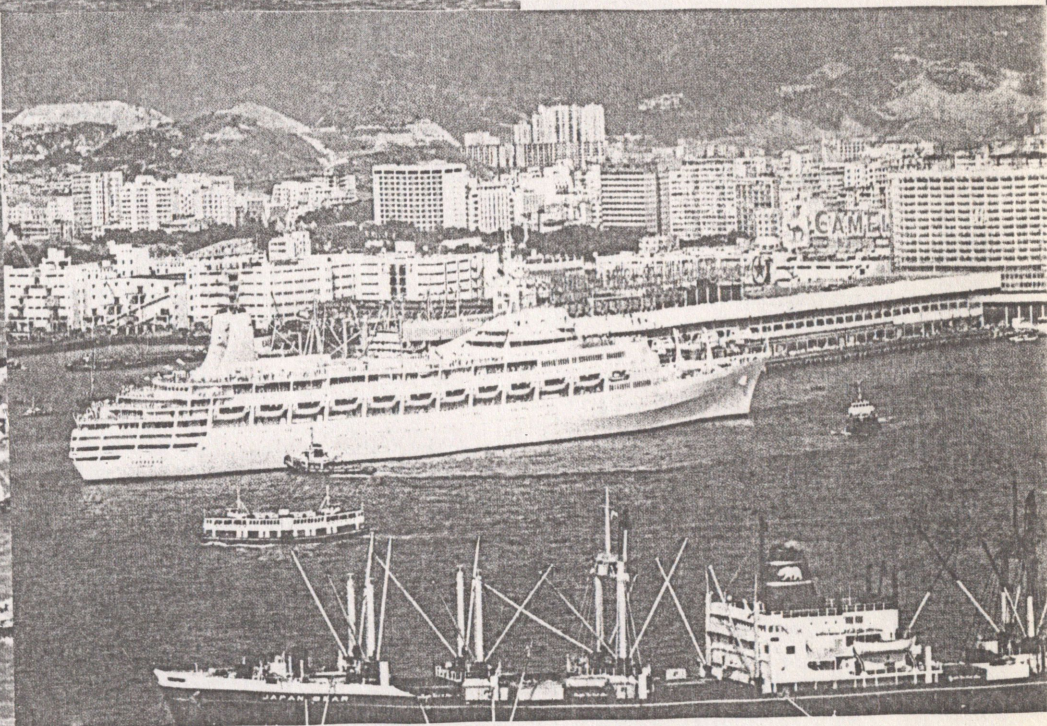
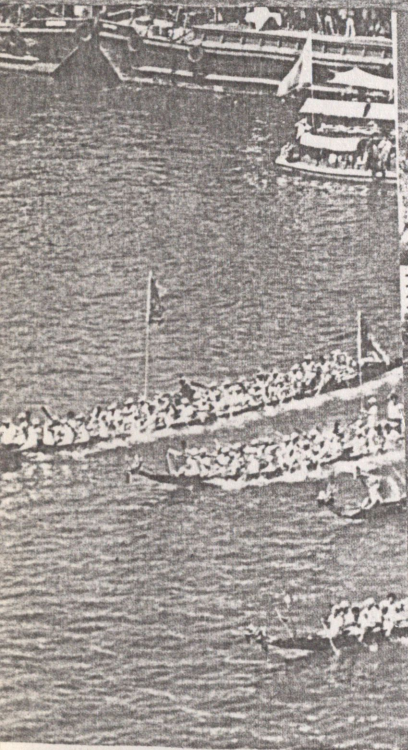
Typhoons may be expected in Hong Kong any time between May and November but they are most likely to affect the Colony in the period from July to September. These disturbances originate mainly over the ocean east of the Philippines and travel westward before turning north or northwest toward Hong Kong and the southeastern coast of China. The strong winds and torrential rains accompanying typhoons often result in extensive damage.





