

POLICIES AND MODEL OF URBAN RESIDENTIAL DEVELOPMENTS
FOR LOW AND MIDDLE INCOME SECTORS IN BANGLADESH

by

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by Ajmal H. Ahmad

Submitted to the Department of Architecture on May 12, 1972 in partial fulfillment of the requirements for the degree of Master in Architecture (Advanced Studies).

ABSTRACT

Bangladesh was born in the midst of problems of unprecedented magnitude. In 1971, there was repression and genocide of Bengalis by West Pakistanis in which more than 2 million people were killed, 9 million people took refuge in India and a near destruction of the economic base and transportation network was caused by the West Pakistani army. In the war which followed in December 1971 between India and Pakistan, Pakistan was defeated and Bangladesh was liberated.

At present the new nation is facing the gigantic task of rebuilding. This includes rebuilding of the transportation network, industries, houses, schools, etc., which were destroyed.

The three major urban areas of the country--Dacca, Chittagong and Khulna--are experiencing a rapid population growth of such volume that it has outpaced available resources and capacities: there is a severe shortage of housing; there is a shortage of available land for housing and other needed purposes; the land cost has increased significantly; and the cost of construction has tremendously increased due to the inflation. Current housing programs have failed to meet the demands of the middle and low income sectors.

This thesis deals with two aspects of housing in Bangladesh:

- a. The formulation of housing policies (including land, finance, administration and legislation) which may serve as reference for housing policy formulation of the new nation.
- b. The development of a model for residential areas for low and middle income sectors which includes planning and design policies/goals for a site in Khulna which may serve as a reference for future developments.

Thesis Supervisor: Horacio Caminos
Title: Professor of Architecture

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SCHEDULE OF THESIS PREPARATION

This work culminates two years of research work at M.I.T. The schedule was as follows:

- Fall 1970 Research on basic context on Pakistan as a whole and East Pakistan (now Bangladesh). This was concurrent with classwork in the Education/Research Program: Urban Settlement Design in Developing Countries.

- Spring 1971 Research and data collection of East Pakistan: housing programs, plans for low income housing projects. Tentative formulation of thesis proposal.

- Fall 1971 Collection of additional information from East Pakistan. Synthesis of basic information. (Birth of new nation of Bangladesh: subsequent change of certain aspects of the thesis.

- Spring 1972 Final thesis preparation: Formulation of housing policies for Bangladesh and development of a model for urban residential development for low and middle income families.

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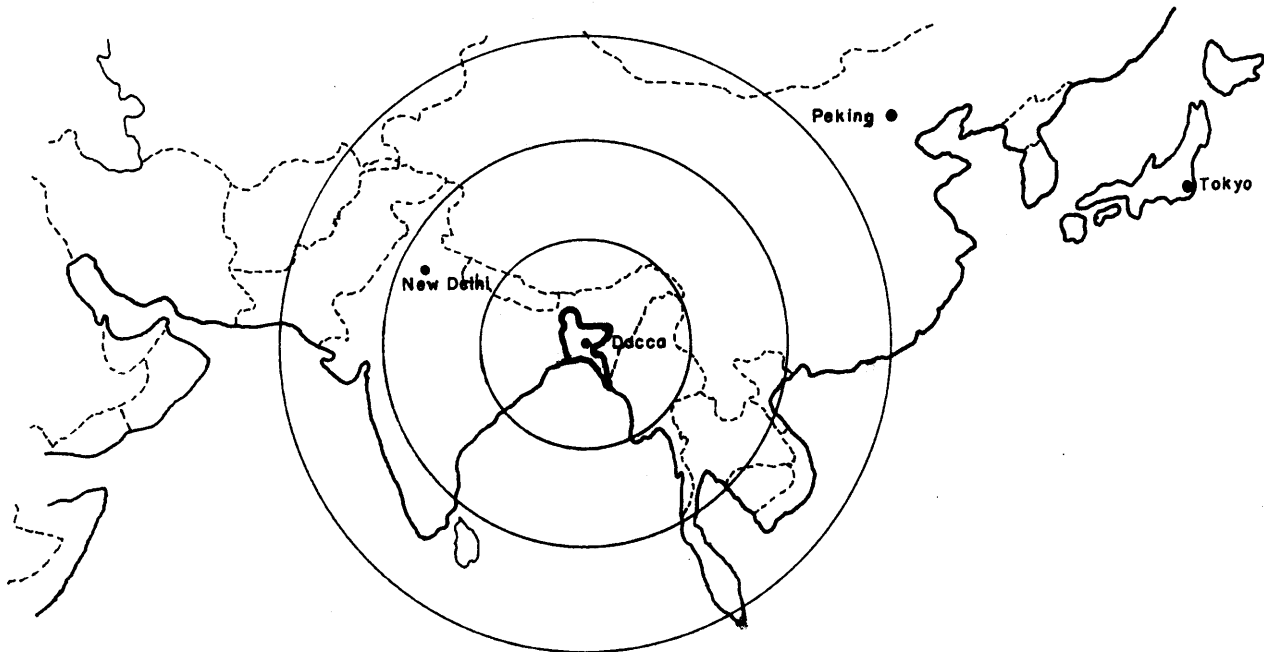
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SECTION 1. THE BANGLADESH CONTEXT

1.1 GENERAL INFORMATION

Official name	REPUBLIC OF BANGLADESH.
Area	55,126 square miles.
Population	72,000,000 (1971 estimate).
Language	Bengali is the official language. English is widely used in government and commerce.
Currency	Rupee. 1 Rupee equals approximately US\$0.21.
Government	Bicameral Republic.
Religion	Islamic and Hinduism.
Major urban areas	Dacca, largest city (population 1,201,880 by 1971 estimate) and capital; Chittagong, main port (population 550,000) and industrial city; Khulna, inland river port (population 331,923) and industrial city.



LOCATION OF BANGLADESH

Scale: 1: 70,600,000

EACH DIVISION REPRESENTS 500 MILES, WHICH IS APPROXIMATELY ONE HOUR OF FLYING TIME

1.2.1 Geography and Climate

Bangladesh, a new republic, is situated in the northeast of the Indian Sub-Continent. It stretches longitudinally between 20°35'N and 26°75'N and latitudinally at 88°3'E and 92°75'E. It is bordered on the north by India, on the south by the Bay of Bengal, on the east by India and Burma and on the west by India.

Bangladesh may be divided into four main geographic divisions: the alluvial plains of the north, central and south divided by rivers and the marginal hills in the east and southeast. The alluvial plains are watered by extensive networks of rivers and the terrain is generally low and flat.

The climate is of the tropical monsoon type. It is characterized by moderately high temperatures for about eight months in the year and high humidity with heavy rainfall in the summer, and dry winter.

1.2.2 History

As a part of ancient Bengal, the history can be traced back to the Second Millenium B.C. From the middle of the eighteenth century to 1947 it was part of the British Colonial Empire.

- 1947 British leave India. India is divided on the basis of religion. Pakistan is established with the Muslim majority areas of India. Two thirds of Bengal became the eastern province of Pakistan. Pakistani army was virtually made up of West Pakistanis. With army's support West Pakistani politicians start economic exploitation of East Pakistan.
- 1958 General Ayub, head of Pakistan army, becomes President through military coup. Economic exploitation of East Pakistan reaches its height.

- 1969 General Ayub steps down and transfers power to General Yahaya. Yahaya promises to hold popular election and transfer power to elected representatives.
- 1970 Awami League headed by Sheikh Mujibur Rahman of East Pakistan wins majority of seats in National Assembly election.
- March 1971 Yahaya does not transfer power to the elected representatives and Sheikh Mujib. Yahaya sends his army to crush democracy in East Pakistan.
- March to December 1971 Yahaya's army commits a butchery in East Pakistan and approximately 2 million people are killed. 9 million people take refuge in India.
- April 1971 Elected representatives declare independence of East Pakistan (Bangladesh) and form government in exile.
- December 1971 India-Pakistan war; West Pakistan army is defeated in East Pakistan and Bangladesh government takes over.
- January 1971 Sheikh Mujib is released and becomes Prime Minister of Bangladesh.

1.2.3 Natural Resources



Aside from the agricultural potential of the land and the transport and hydroelectric potential of the water system, natural resources include gas, coal, peat, limestone and timber.

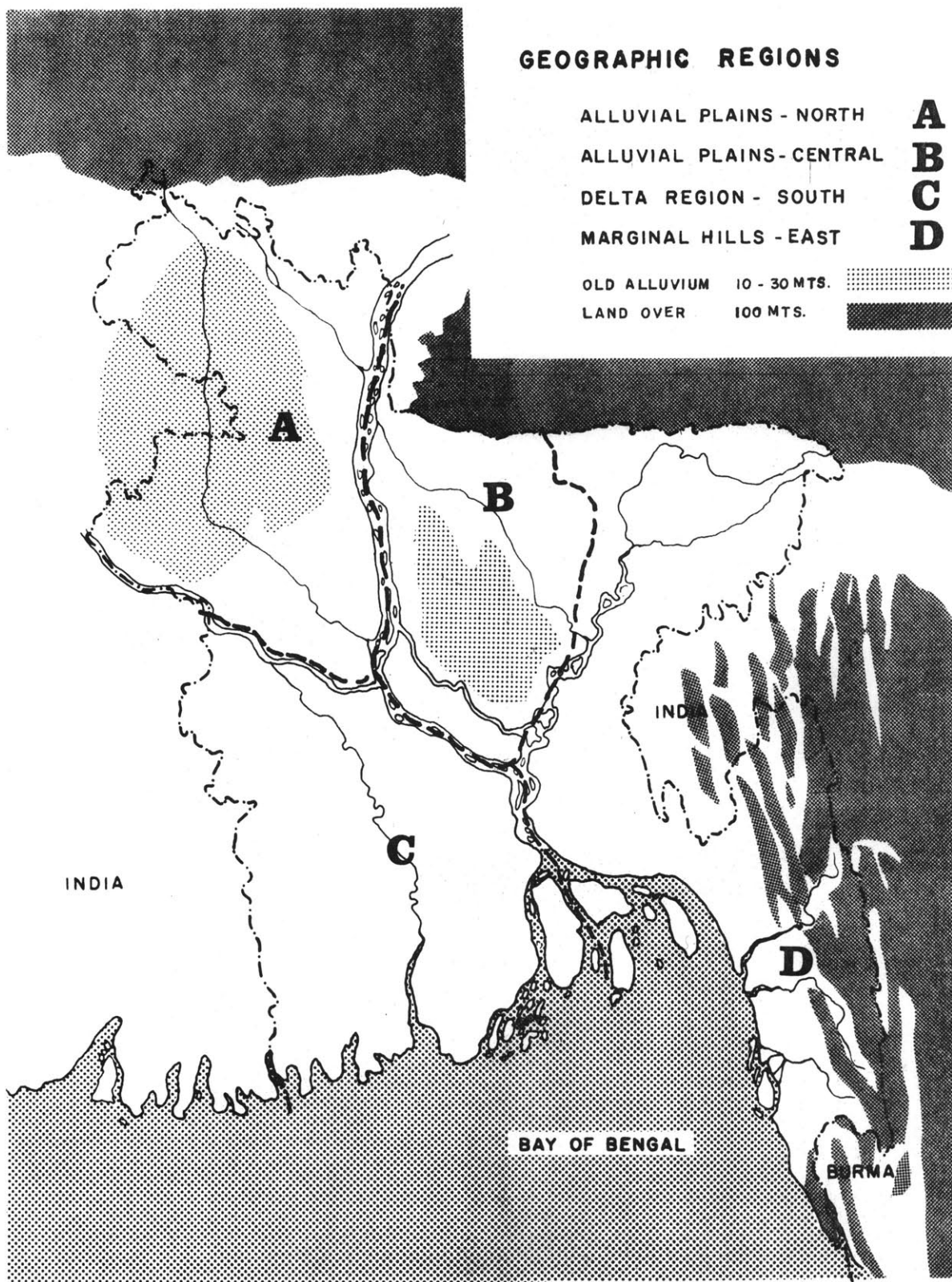
1.2.4 Transportation

The river network is the most extensive and economic means of transport in Bangladesh. A large part of the network is navigable throughout the year. Vessels are propelled by human as well as mechanical means. Other means of transport in order of ascending cost are railroads (total length 1750 miles), motorized road traffic (total length of major road network 1800 miles) and airplanes.