SITE

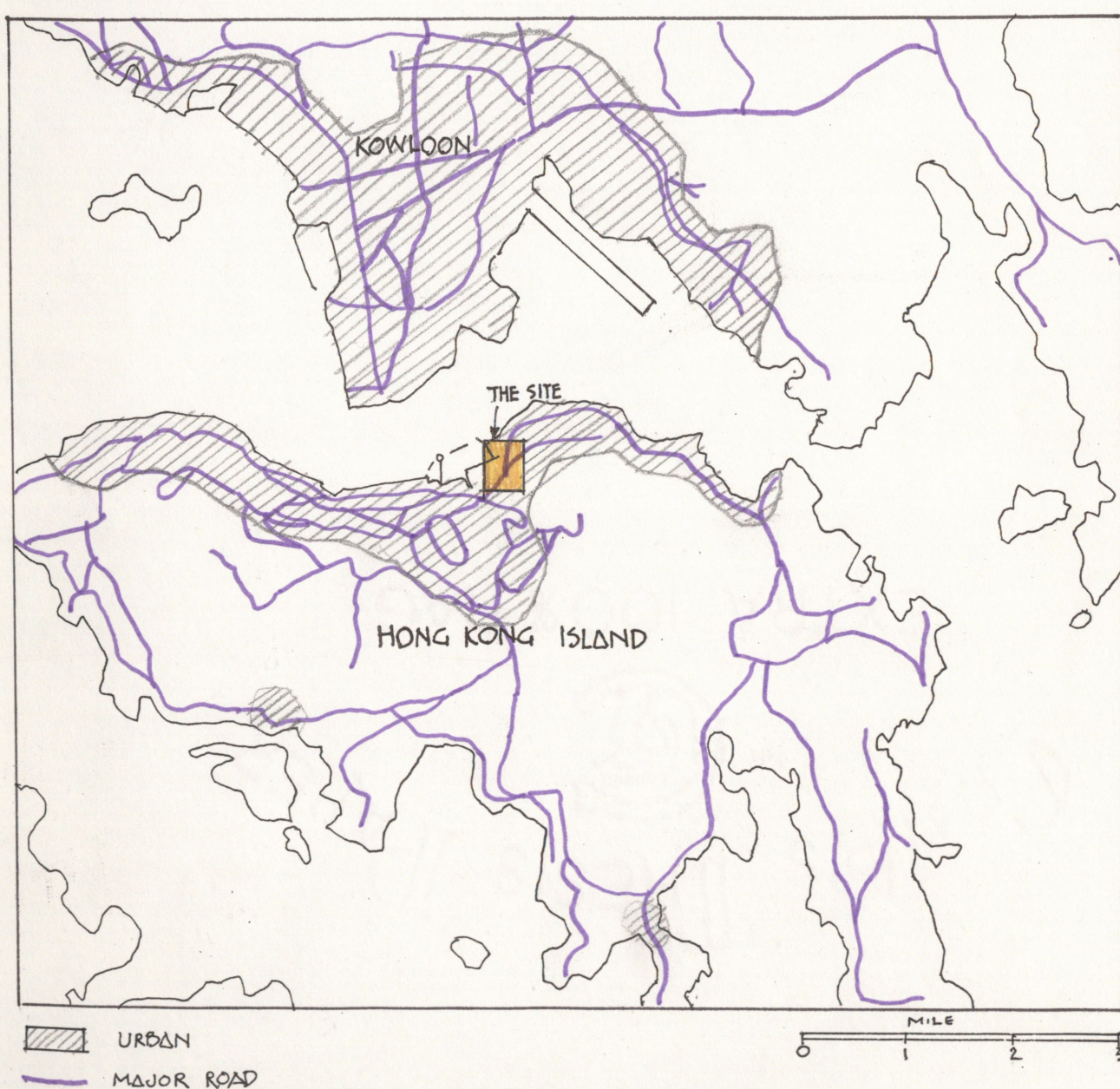
CONDITION



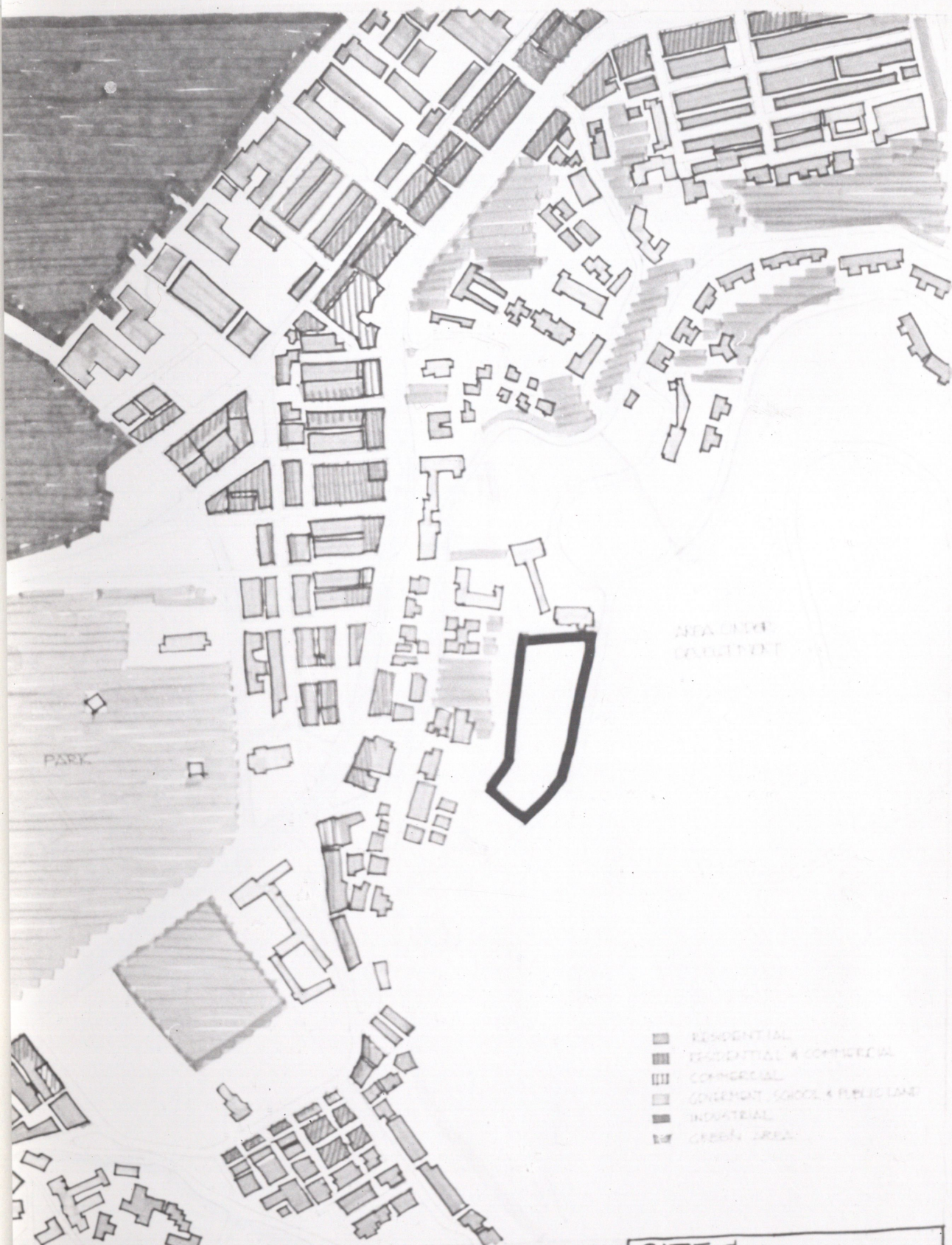


## ORIENTATION OF THE SITE

The site is located at the northern coast of Hong Kong Island. On the northern side of hill Butler. The altitude of the site is about 200 ft above ground. The site is of a rectangular shape stretch in a north-east south-west direction. The length is about 650 ft and the width is 270 ft approximately. The site is sloping down in a  $30^{\circ}$  slope.







SEALED LOT

PARK

- RESIDENTIAL
- RESIDENTIAL & COMMERCIAL
- COMMERCIAL
- GOVERNMENT, SCHOOL & PUBLIC LAND
- INDUSTRIAL
- GREEN AREA

1  
2400

LAND  
UTILIZATION

SITE &  
NEIGHBORHOOD





1  
2400

TRAFFIC FLOW

SITE &  
NEIGHBORHOOD



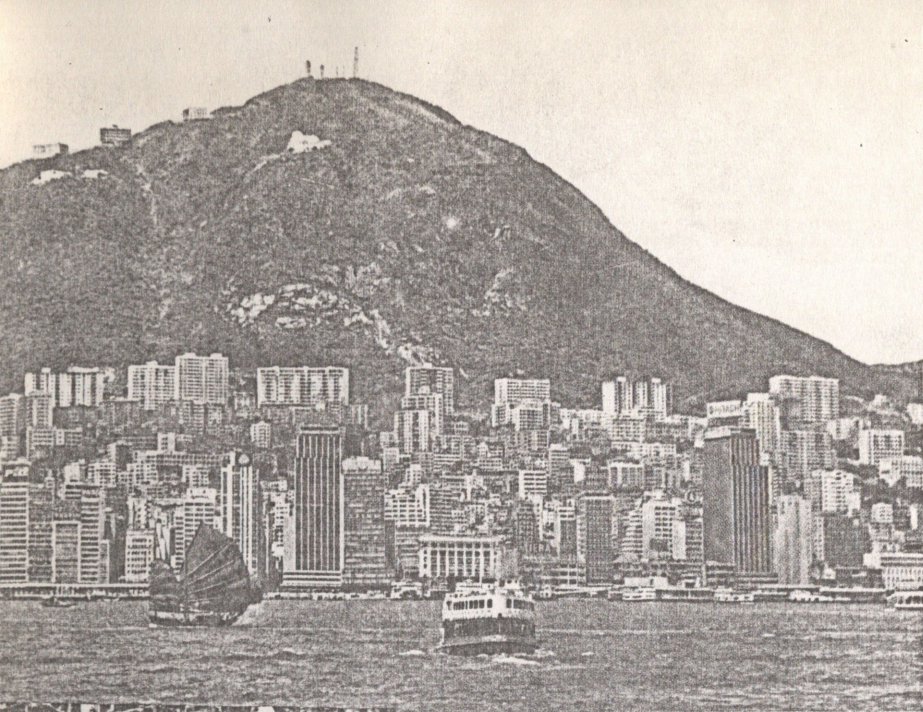
## THE CITY

Buildings built within last 10 year were all about 18 to 20 stories high, wall to wall against each other. There is no significant difference to distinguish in height whether it is a commercial building or a residential building. As a matter of fact, most of the recent buildings are actually having commercial area on the first three or four levels, and above that, runs 18 or 20 stories of apartment. Along the major road, you can find almost all the highrises are of these ~~both~~ double functions.

This development to a city having downtown area all over the place. Most of the residential area are within the walking distance of a neighbourhood commercial district.

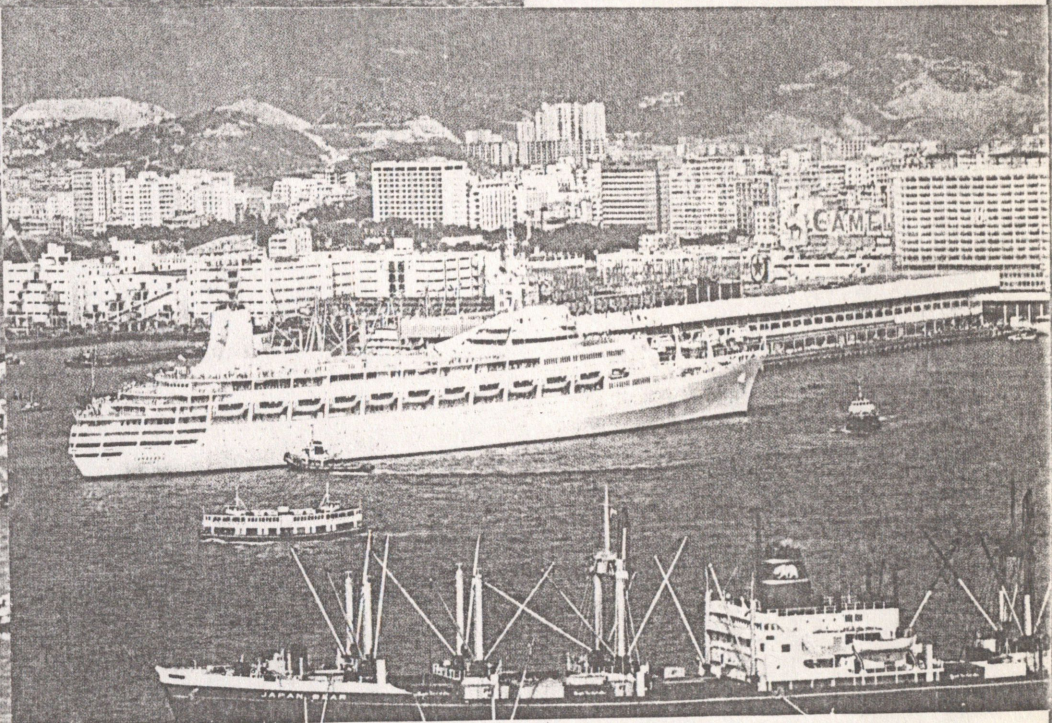
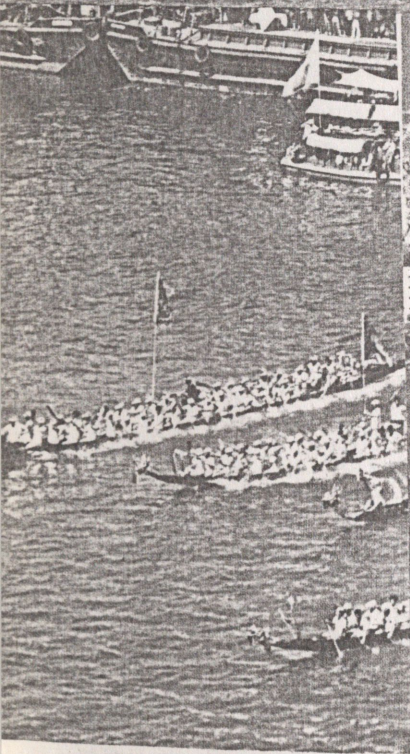
Another strange situation happens in Hong Kong, There are no suburban houses around the city like most of the major cities. This is because land development in New Territories are least profitable since the area will be return to China within next 20 years.