GEOGRAPHIC REGIONS

ALLUVIAL PLAINS - NORTH **A**
ALLUVIAL PLAINS - CENTRAL **B**
DELTA REGION - SOUTH **C**
MARGINAL HILLS - EAST **D**

OLD ALLUVIUM 10 - 30 MTS. 
LAND OVER 100 MTS. 



BANGLADESH

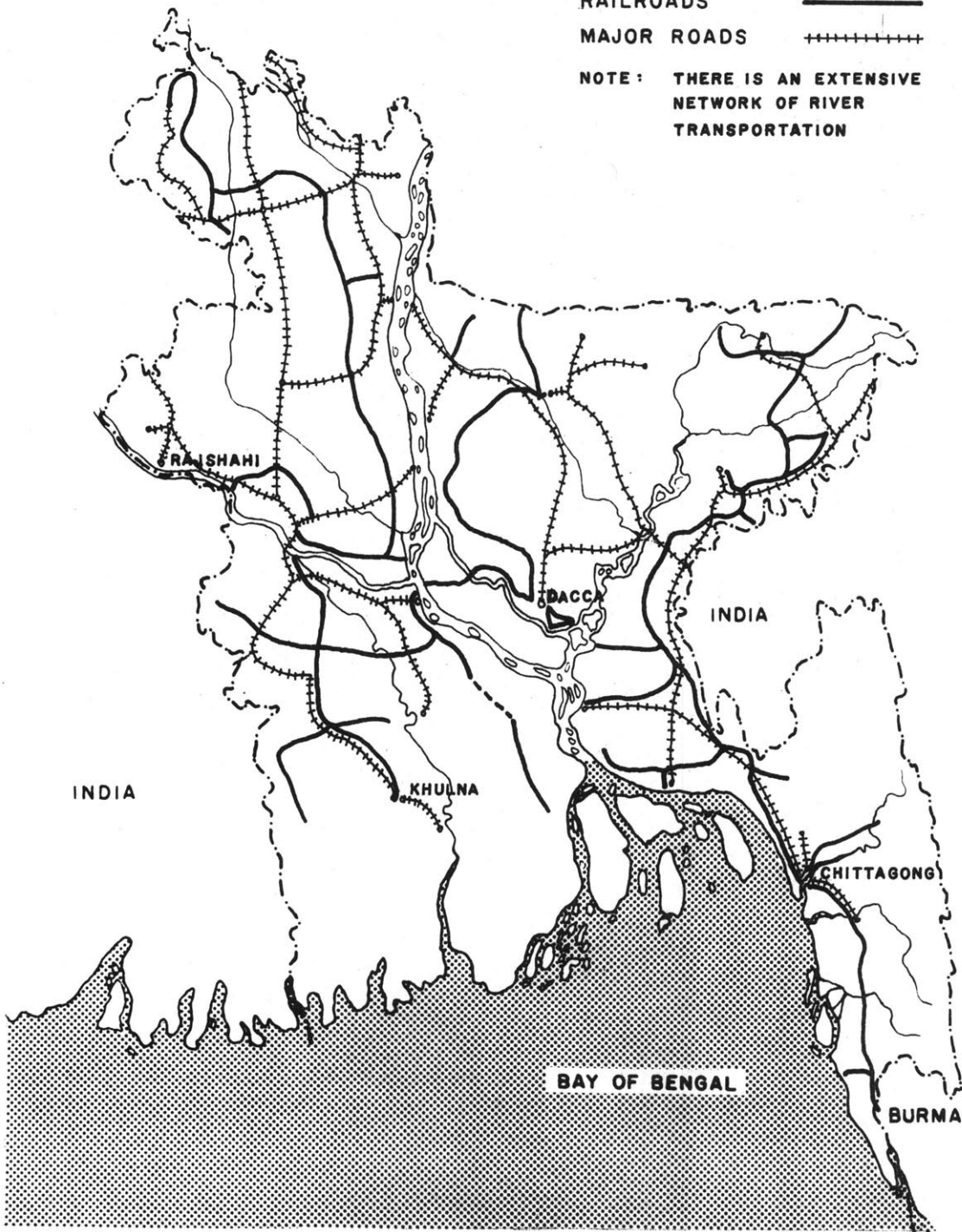
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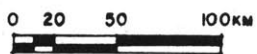
TRANSPORTATION NETWORK

RAILROADS 
MAJOR ROADS 

NOTE: THERE IS AN EXTENSIVE NETWORK OF RIVER TRANSPORTATION

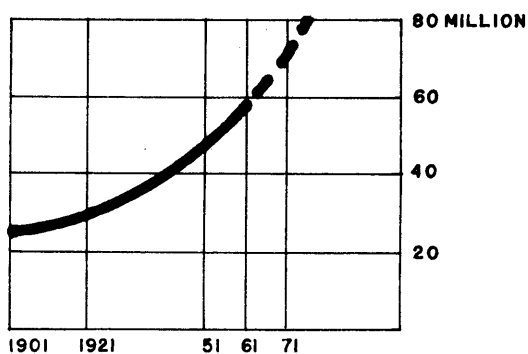


BANGLADESH

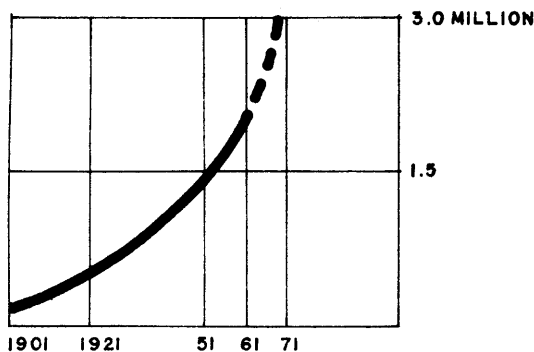


1.2.5 Demographic Characteristics

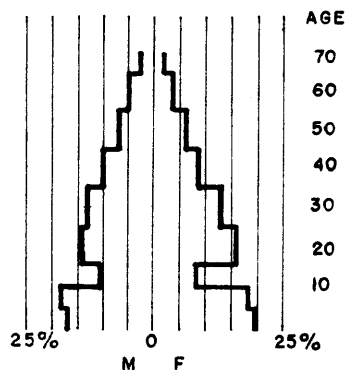
In 1971 estimated population of Bangladesh was 72,000,000 with a density of 1,250 inhabitants per square mile. The average yearly rate of population increase was 3.3%, which results in a doubling of the population every 25 years. Average family size was 6 (1971 estimate) for the country. Illiteracy was 76%.



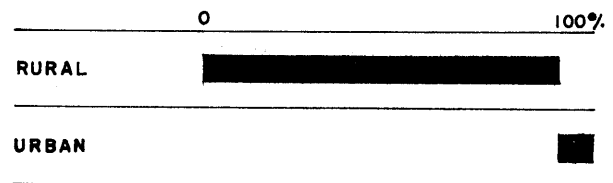
POPULATION GROWTH



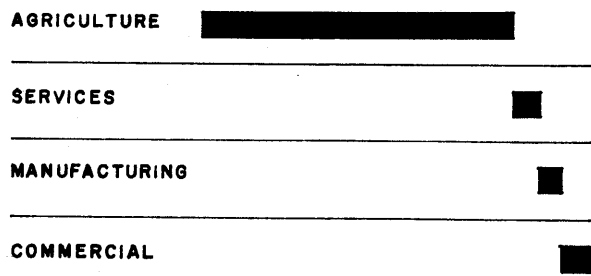
URBAN POPULATION GROWTH



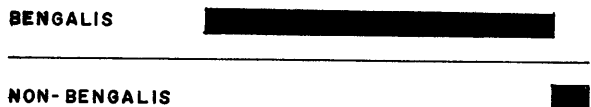
POPULATION DISTRIBUTION
(SOURCE - CENSUS REPORT 1961)



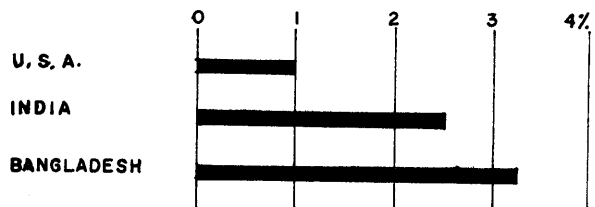
POPULATION DISTRIBUTION



LABOR FORCE

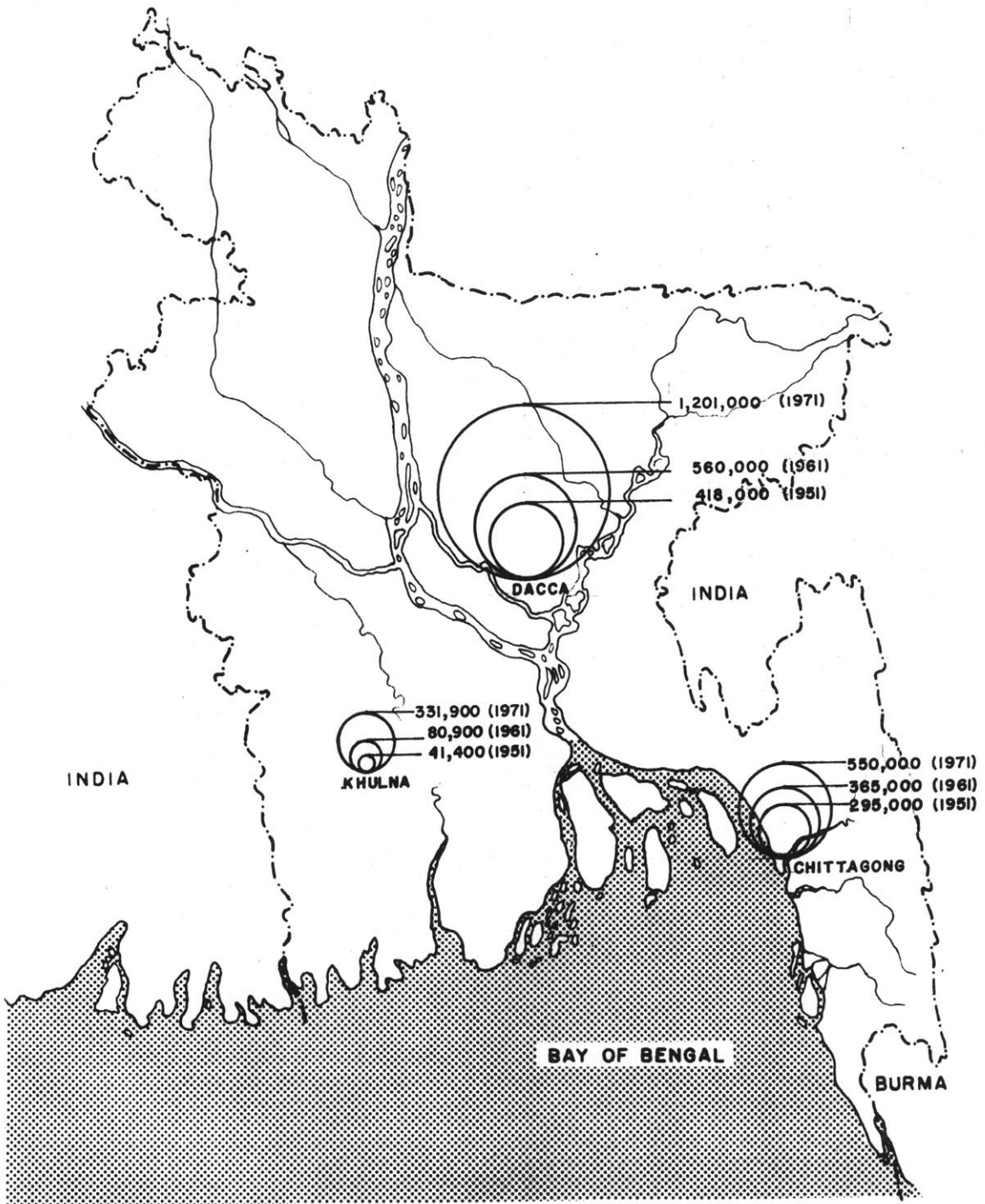


ETHNIC GROUP



CURRENT RATE OF POPULATION GROWTH
(SOURCE - U.N. 1969 DATA SHEET)

POPULATION OF MAJOR URBAN AREAS



BANGLADESH

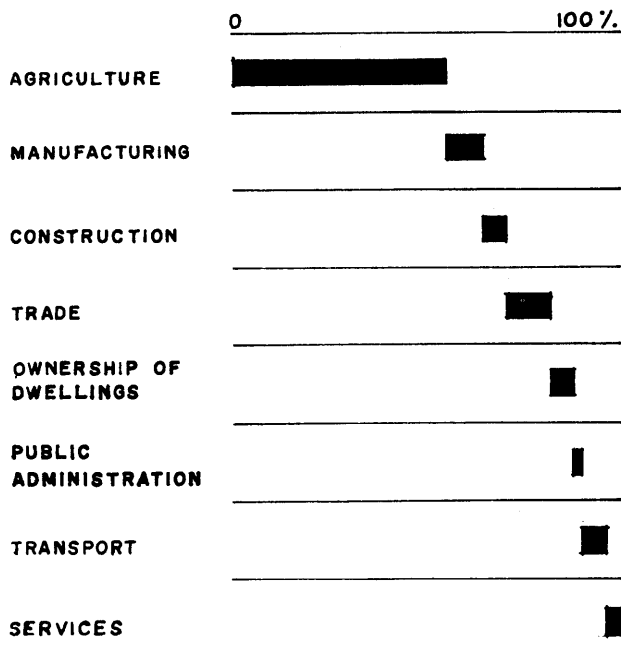


1.3.1 Economy

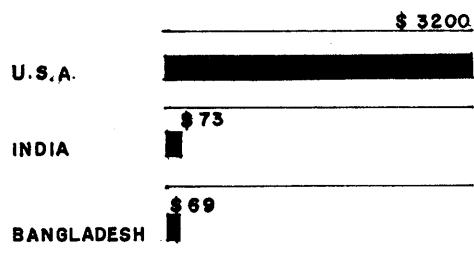
The gross national product (GNP) is \$4.75 billion, primarily composed of (agriculture) jute, rice, tea, sugarcane, tobacco, (wholesale and retail), (manufacturing) burlap, sugar, iron and steel, cement and textile, (public administration and defense), (services), (ownership of dwellings and construction).