BUILDING

PROGRAMME





## HOUSING IN GENERAL - for families of 5 to 10

- 100 units

The size of the site I purposed is approximately 3.5 acres. According to the density of inhabitant for an average housing estate, one acre of land should have about 1,500 inhabitants. This is by no means a standard for density of other cities, or any ideal urban design. Hong Kong is almost the only city that required such high density of population. So for a 3.5 acres area, it should inhabit over 5,000 person.

The programme of my purposed housing will be an eight hundred units project, and the buildings are most likely highrises.

There will be four kinds of units included, namely, a one-bedroom unit, a two-bedroom unit, a three-bedroom unit and a four-bedroom unit.

1) One-bedroom unit - for a family of 2 to 4.

- 50 units

- area of 500 square feet minimum.

- possibility of providing extra area for sleeping.

- separate kitchen

2) Two-bedroom unit - for families of 3 to 6.

- 250 units.

- 600 square feet minimum of area.

- possibility of providing extra area from living room for sleeping.

- separate kitchen.

3) Three-bed. unit - for families of 4 to 8.

- 400 units

- 750 square feet minimum

- separate kitchen



- 4) Four-bed. unit - for families of 5 to 10
- 100 units
  - 850 square feet minimum
  - separate kitchen.

All the units will have living and dining area of not less than 220 square feet. Kitchen will be separate and will provide exhaust fan in both the kitchen and the bath room. An area of 40 square feet will be provided for storage and utility. Clothes-drying rack will be provided in the area with direct contact to the sun and also good ventilation.

Parking - 400 parking space will be provided for the units, since the site is limited in space, the parking will be underneath the living units.

Cable car - I am considering using cable car for access to the commercial district 200 feet below the site.

Shops - I will provide space for one or two small grocery store at the ground level (major circulation level). Since the commercial district is within walking distance, shopping area is not a necessity for the apartments.

Playground - Roof top of each building will be used for children's playground. Also, I will provide at least one playground for the children. The rest of the open area will be utilized for plaza with tree and plant.



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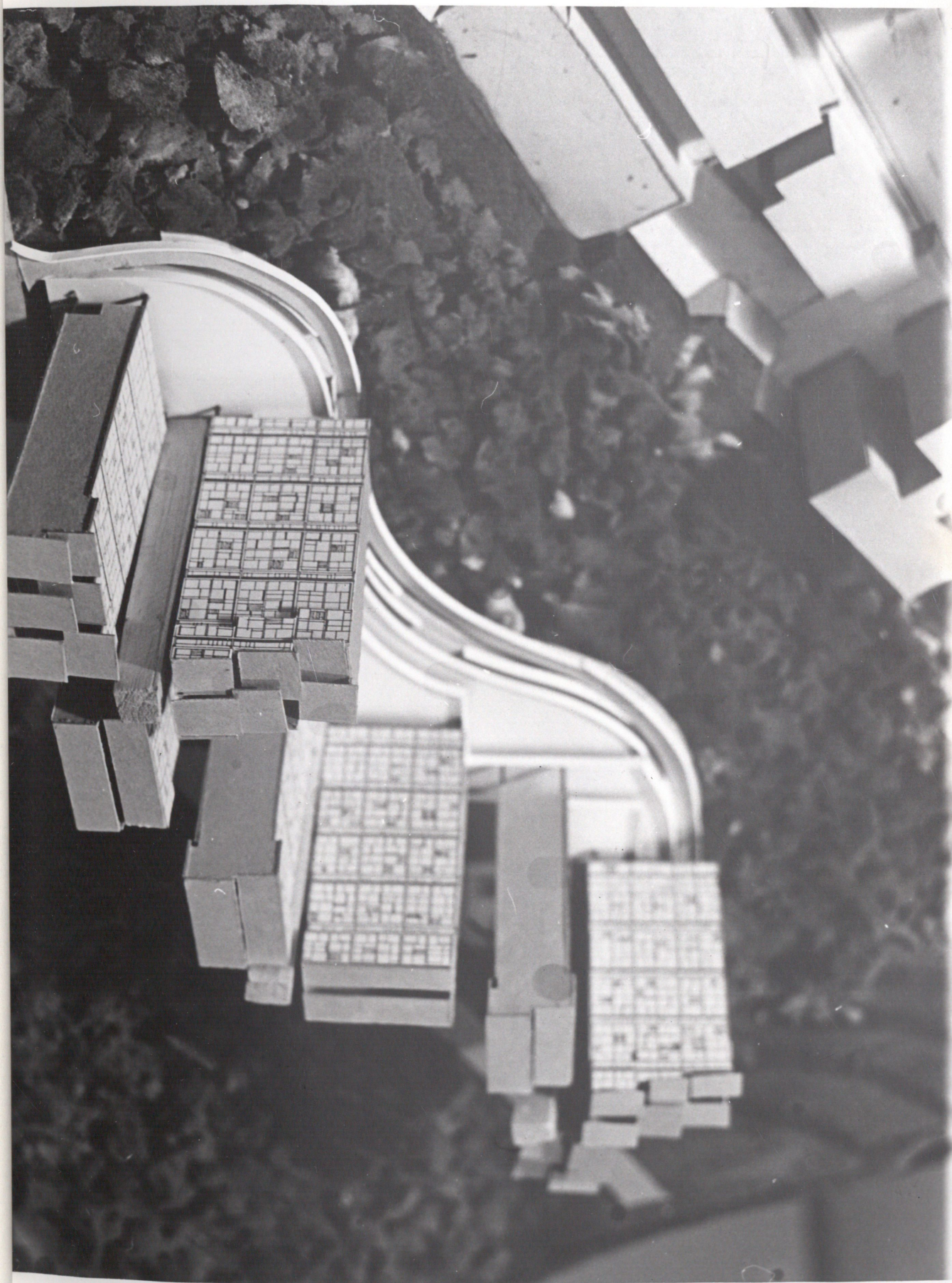
Team 10 primer