The per capita income is \$69 per year. The average factory worker earns about \$410 per year.

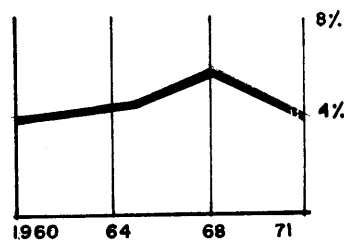
The principal trade partners of Bangladesh are India, United Kingdom, Japan, West Germany, Hong Kong, Singapore and the United States.



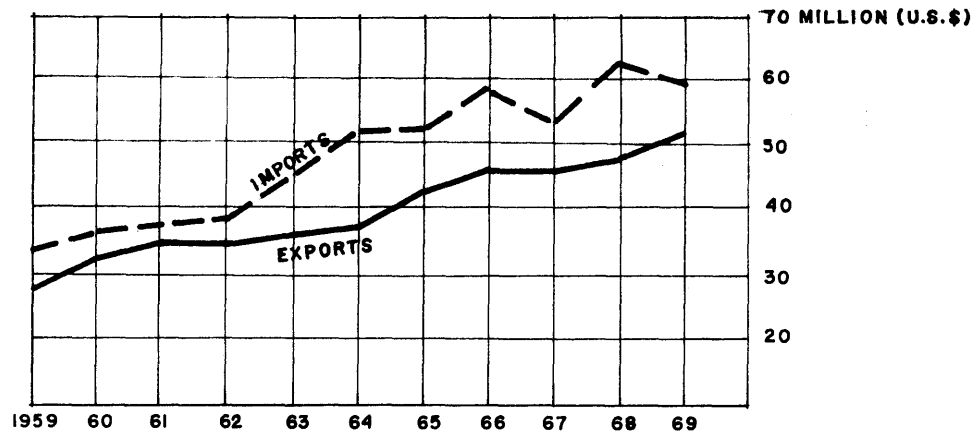
GROSS NATIONAL PRODUCT



PER CAPITA INCOME



RATE OF GROWTH OF GNP



FOREIGN TRADE
(SOURCE - PLANNING DEPARTMENT, GOVT. OF BANGLADESH)

URBAN INCOME GROUPS

On the basis of published and unpublished data of Central Statistic office, Dacca, United Nations data, Indian and Asian data, the following urban income groupings may be made.

<u>Group</u>	<u>Yearly Income in US\$</u>	<u>Percentage of Urban Households</u>
Lowest	\$ 0 - 960	80%
Medium Low	961 - 1920	12
Medium	1921 - 2880	4
Medium High	2881 - 3840	2
Upper High	3840 - 4800	2

Note: Of the lowest income group 27.5% has yearly income of less than \$200, and 52.5% has yearly income \$200-300.

1.3.2 Political and Administrative Systems

Bangladesh is a republic with the President as head of state and the Prime Minister as chief executive. Public power is divided into three categories:

Executive Body: Formed by the Prime Minister of the Republic, the members of the Ministerial Cabinet, and the heads of the Administrative Departments. The Prime Minister is the party chief and is elected by the people for a 5-year term. He may be re-elected.

Judicial Body: Formed by the Supreme Court and Higher District Courts.

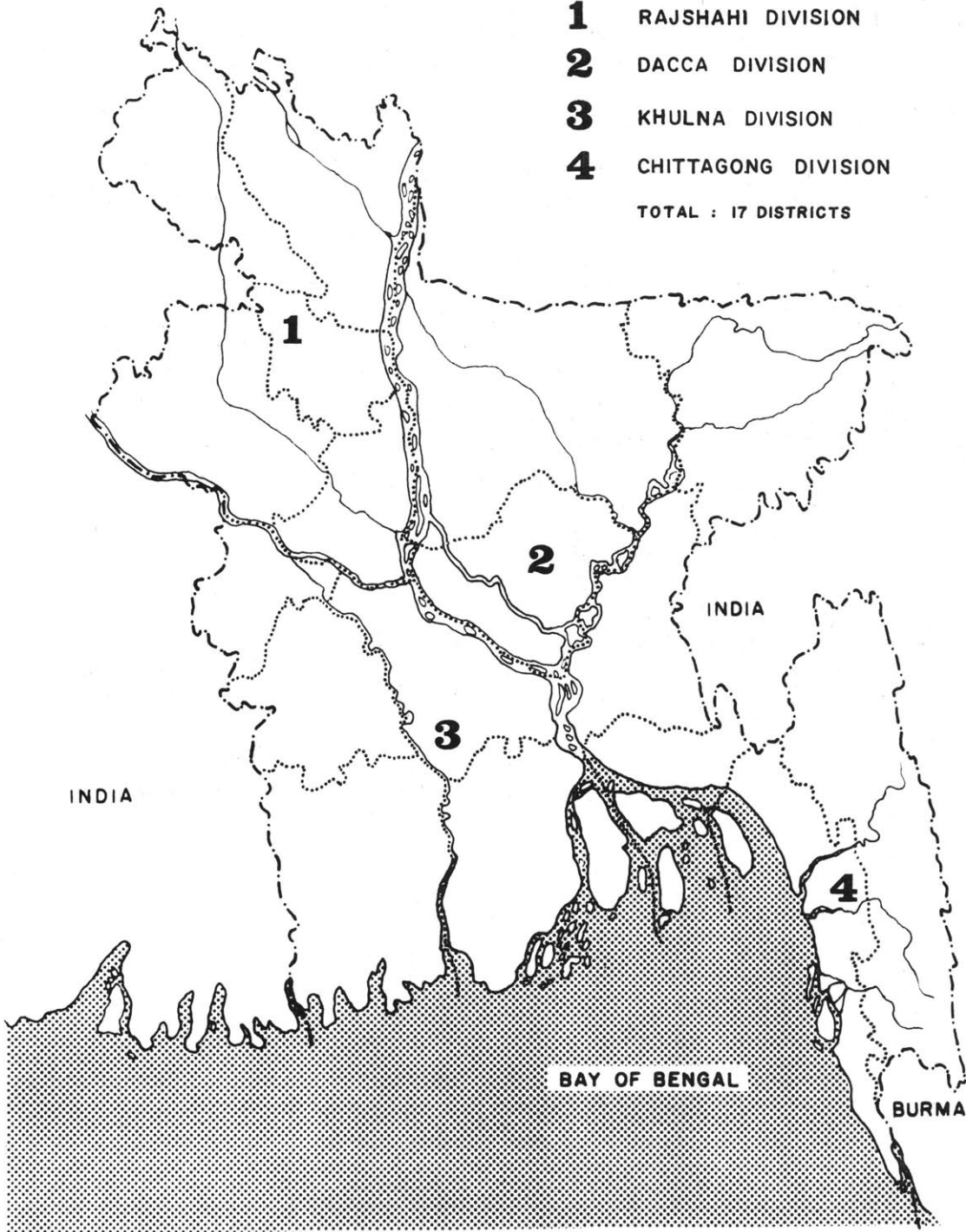
Legislative Body: Bicameral, consisting of Lower and Upper Houses of elected representatives.

Administration: 15 Departments, headed by a secretary appointed from the civil service by the Prime Minister.

Local Government: For administrative purposes Bangladesh is divided into 4 division and 17 districts. Each division is headed by a commissioner and each district by a deputy commissioner, appointed from the civil service.

ADMINISTRATIVE DIVISIONS

- 1** RAJSHAHI DIVISION
 - 2** DACCA DIVISION
 - 3** KHULNA DIVISION
 - 4** CHITTAGONG DIVISION
- TOTAL : 17 DISTRICTS



BANGLADESH

0 20 50 100KM



1.3.3 Housing and Housing Programs

The housing situation in Bangladesh is highlighted by the Census statistics given below.

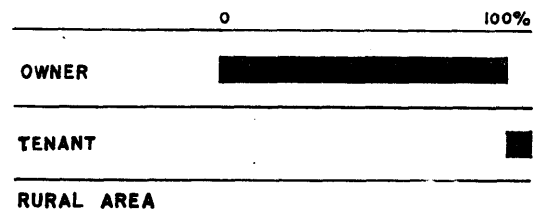
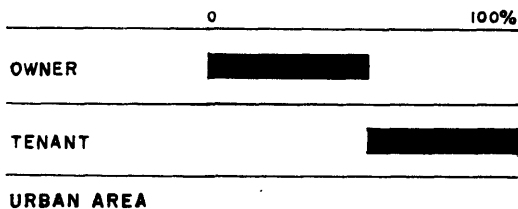
According to the 1961 Census (there was no census in 1971 due to the Civil War) there were 9,700,904 occupied dwelling units in the nation for a population of 51,525,807 inhabitants. Of these 487,355 (about 5% of total) were in the urban areas and 9,213,549 (about 95% of total) were in the rural areas. The average number of persons per family was 5.4 in rural areas and 5.6 in urban areas.

Considering that the net rate of population growth is 3.3%, it will require about 330,000 dwelling units in both urban and rural areas to be built each year.

1960 HOUSING CENSUS OF BANGLADESH

<u>Construction Types</u>	<u>Number</u>	<u>Percentage</u>
Masonry-Concrete	218,000	2.3%
C.I. Sheet (tin), bricks, wood	2,900,000	30.8
Shacks (wood, bamboo and mud)	3,460,000	36.7
Adobe (with bamboo)	940,000	9.9
Mobile (boats) and others	1,920,000	20.3
TOTAL	9,438,000	100.0%

1960 TENURE PATTERN OF BANGLADESH



DEFICIT IN DWELLING UNITS: URBAN AREAS, BANGLADESH
 (Source: Planning Commission, Draft Housing 1971)

	<u>Dwelling Units</u>
Shortage up to 1960	300,000
Demand during the period 1960-1965	250,000
Constructed during the period 1960-1965	<u>75,000</u>
Deficit as of <u>1965</u>	475,000
Demand during the period 1966-1971	300,000
Constructed during the period 1966-1971	<u>146,000</u>
Total Deficit <u>1971</u>	629,000

All houses in the rural areas are built by self-help and mutual aid. In the urban areas houses are built by owners with the help of small contractors, artisans and in some cases by self-help.

The only house building financing agency in the country is the House Building Finance Corporation (HBFC), which is a government autonomous organization created in 1952 for the purpose of providing long-term loan to all groups of people for the construction of residential houses. Later HBFC also provided loans to the private commercial sector. HBFC advanced \$40,000,000 to 8,808 applicants from the period 1955-1968.

The government agencies which are responsible for housing and new community developments are Works (Housing and Planning) Department, and Urban Development Directorate. Together they are responsible for the development of urban land and construction of public housing at various towns and cities of Bangladesh. The following were completed by both agencies as a part of the public housing program for the period 1958-1970.

Nucleus houses		29,102 nos
Low cost flats		6,316 nos
Residential plots		32,130 nos
Industrial and commercial land		442 acres
Other facilities:		
Primary school	28 nos	
Health centers	15 nos	
Commercial shops	1,599 nos	

The total cost of the program mentioned above was \$92,000,000.

The Public Works Departments of the government constructed housing for the government employees separately. This met 60% of the housing demand for the government employees.

Improvement Trusts, Public Works Department and private sectors developed residential communities in Dacca, Chittagong and Khulna.

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SECTION 2. NATIONAL AND URBAN HOUSING POLICIES

2.0.0 Introduction: Evolution of a Housing Policy for Bangladesh

From the inception of Pakistan in 1947 and up to 1968, the Government of East Pakistan had to deal almost entirely with emergency housing measures. The government was concerned with the building of dwellings for government employees while statutory Improvement Trusts were concerned primarily with the development of land for resale and improvement by private interests. The beneficiaries were either middle or higher income groups. With the mass influx of refugees (Moslems who migrated from India because of animosity between the two religious groups resulting in persecution), the government was compelled to assume a new responsibility: housing of families of lower income for whom neither the Improvement Trusts nor any other agency, public private, was providing either land or housing. The housing of the refugees was administered through the Rehabilitation Departments and was executed through the Public Works Departments.

In 1952, the Government of Pakistan established a (Government) House Building Finance Corporation with power to make direct loan to home owners up to 80% of the house value.

The refugee influx sparked the government's interest in home building for low income families on an emergency basis. The housing problem is also the consequence of a natural increase in population and of the influx of the families pouring into cities from the rural areas in response to the increasing demands of industrialization and relative inadequacy of rural prospects.

The housing problem as such is not a purely "refugee problem" or a temporary problem. Housing problems have confronted other developing countries as it has confronted Bangladesh.

Despite the long and growing seriousness of the problem, there was still implied in the official policies the underlying premise that the problem would disappear with the application of temporary remedies. This situation is not peculiar to Bangladesh, but characterizes most other developing countries.

At the present, discussion with officials and non-officials revealed agreement that the time had now come for charting a more consistent and long term policy.

2.0.1 SUMMARY OF POLICIES

	<u>Existing Situation/Policy</u>	<u>Recommendations</u>
LAND		
Squatters	Refugees from India and new rural migrants started squatting in urban areas	Provision of housing for squatter families through proposed Housing Agency Provision of housing for new rural migrants
Land Use	No clearly defined policy on land use, particularly no policy on land for housing	Sufficient land should be earmarked for low income housing on the basis of employment location Removal of military bases from cities to free land for housing
Land Cost, Acquisition	Raw urban land held for speculation Land cost is increasing Difficulty in securing land at reasonable cost Acquisition procedure is inefficient	Control of increase in land cost--taxation of urban raw land Zoning to regulate the rational development of land in town
FINANCIAL POLICIES		
Financing Institutions	Government HBFC has been making loans up to 80% of estimated cost of the house to upper income sector The HBFC has failed to meet the demands of middle income and low income sectors	For middle income: Tapping of private savings through creation of Building and Loan Society For lowest income: Housing agency to be organized with provision of making small loans and subsidies

	<u>Existing Situation/Policy</u>	<u>Recommendations</u>
ADMINISTRATION	<p>Lack of an agency whose job is to make land available for low income housing</p> <p>No agency to initiate finance and execute low income housing schemes</p> <p>Government created Improvement Trusts (which have failed)</p> <p>Shortage of housing personnel</p>	<p>Ministry of Housing: To formulate policies at national level</p> <p>Housing Agency: Responsible for housing operations</p> <p>Improvement Trusts: Only limited clearing of vital areas</p> <p>Direction of limited pool of experience to vital purposes</p> <p>Training of housing personnel</p>
LEGISLATION	<p>No legislation for housing, land development and institutions</p>	<p>Recommendation for proper legislative base should reflect the policy and objective of the government to include low income majority</p>

2.1 LAND PROBLEMS AND POLICIES

2.1.1 Introduction

The towns and cities in Bangladesh are surrounded predominately by agricultural land; the problem of expansion generally encompasses the transportation of rural land into urban uses. In each case, however, the following issues are apparent:

- a. Squatters and Squatting: Appropriation by squatters of land required for other essential uses, and the rehousing of the squatting families.
- b. Competition in Land uses: Competition of land uses between the needs of the agriculture, housing, industry, trade and military.
- c. Land Costs and Acquisition: The problems of land costs, land acquisition and speculation.

2.1.2 Squatters and Squatting

Squatting problems are not peculiar to Bangladesh, but exist wherever there has been a mass movement of people to cities and an absence of shelter in which to house them. Squatting occurs most frequently on government-owned lands or on land of absentee owners. It is a trespass of desperation, a consequence of the struggle for shelter in the world.

Though understandable, mass squatting nevertheless offers a formidable threat to the health of the squatters themselves and their neighbors, to legal and property rights, and to community and national well-being. When the problem is ignored, illegal possession gradually develops a color of right bringing with it increasing political pressures to protect the status quo or enforce excessive compensation for removal.

The proportion of urban population compared to total population in Bangladesh is very small. The figures are given below:

	Total urban population	Per cent of total population
1951 (Census)	1,819,773	4.34%
1961 (Census)	2,640,726	5.19%
1971 (Estimate)	4,400,000	8.40%

Of the total urban population more than 55% live in the four cities, namely Dacca, Chittagong, Khulna and Rajshahi. Next to big cities it is the middle sized towns that claim the largest proportion of town dwellers. The comparatively smaller towns with population of 25,000 or below claim about 25% of the urban population. It is apparent from the above figures that Bangladesh is predominantly agricultural; that is the reason squatting in Bangladesh is in initial stages and it is mainly the problem of three major urban centers: Dacca, Chittagong and Khulna.

2.1.3 Considerations

Any policy formulated must include the following considerations:

- a. Government Policy: Squatting has persisted because there has been no adequate housing program for those affected. Uncertainty of policy has encouraged further squatting and expansion of existing settlements. To end the squatting, government policy must be clearly defined so that present and future settlers know their rights, their prospects and their risks.
- b. Tenure: The type and durability of buildings erected by squatters is conditioned largely by the certainty or uncertainty of their tenure.
- c. Location: The areas which the squatters have chosen for settlement are usually close to the inner city where petty

trade can be conducted and a precarious livelihood carried out. Any alternative siting must consider the problem of economic transport, proximity to work location, or suitability for trade. (Re-settlement locations such as Mirpur, about 10 miles from Dacca City, are not near enough for trade and cannot be made economic, unless the entire area is improved and planned as a more or less self-contained unit with its own opportunities and its own solvent environment.)

- d. Size: The pattern of settlement varies from aggregations of thousands in well-defined concentrated areas as in Dacca, Chittagong, Khulna, to scatterings of a few in many places as in Jessore and Dinajpur. Some squatters' settlements exist on very costly land suitable for extensive and much-needed improvement, vital to the growth of the community. But absence of a firm policy keeps the improvement from going ahead.

2.1.4 Required Surveys

Before a policy can be formulated the following are necessary:

a survey of squatters and a survey of land available (for resettlement).

- a. Survey of Squatters: The following Socio-Economic Information should be collected by adequate staff, assembled and trained by the Housing Agency as described in Section 2.5 Administration and Legislation:

The magnitude and character of the squatter problems in particular localities with special reference to the number of squatter families on government and private land, including the number of occupants and the incomes of squatter families. (This information is essential to determine the contributions

which each family can be expected to make toward the cost of their resettlement or towards the improvement of their present accommodations.)

The determination of those areas now occupied by squatters which can be turned over to them for their lawful possession. (Such determination would be conditioned upon the feasibility of the site for improvement by adequate roads, water supply and sanitation and the willingness and capacity of the squatting families to purchase or rent their existing or alternative quarters on or near the existing site.)

The determination of the work location of the families to be re-housed, so that any re-settlement programs can make provision for new sites and for location of settlers within reasonable distance of employment.

- b. Survey of Available Land: A survey should be made in each area of land available for development and resettlement. It should be supplemented by a plan for acquisition, development, allocation of material, provision of funds for subsidy and loan financing and for the type of new tenure as suggested by the data. On the basis of the information gathered by the rehabilitation officers, land should be made available for all those to be re-housed. This land should be sub-divided into building plots, and provided with access roads and utility service. Squatters should not be rehoused all in the same locality. Sites should be located with the employment place as one of the prime considerations.

2.1.5 Housing Policies

Arrangement for rehousing the squatter families in the new settlements should be made by the Housing Agency as described above.

The squatter families to be resettled should be given the choice of the following:

a. Option A

Provision: Site and Core House

Tenure: Ownership

Financing: Long Term Loan

(Outright purchase if applicable. Site plus core house with plans for future additions and loan to be repaid in small installments.)

b. Option B

Provision: Site and House Loan

Tenure: Ownership

Financing: Loan

(Loan to be repaid in installments and as improvement proceeds. Wherever possible, loan should be in the form of material for construction.)

The formation of cooperative housing societies and other voluntary organizations among squatters who are to be resettled should be encouraged. After identifying the sites that can be utilized with little or no displacement, plans should be prepared under which those squatters who are allowed to remain on the land they occupy can acquire ownership through easy installment payments. Community improvement programs for roads, drains and water supply should also be included.

2.1.6 Eradication Policies

Squatters should be removed when the land is needed for vital urban purposes such as for utilities, schools, or for the safety of the squatter families and adjacent areas. Houses worth preserving should be

moved to other sites. Others should be destroyed. The area should then be cleaned and posted with notices stating that future squatters in the cleared locality will be prosecuted and an appropriate law or order should be promulgated accordingly. (Where feasible, areas cleared of squatters should be fenced off, put to use as playground, garden sites, parks, permanent housing, or for industrial or commercial purposes as the circumstances may warrant.)

Provision should be made for a fund to pay the moving expenses of those bona-fide squatters and migrants who prefer to find their own accommodations in the community or elsewhere.

The above recommendations are designed to respect the history and background of squatting in Bangladesh and the public feelings towards them. They aim to avoid the uprooting of more families than required by health and community welfare. They are not intended as a universal or rigid formula; they must be detailed as the program proceeds and as experience dictates.

2.1.7 Provision for New Migrants

Towns and cities in Bangladesh will continue to grow rapidly. Migrants will continue to flow into the urban areas, many of them penniless, in search of work and shelter. If no provision is made for them, they too may be forced to become squatters, and create slum settlements as in the past. The following principles must therefore condition the above program:

Timely estimates must be prepared of any substantial increase in population anticipated as a result of new industries, administrative

offices, or other undertakings which spur migratory movements. Sites must be prepared and plots made available to future in-migrants in the same way as suggested for the squatter families. The provision of developed land must always be one step ahead of the anticipated influx. If it is to avoid illegal appropriation of land and slum formations, the local community must always have land ready for legal occupancy, settlement and development.

2.2 COMPETITION IN LAND USES BETWEEN THE NEEDS OF AGRICULTURE, HOUSING, INDUSTRIES, TRADE AND MILITARY

2.2.1 Introduction/Considerations

In the past, the army, the public services, industry and the airport have competed with agriculture for the land bordering on the built-up areas of the cities. Such land has been also attractive for the university, the cantonment, cemeteries, and recreation. Improvement Trusts have entered the competition as another contestant to meet the demand for sub-division of land for resale to higher income families. Composed of contiguous parcels of one or a few ownerships, it could be acquired for immediate development by those able to pay the price. Land for low cost housing had to be procured from whatever land was left from the process. The wealthy could choose the land on the immediate periphery where they could be close to the urban centre, but free from its crowding, noise, and pressures. The poor had to crowd into the central dense areas or find housing land far outside the desirable periphery. Lacking automobiles, they were dependent on the bus or the railway, paying out of their meager wages the travel costs incident to the process and enduring the consequences of the lengthening

journey to work. The colonies at Mirpur, twelve miles from the urban center of Dacca, are recent examples of the rise of the distant periphery, while the squatters along New Market Road exemplify the concentration process at the urban center.