Environment Design Dober

Matrix of Man Moholy-Nagy

The Hong Kong Economy Chinese University Press





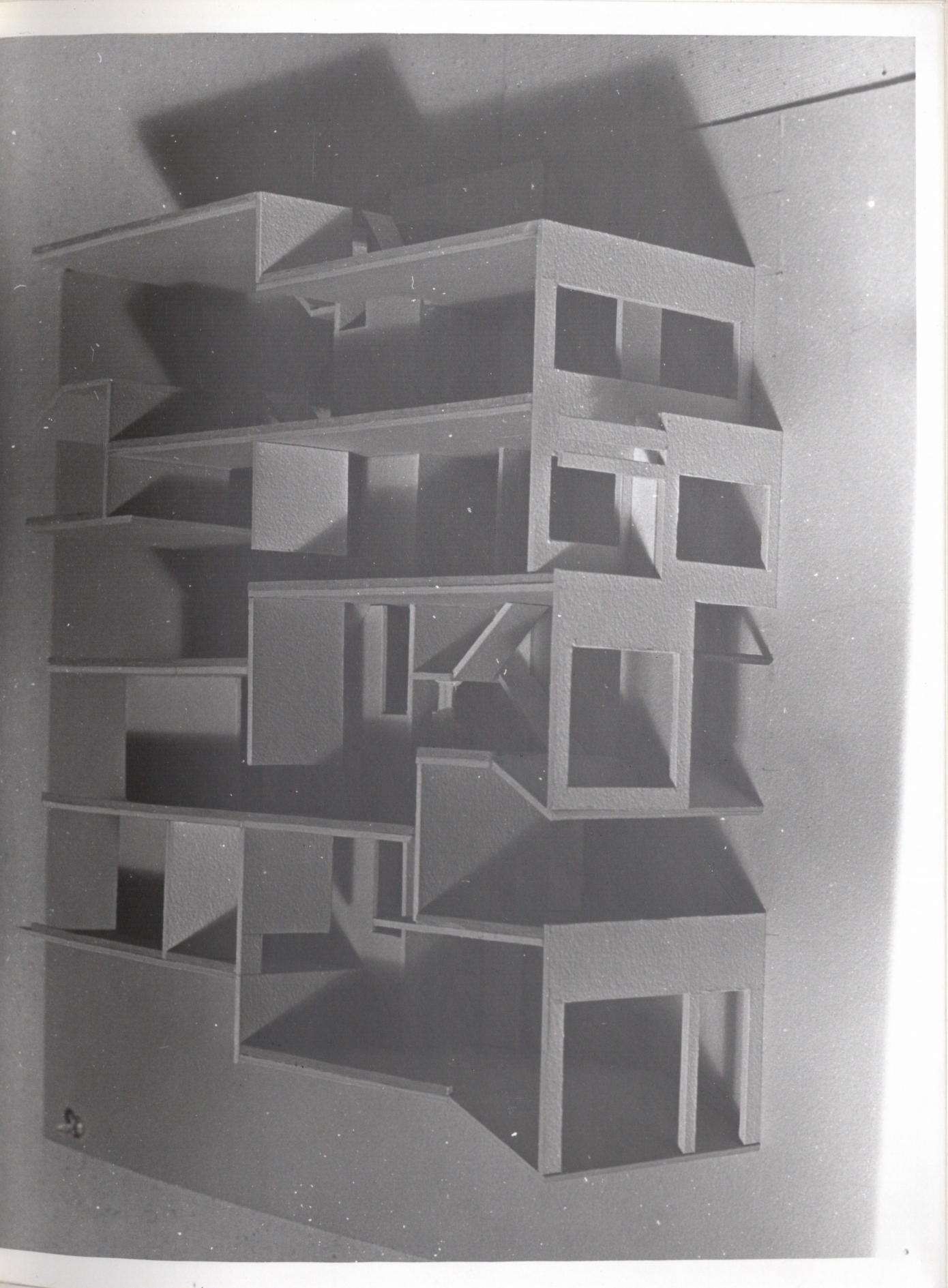






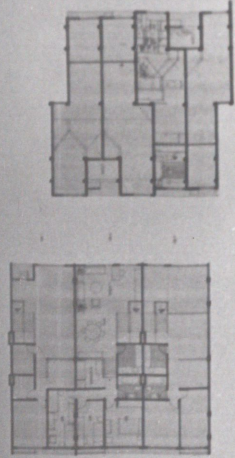




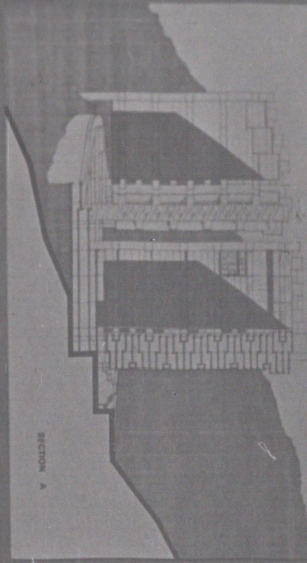




FLOOR PLAN & SECTION

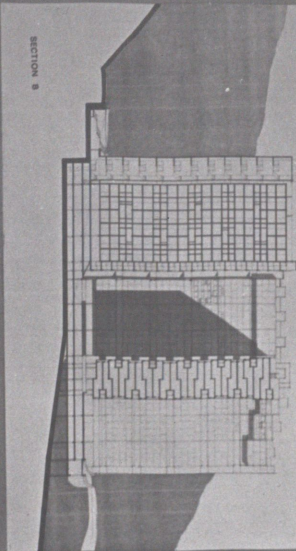


SECTION A