Policy must necessarily reflect on local conditions (for instance, in Dacca most of the land adjoining the city is subject to flooding and is unsuited for housing). There are a few general principles underlying land use policies, however, which apply to all Bangladesh towns:

- a. Low Density Settlements: The climate of Bangladesh and social traditions combine to emphasize the predominant building of low density settlements. Net densities of 25 families per acre (55 families/Ha) or less are the rule for low cost housing areas. The climate is sympathetic to outdoor living and, in the case of the poorer class, the functions of the house are shelter from bad weather and retreat for privacy. A poor family can subsist with few and small rooms as long as these rooms are close to the ground and afford access to an open space. An enclosed yard, protected from view by walls, is an important living area and the cheapest to provide.
- b. Open Air Living: The open air living space is a cheap solution from the individual home owner's viewpoint, and the only solution he can usually afford. It is, of course, a more expensive solution for the community, whose roads and services will function efficiently only when serving compact settlements of large numbers. One- or two-story houses will remain in the major part of town planning schemes.
- c. Family Size: The tradition of the joint or extended family system reinforces the above-mentioned point. This system will persist as long as it helps assure a cohesive existence

and a greater economic security. The joint family tends more often to grow than to shrink. But as it grows, it also acquires more contributors to the shelter cost. Rigidity of the dwelling unit, whether of vertical or horizontal design, is bound to yield to the hard dictates of limited income and will press for the continued pattern of detached or semi-detached houses on plots that permit additions as required by the growing family unit.

- d. Multi-Storyed Flats: Multi-storyed flats are in towns where lack of space forces development upwards as in Dacca; in the years to come, if population pressures grow, their number will be increased. They are suitable for small families and those middle and upper class families for whom concise living or proximity to the business center and the saving in time and transportation cost are more important than the advantages of groundfloor living and open space.

2.2.2 Recommended Policies

New Settlements: It is recommended therefore that whenever possible, sufficient land be earmarked for low cost housing on the basis of one- and two-story development. While this will and should be the predominant program, it should not preclude inclusion of a few high buildings for offices, for upper class housing and for those few others whose needs can be met by such taller structures.

As low cost building estates tend to spread horizontally, they will necessarily call for more land and for cheap land. Only in some places and in smaller towns will such land be available within walking distance of old established town centers. However, successful solutions on accessible

outlying sites should be possible, if the following points are considered:

- a. Location: The siting of housing must be related to employment. Housing and industries must be planned together instead of competing with each other for the identical sites. Housing sites must be within distance of the work locations. Before a factory is built, the housing requirements should be charted and planned for. The government should be prepared to use its compulsory purchase powers to acquire the most suitable industrial land. In the long run, it is housing plus utility and other costs which far exceed the cost of the factory. Low cost housing estates should be either situated within walking or cycling distance of an existing urban center, connected to it by frequent and cheap transport, or large enough in themselves and sufficiently diversified in their social and economic structure and composition to offer employment facilities near or within the borders of the community. It may often be more economical to subsidize low cost housing on expensive land near an existing town, particularly where it is anticipated that the outlying settlement will expand into an independent center of urban employment.
- b. Employment: Industrial employment is important, but by no means the only factor in urban growth and development. For one person working in a factory, two or more may be employed in the trade, crafts, or service industries. Opportunities in trade and in the service industries grow rapidly with the increasing size of the town, particularly with the presence of middle and upper income groups.

2.2.3 Military Bases Within the Cities

One of Bangladesh's legacies from pre-partition days (1947, Independence) are the cantonments originally situated outside the urban center but now lying within them or at their immediate outskirts. Dacca and Comilla are examples. Cantonments, as distinguished from the "civil lines" which have become integral parts of urban patterns, are large enclaves under military control, non-urban in character and residential only as an incident of the military purpose.

Their original siting was doubtless logical and strategic about 50 years back. Today they sprawl mid the town's bustle and crowding and land hunger. They are often more like military estates than compact and efficient units of operation. Considerations of military secrecy, troop morale, the requirements of quick mobility and protection against political subversion make it undesirable to house troops in the middle of towns. Presence of cantonments within the built-up areas adds the towns and their people to the military targets in case of air attack, such as in the recent war in 1971. The presence of the townspeople impairs military mobility and privacy. Modern mechanical transport makes it possible to locate the cantonments at accessible distances from major cities and bring troops into town at a moment's notice should the need arise. The shifting of the cantonments to sites more in keeping with modern military requirements would increase the safety of the civilian population and simultaneously free valuable land for housing.

2.3 PROBLEMS OF LAND COSTS, LAND ACQUISITION AND SPECULATION

2.3.1 Introduction

Securing land for housing at reasonable cost poses a problem in Bangladesh. Urban land cost may be conditioned by the availability of an accessible land supply, the use to which the land is put and the efficiency of acquisition procedures. Except in the central areas of cities, one and two story buildings are still being built and are feasible. General resort to the vertical construction is not yet essential as in Singapore, Hong Kong, or other places. In the smaller cities, access to employment location is achievable by bicycle or by relatively short bus routes. Both the land problem and land cost are linked to (a) the expansibility of the land supply at the periphery, (b) the adequate utilization of raw land or under-utilized land within the town, (c) the linkage of land supply to transportation and to work location, and (d) the proper use and development of sites for housing the people for whom the pressure is greatest.

2.3.2 Control of Increase in Land Costs

Yet land costs are increasing. Land cost, moreover, is an important item in the housing of the lowest income group to whom all costs, however small, are a burden. Runaway increases in land cost can be controlled in a number of ways. Taxation is one. There is presently no tax on raw land, as exists in the United States but not in the British Commonwealth. A tax on land value as assessed would hold down the land costs without eliminating the owner's profit, force more land into use and give the Government revenues. The tax could take the form of an annual levy on its capital value.

Zoning is another device which can be employed not only to curb speculative increases in value, but to regulate the rational development of land in towns. Unless zoning laws are enacted, haphazard growth is inevitable. In the preparation of any Master Plan for a town, zoning should be a required item. It should include regulation of use, height, coverage and open space and govern density and set-back requirements. There has in fact been no comprehensive zoning for towns in Bangladesh. It is recommended that model zoning ordinances be prepared and applied.

2.3.3 Compulsory Acquisition Laws

One of the problems confronting Bangladesh is the condition of its Compulsory Acquisition Laws. They date back to the last century and are embodied in old colonial enactments that still survive. Many can be retained, but some parts are confusing and some contradictory. Irrespective of whether the purpose is an emergency one or otherwise, the public authority should be authorized to take possession without waiting for the award to be determined.

2.4 FINANCIAL POLICIES

2.4.1 Introduction

House construction in Bangladesh is undertaken either by cash outlay, construction in stages, or Government operations directly. The bulk of the housing is built without mortgage funds. There are no financing agencies in the country with power to accept deposits, nor are mortgage loans made by insurance companies or banks, nor are there Building and Loan Associations

or Savings and Loan Associations whose main purpose are to accept deposits at interest and re-lend such deposits to homebuilders. Bangladesh has not developed any practical formula for financing house building.

In the absence of such financing mechanisms, most families must have the total cost of a house in hand before starting to build. Only the rich with liquid funds can afford and pay for a good house. The poorer classes must live under the unsatisfactory conditions for years, before they have accumulated necessary funds to build the core of a house or to complete it.

A by-product of this lack of mortgage money is the stagnation of the construction industry of which home-building is a major part. In most countries, the home building industry is one of the main sources of employment and economic well-being. While family income generally is still too low in Bangladesh to make home-building significant as an economic pump-primer, an effort to develop the home-building potential through the evolution of a working mortgage system deserves serious consideration.

2.4.2 Present Financing System

To meet the need for mortgage money, the Government has set up (in 1952, by the then-Pakistan government) the Government House Building Finance Corporation with three regional offices in Dacca, Chittagong, and Rajshahi. The Corporation has been making loans up to 80% of the estimated house value at 7% interest for individuals and at 5% interest for Cooperative House Building Societies. The maximum loan period is 15 years with repayments made in monthly installments. The maximum allowable loan is

40,000 rupees (Rs 1,000,000 for Co-operative House Building Societies). An application for a loan must be accompanied by proof of sufficient income, by a plan approved by the competent local authority, by an architect's or engineer's estimate of the total cost of construction and by proof of title.

Although this represents a sincere effort to meet a pressing need. However, it has met housing needs only fractionally, and has failed to meet the requirements of the low and lowest income groups completely.

2.4.3 Recommended Policies for Middle Income and Low Income Groups

It is generally agreed that the shortage of mortgage money is holding back construction, thereby prolonging squatting, and working a hardship on families of moderate and lower incomes.

It should also be manifest that no country can finance its housing entirely from grants or tax revenues. A house is a long term investment, the cost of which could be amortized over all or most of its life. To finance a housing program, two general principles form the base of these recommendations:

- a. Private Savings or other private funds may be drawn in to finance that portion of housing which is self-liquidating. Government stimulus may be given to achieve this objective, and it may be done in a variety of forms.
- b. Direct government loans may, however, be made for families whose homes are not self-liquidating and who thus require public subsidy.

Before proposing a financing formula, it is first essential to determine whether savings are available.

The National Saving Certificates in Bangladesh were purchased mostly by middle and upper income groups. Between 1960 and 1969 such savings have amounted to 66.5 million rupees. While it is impossible to measure accurately how much additional savings might be available for conversion into mortgage loans, sufficient evidence exists to make the mortgage financing plan worth trying.

Since it is desirable to expand the quantity of savings rather than to divert Government revenues into mortgage loans, any formula for approving mortgage loans should offer inducements to savers which will attract their savings into a Corporation authorized to make mortgage loans. Savings are normally encouraged by factors of safekeeping of funds and attractive interest rates. If a further inducement is the prospect of a loan for a house or a developed site, the additional inducements could be sufficient to draw out an additional pool of savings now untapped.

It is therefore proposed that the Government should launch the establishment of a Building and Loan Society as a pilot effort. Such society should function initially in Dacca with branches in Chittagong, Rajshahi and Khulna. Its operation would aim to be ultimately self-supporting, although the Government would initially finance it. Its purpose would be to supply loan funds to moderate-income families who can pay for housing on a self-supporting basis.

2.4.4 Policies for Lowest Income Families

The Building and Loan Society is intended primarily to serve families of moderate income. It cannot be expected to meet the needs of the lowest

income group for the following reasons:

- a. Such families cannot pay the going interest rates on a self-supporting basis. Interest rates would have to be considerably lower than 7%.
- b. The servicing costs on small loans would be too high.
- c. Many special arrangements would have to be made with squatters and other low income families having special problems.

Loans to squatter families with very low incomes (approximately 60-150 rupees per month) will require special applications. Most families will have a choice of either a core house built by the Government Housing Agency, a site provided by the Government on which to build their own house, or a house already built in a squatters settlement or elsewhere which may require alteration, replacement or addition. For the low income families, the Government Housing Agency should be organized with a provision of making small loans.

Since the authorization period of the loan is one of the most important factors in the determination of monthly charges, the period of the loan should be related to the type of improvement to be made, the value of the fixed security and the financial responsibility of the borrower, for up to 25 years. The types of loans should be classified and terms defined for each class so as to hold down individual negotiations.

Interest should be low (about 2-3%) and should be no higher than the rate at which the Government borrows on short term financing (5-7 years) plus a small charge to cover operating costs. Subsidy may be required in some cases. The operation cannot be viewed as profit-making.

Loans should not be paid out in bulk but should be advanced in serial payments linked to the stages in which the improvement is completed. Loans may be made in the form of materials, where such materials are owned by a Government agency and can be so delivered.

The loans should be protected by mortgage and bond. Default in loan payments should be strictly enforced. If the general feeling is established that such loans are dealt with leniently, defaults may become general and the loans be viewed as gifts. Again, if rent collections break down, capital would be unavailable for other housing.

2.5 ADMINISTRATION AND LEGISLATION

2.5.1 Introduction

The following table enumerates the administrative functions involved in housing and planning in Bangladesh today, and notes against each function the agency responsible for it.

2.5.2 Distribution of Housing and Planning Functions in Bangladesh

Subject	Urban areas	
	Dacca, Khulna, Chittagong	Other urban areas of Bangladesh
LAND		
1. Preparation of land use zoning, and town development plans	Improvement Trusts	P.W.D. and Urban Development Directorate
2. Acquisition of land (compulsory or by agreement)	Improvement Trusts or Government	Government
3. Survey of land, construction of roads and drains	P.W.D.; Improvement Trusts; Municipality	P.W.D.
4. Disposal of housing sites		
a. at market price	Improvement Trusts	Housing and Settlement Department
b. for lower income group	None	None
5. Control of private development activities, building permit license, street lines	Improvement Trusts	None
6. Slum clearance including re-development, and re-housing	Improvement Trusts	None
7. Water supply and sanitation	Water Supply and Sewerage Authority	Municipality
FINANCE		
8. Financing		
a. from government sources at market rate	Government House Building Finance Corporation	Government House Building Finance Corporation
b. from private sources	Negligible	None
9. Financing at below market for low income group	None	None
ADMINISTRATION		
10. Initiation of low cost housing projects	Improvement Trusts and Works, Housing and Settlement Department	Works, Housing and Settlement Department
11. Estate Management		
a. Maintenance	Improvement Trusts P.W.D.	P.W.D.
b. Rent Collection	Improvement Trusts P.W.D.	P.W.D.