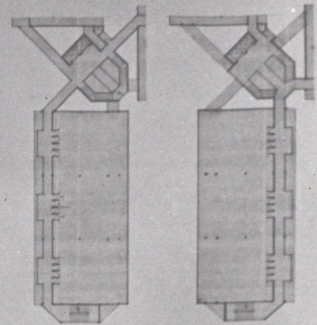


HIGH DENSITY  
HOUSING  
FOR HONG KONG

SECTION B



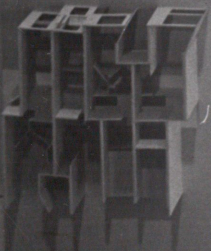
CIRCULATION



TRAFFIC FLOW

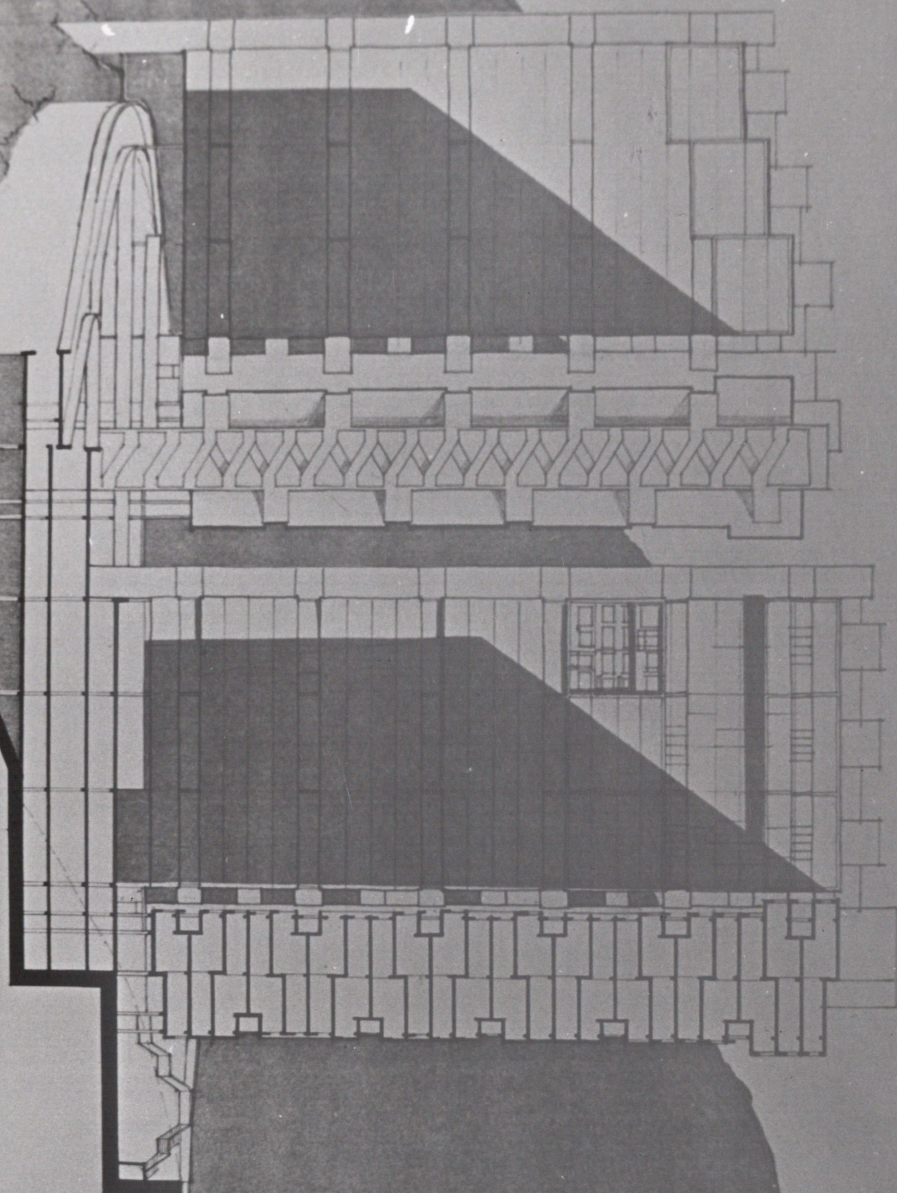


LAND UTILIZATION





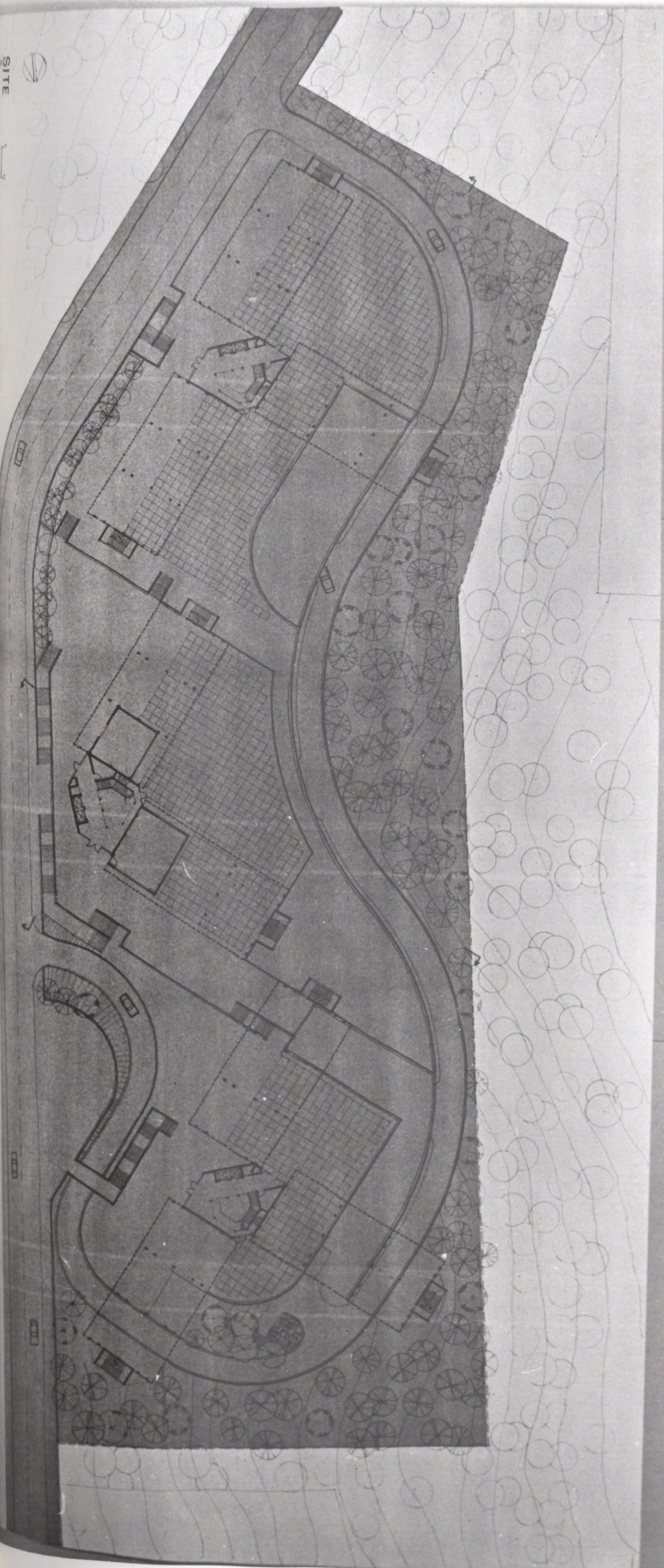
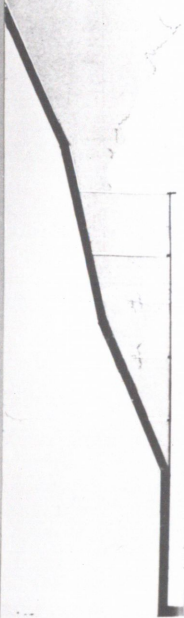
SECTION A