Subject	Urban areas	
	Dacca, Khulna, Chittagong	Other urban areas of Bangladesh
DESIGN AND MATERIALS		
12. Design of houses	Improvement Trusts; P.W.D.; Works, Housing and Settle- ment Department	P.W.D.; Works, Housing and Settlement Department
13. Building Research	P.W.D. (C.S.I.R. in Dacca only)	None
14. Procurement of building materials	Director of Supply	Director of Supply

2.5.3 Deficiencies of personnel and lack of proper housing agency

The above table indicates significant gaps in the administration of housing and planning in Bangladesh. Moreover, the nominal allocation of an administrative function does not guarantee its performance. For example:

- a. In the urban areas and in the whole country there lacks an agency whose job is to make building plots available for low cost housing. Improvement Trusts develop building land only for upper class housing.
- b. There is no authority in Bangladesh whose task is to initiate, finance, and execute low cost housing schemes.
- c. Loan financing of lower and middle income housing is at present negligible. There are a few beneficiaries of direct government loans (i.e., upper and middle income borrowers through Government House Building Finance Corporation).
- d. There is no institution to collect private savings and deposits for use in the financing of house building.
- e. The processing and servicing of small loans are non-existent.

- f. Planning (Town development plans, land use, zoning, etc.) is provided in theory, but owing to the shortage of technical staff, rarely gets beyond the preparation of a lay-out plan for a housing estate.
- g. There is no research in low cost housing and little in the development of indigenous building materials.
- h. In the whole country, supervision of house construction in the public sector, and often the design work as well, rests with the heavily burdened Public Works engineers--an arrangement uniformly considered unsatisfactory. (The Public Works Department was created 100 years ago with different social and economic conditions, and for a specific purpose. During the past 100 years the Department has done fine work in the specific field of public works; however, it was not created to handle housing matters. Informed officials and non-officials in Bangladesh have the conviction that it would be essential to separate housing efforts from Public Works and to create a new technical agency or agencies for housing.)
- i. For the urban areas of Dacca, Chittagong and Khulna, the above table cites Improvement Trusts. It should be noted that their jurisdictions are limited. (A difficult question is the role of the Improvement Trusts in the housing programs of the urban areas. The Improvement Trusts were intended originally to deal with slum clearance. Because local authorities were not fully equipped, the Improvement Trusts were also often asked to help out with municipal functions. They did town planning and some zoning work, undertook road improvement schemes, the construction of bus shelters, markets, shopping centers and developed housing estates for upper and middle income groups.

2.5.4 Administrative Policies

Housing policies, plans, and implementation first of all should be separated from the Public Works Department and the Improvement Trusts as well as general heavy reliance on the public sector.

- a. Ministry and Housing Agency: At the national level it is necessary to establish a central agency responsible for housing programs. This can be in the form of a ministry, which will give housing interests a voice at the highest level of government. Again, the operations of the housing programs can frequently best be accomplished outside of the government structure, preferably in the form of a public corporation/agency. This system has the advantage of allowing conventional business practices to be utilized. This also gives great flexibility and control. The staff does not have to be a part of the civil service, thus providing for better performance and accountability. The housing agency is freer of political pressures. A combination is possible in which a ministry is responsible for policy formation and for supervision of the housing agency.
- b. Present shortage of Housing Personnel: Bangladesh suffers from a severe shortage of experienced administrators in these fields, as well as architects, planners, and road, sanitary and structural engineers. There are no trained industrial cost accountants, building research workers, or estate managers. A basic aim should be to direct the limited pool of experience towards the most vital directions. (It may be noted that the Engineering University at Dacca and Engineering Colleges are producing engineers, and the School of Architecture and Planning at Dacca has started producing architects from 1968, and the first planners will graduate in 1972.)

- c. Decentralization of Housing Programs/Operations: The operations of the housing programs should be decentralized. An effort should be made to establish decentralization at least to the regional level, if not to individual urban centers. The constraints which should limit premature decentralization are the ability to staff the agency with sufficiently trained personnel, and the experience of the agency to the point where routine operations become systematic. Until these blocks can be overcome, it is best to maintain central control. Decentralization is also desirable because it allows the housing program to be more in tune with local needs and resources, it saves processing time for routine business, and it allows closer supervision of projects.

2.5.5 Functions of the Housing Agency

The public sector program needs to be limited to the essential needs of the lowest income groups. The program for the middle and upper income groups needs to be transferred to the private sector. The government should set up an autonomous housing agency which should cater to both public and private sectors. The responsibility of the housing agency should include the following:

- a. make building plots for low cost housing available.
- b. initiate, finance and administer low cost housing schemes.
- c. provide and service small loans for lower income housing.
- d. administer housing estates.
- e. plan, zone control, and execute housing and ancillary works.

2.5.6 Building and Loan Association

The collection of savings and deposits should be entrusted to a Building and Loan Association or other suitable agency as outlined in Section 2.4.3.

2.5.7 Legislative Base

Basic to the institutionalizing of a housing policy is the establishment of an adequate legislative base. Legislation should reflect the policy objectives of the government. In view of the urgency of the housing situation in the country, it should include legislation for housing and land development institutions; in addition it must include appropriate property tax laws, building codes which reflect local conditions, town planning legislation to meet local needs, and housing finance laws. In establishing the legislative base, housing policy background research should be employed to formulate policies and test the possible results.

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SECTION 3. THE CITY OF KHULNA CONTEXT

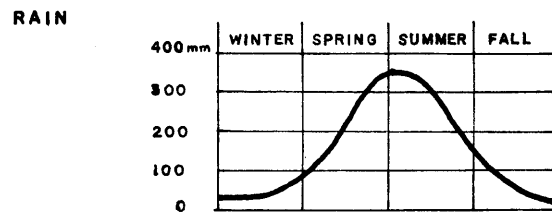
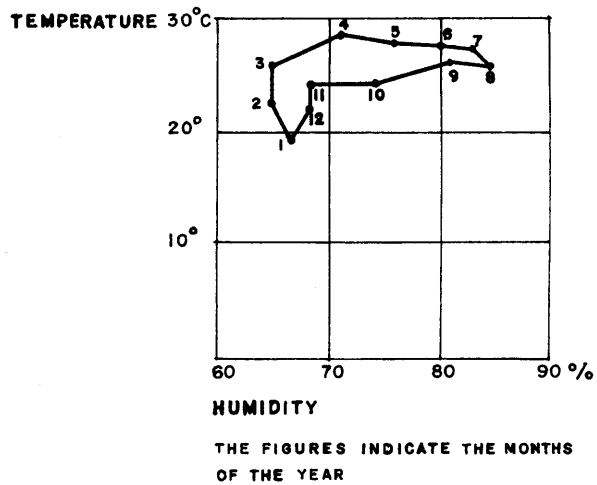
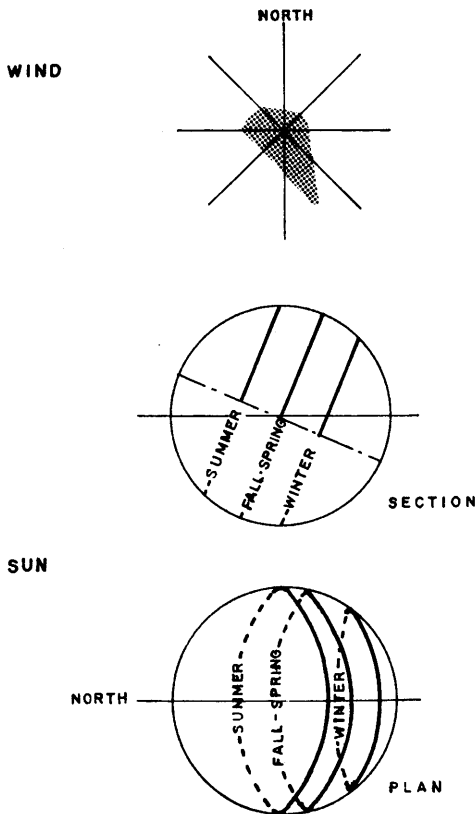
3.2.1 General Information

Khulna is the third largest city of Bangladesh. It is an industrial and commercial center. The city is located 90 miles (144 km) southwest of Dacca, the capital of Bangladesh, and 90 miles (144 km) east of Calcutta. Khulna is located on flat land and on the banks of Bhairab and Rupsa rivers.

The city spreads 11 miles from north to south and 2.5 miles east to west. Its location on the Bhairab river gives it access to the delta regions in the south. The railroad and the road going north connect it with the northern part of Bangladesh. The Chalna-Mongla anchorage, twenty miles to the south, makes Khulna in reality a seaport.

The climate of Khulna is moderately hot and humid with an annual rainfall of 68 inches.

KHULNA 23°N



3.2.2 History

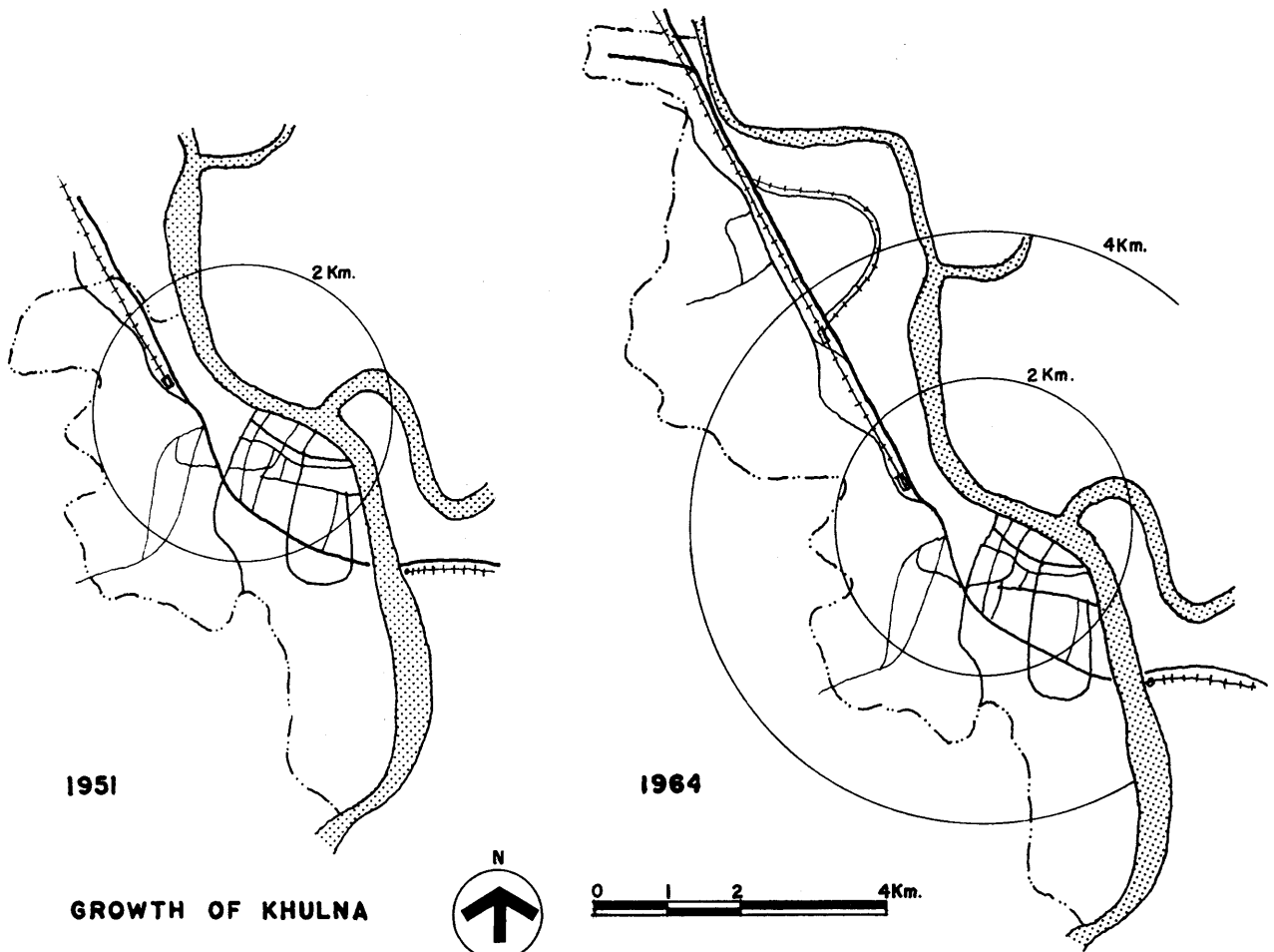
Until 1880, Khulna was a small agricultural village in the Jessore district. In 1882 the new district of Khulna was created and Khulna was made District headquarters. It quickly grew into a small town along the banks of the Bhairab river.