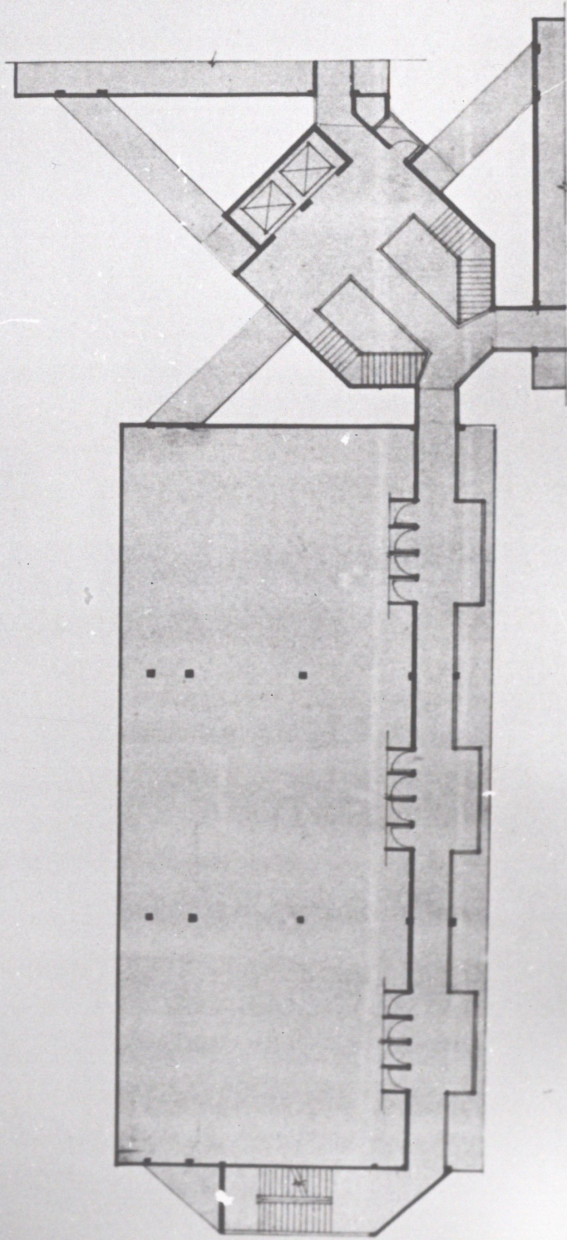
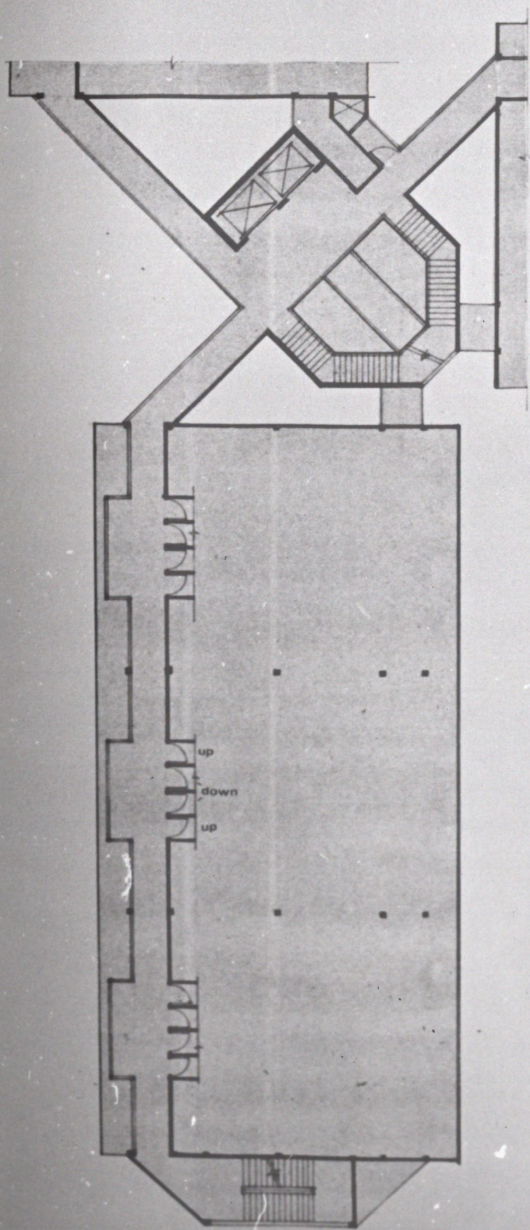