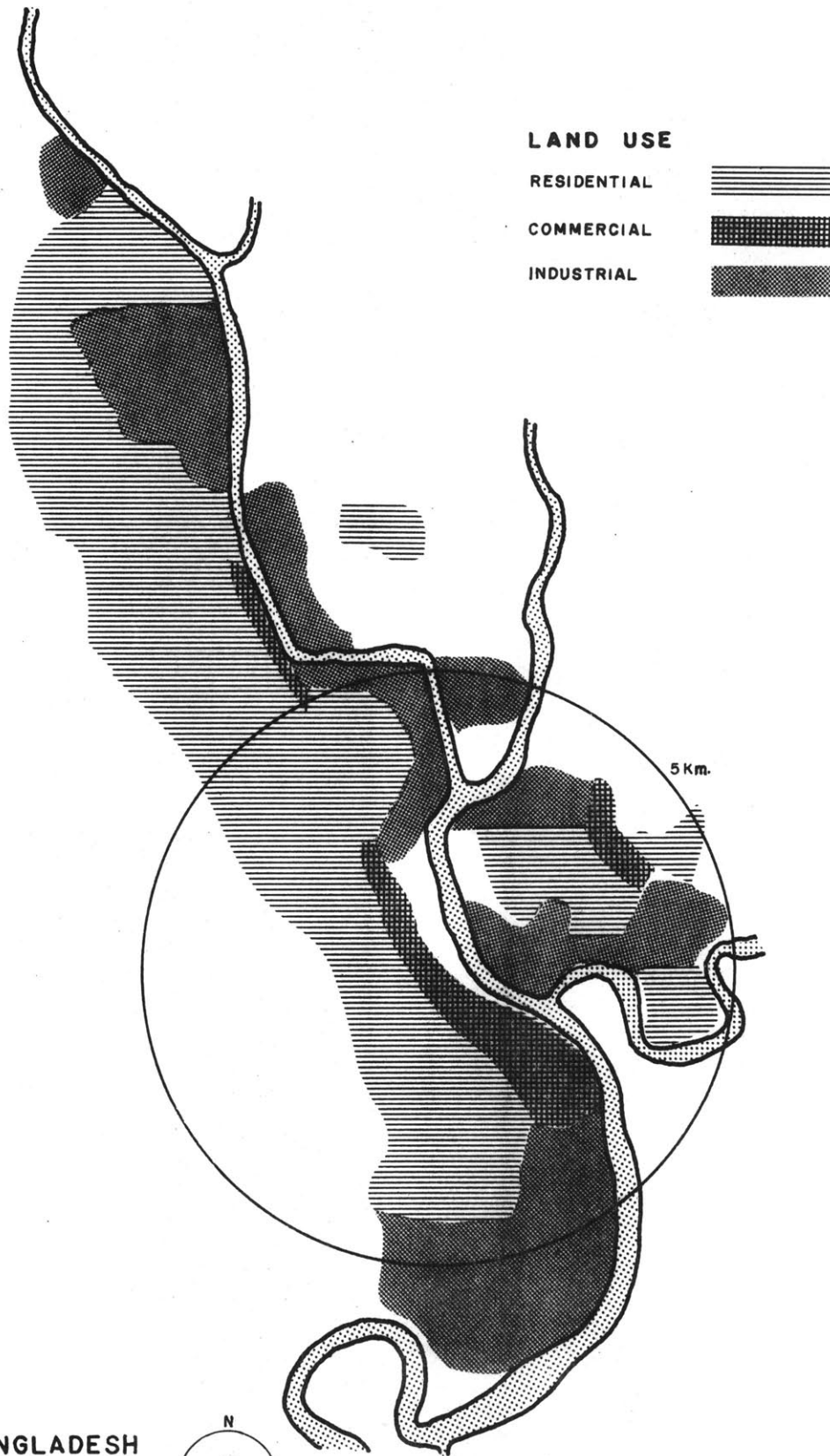
During the 1950's Khulna became industrialized. A large newsprint factory, several jute mills, and a huge power generating station were built in Goalpara-Daulatpur-Khalispur area to the north of the town on the banks of the Bhairab river.