FOR HONG

SECTION A



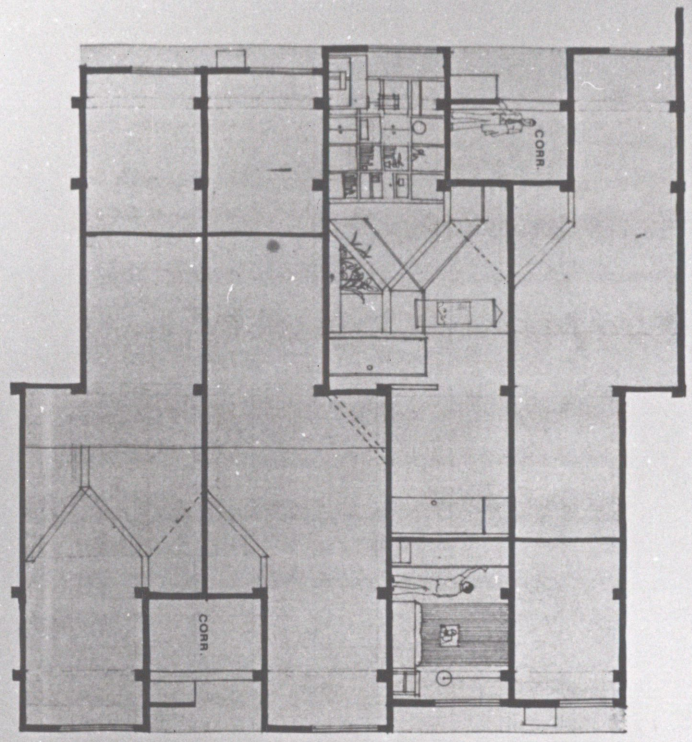






# FLOOR PLAN & SECTION

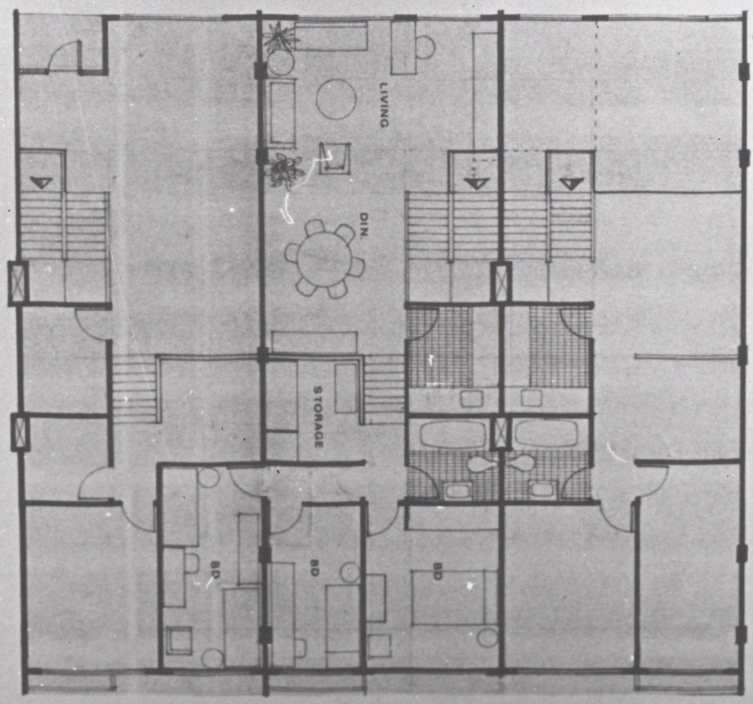
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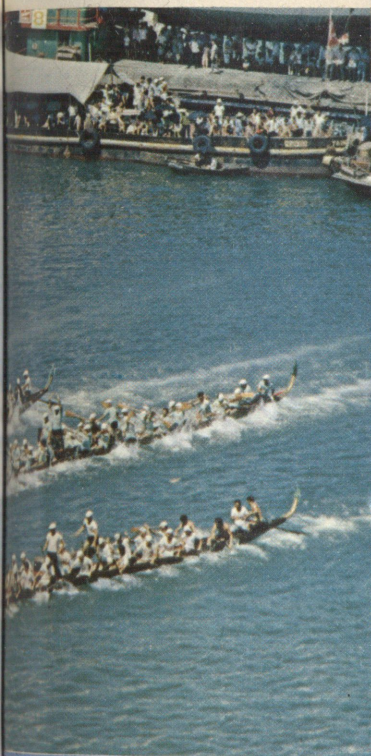
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3 BD

2 BD







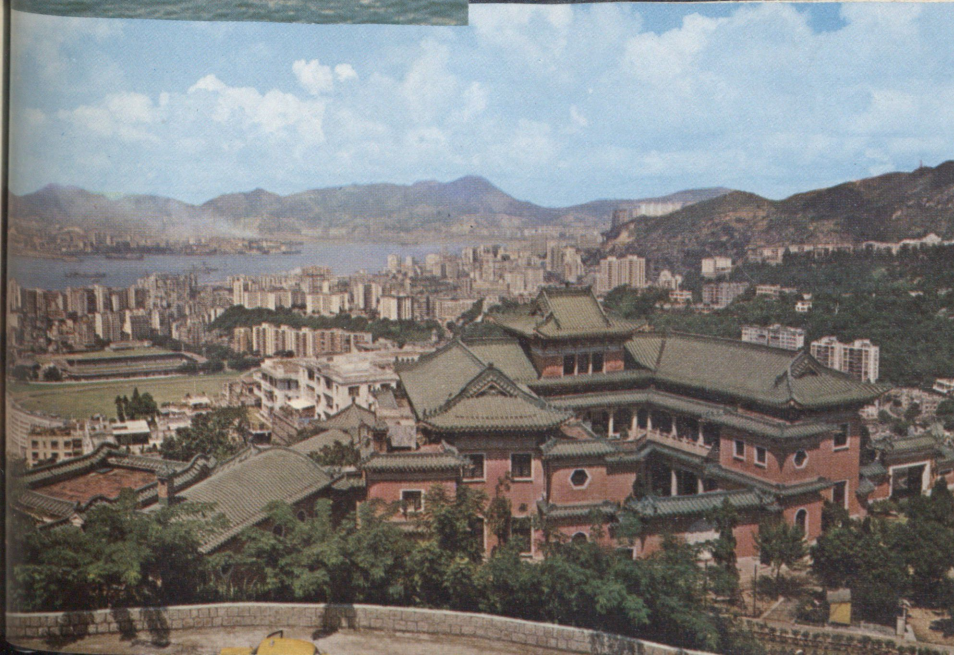
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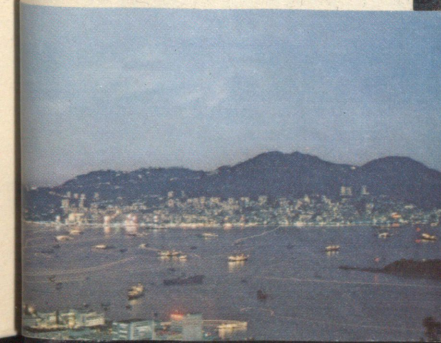
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