Area of Khulna Town

1950
1961
1971

8 square miles
14.30 square miles
18 square miles



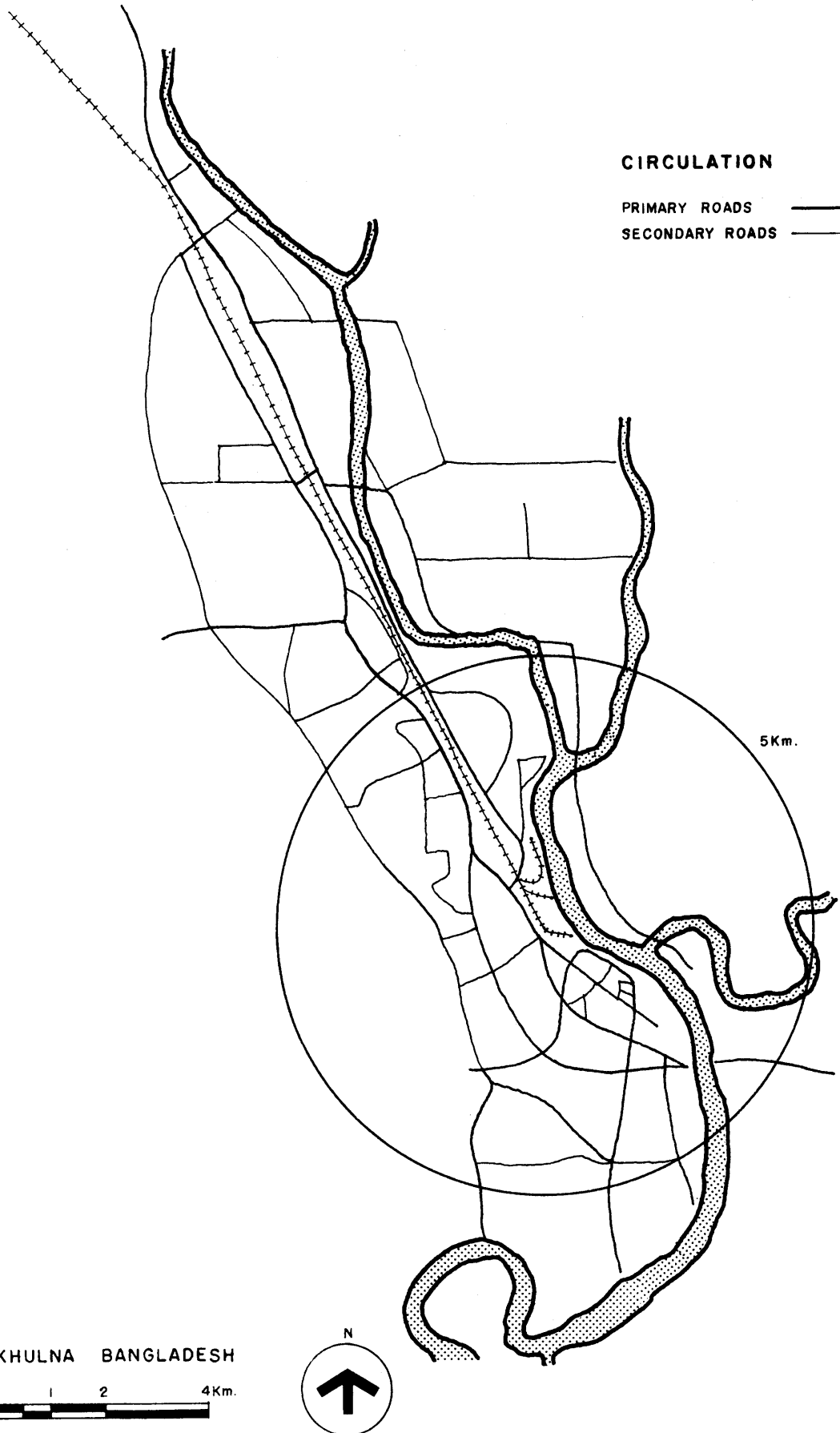


KHULNA, BANGLADESH

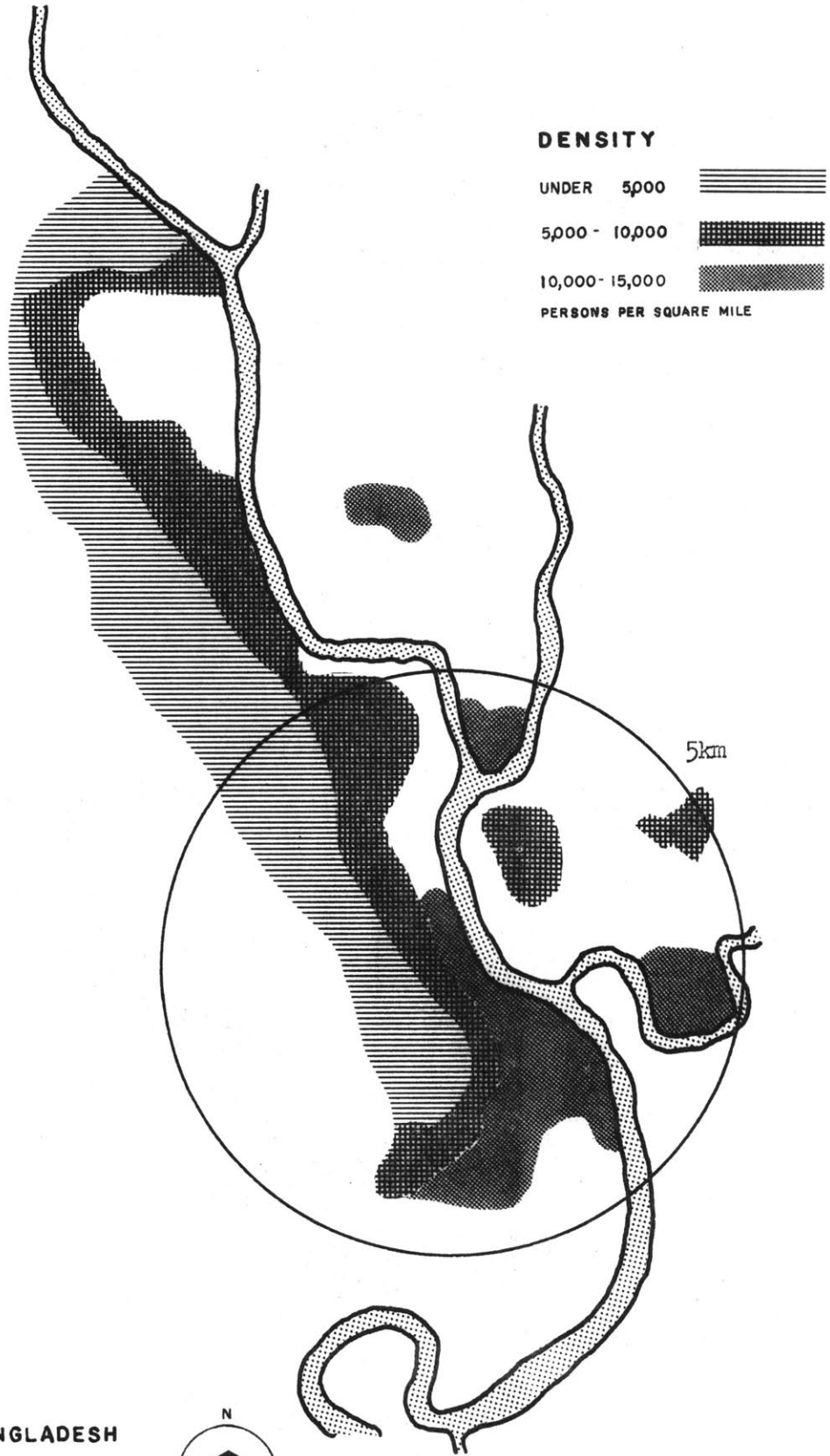


SOURCE: MASTER PLAN REPORT 1962

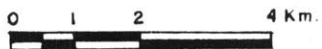




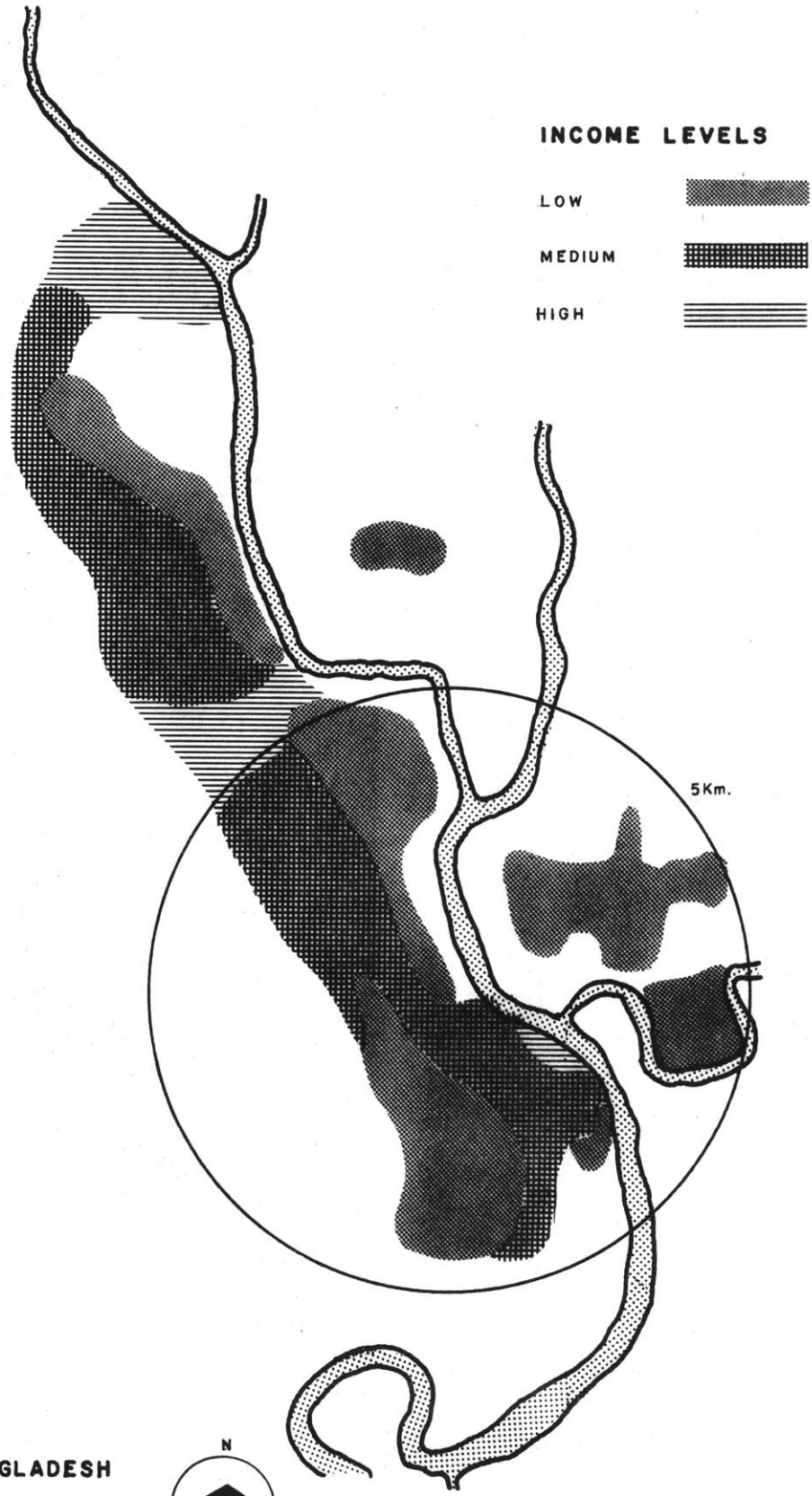
SOURCE: MASTER PLAN REPORT 1962



KHULNA BANGLADESH



SOURCE MASTER PLAN REPORT 1962



KHULNA BANGLADESH



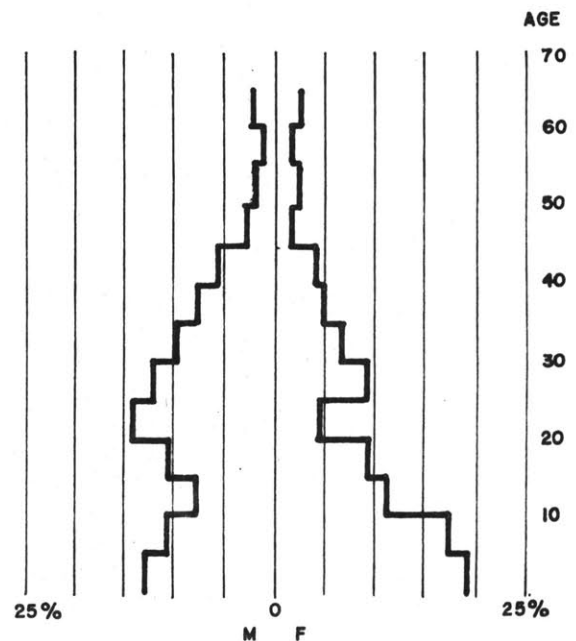
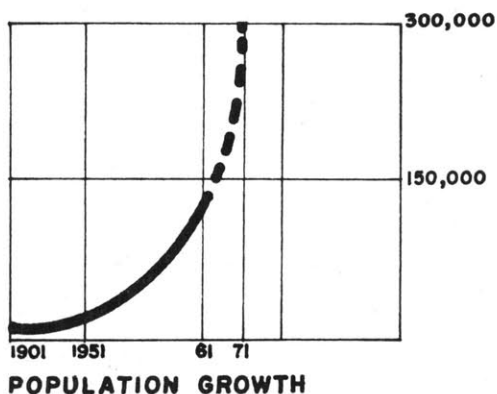
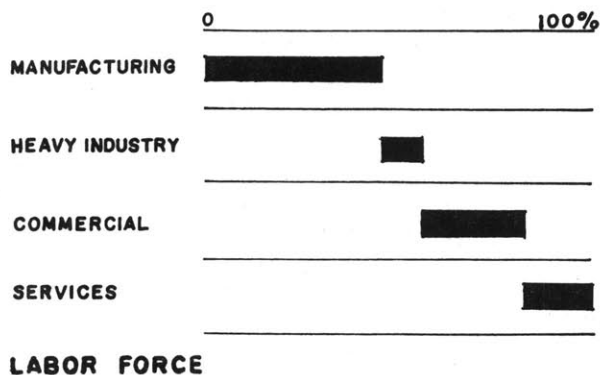
SOURCE MASTER PLAN REPORT 1962



3.2.3 Demographic Characteristics

Khulna grew very quickly during the period 1951-1970. In 1901 it had a population of only 10,426. By 1951 it had grown to 42,225. In the next ten years the opening of Chalna port and the growth of Daulatpur industrial area spurred a 209% growth to a population in 1961 of 127,970. In 1970, the estimated population was 331,923, with a growth rate of 18.5%. The area of Khulna city was 18 square miles in 1970, giving a density of 18,500 persons per square mile.

The ethnic composition of the city is 85% Bengalis and the rest mainly Biharis and others. The highest concentration of low-income households is in the northern part of the city--the Daulatpur-Goalpara-Khalispur industrial area. The upper income sector is located in the south and west of the city; the middle income sector is located around the center of the city.



POPULATION DISTRIBUTION

3.2.4 Economic Activities

Through the port of Chalna, Khulna exports jute, burlap, tobacco, hide and skins, newsprint, and oilseed. Its industrial establishments include a newsprint mill, jute and textile mills, and telephone, electrical and cable production factories. Khulna has also a huge power plant and a small shipyard, and a modern docking facility for inland rivercrafts with concrete jetties and wharf. In addition to the waterways, hard-surfaced roads and a railroad connect Khulna to other parts of Bangladesh. The Khulna/Chalna port handles approximately 20% of the foreign trade of Bangladesh.

Per capita income of an industrial worker in Khulna is \$405 per year.

3.2.5 City Administration

Maintenance of law and order in the city is the responsibility of the General Administration Department of the Bangladesh Government. The Deputy Commissioner is the head of the city's civil administration. He is assisted in his duties by an additional deputy commissioner, a sub-divisional magistrate and certain other magistrates, and a sizable police force supervised by a few officers of the senior police service.

City health, sanitation, water supply, drainage, road-lighting are administered by the Municipal Committee. Primary education and city roads are also managed by the Municipal Committee. The Municipal Committee has an elected body headed by a chairman. The income of the Khulna Municipality was \$850,000 in 1968. The major sources of income were octroi duties, municipal taxes, property taxes, and license fees.

References:

Haroun er Rashid, East Pakistan: A Systematic Regional Geography and Its Development Planning Aspects, Second Edition, Sh. Ghulam Ali and Sons, Lahore (1967).

Nafis Ahmad, An Economic Geography of East Pakistan, Second Edition, Oxford University Press, London (1968).

Khulna Municipality, Program of Development Works 1968, Khulna (1968).

Minoprio and Spencely and P.W. Macfarlane, Draft Master Plan for Khulna, Government of East Pakistan Press (1961).

Government of Pakistan, Census Commissioner, District Census Report: Khulna 1961, (1962).

Section 4. SITE AND PROGRAM OF THE PROPOSED MODEL

4.1 LOCATION

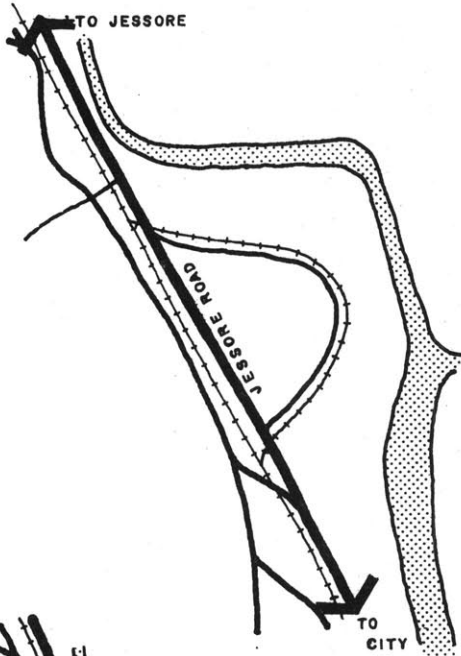
The location of the proposed housing development is at Goalpara-Khalispur industrial area in the city of Khulna. It is located on the northern part of the city and approximately 5 km from the business center.

4.2 ADVANTAGES OF THE SITE

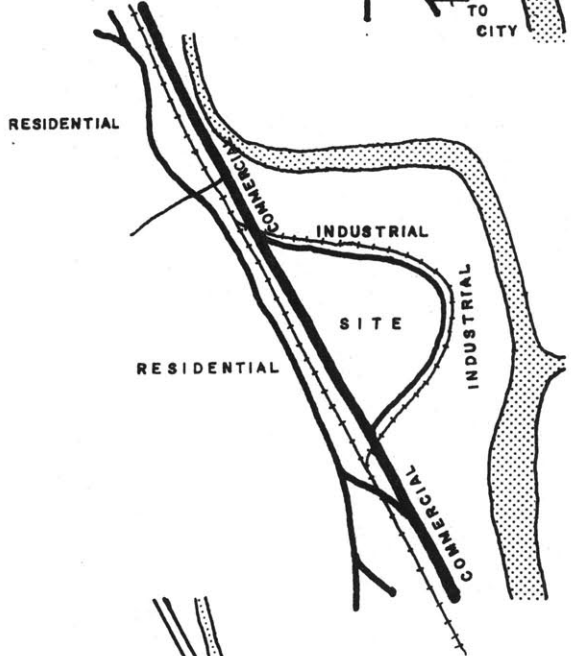
- a. Employment: The site is located adjacent to an existing big industrial area, consisting of jute (burlap) mills, newsprint mill, textile mills and other factories.
- b. Master Plan: The site has been reserved for low and middle income sectors as per government Khulna city development Master Plan.
- c. Proximity to recreation areas: The site has an open space called Riverside Park adjacent to it. It is also close to other recreation areas of the city.
- d. Transportation: The site has easy access to a major road connecting the city center and other areas in the north.

4.2.1 The Site Goalpara

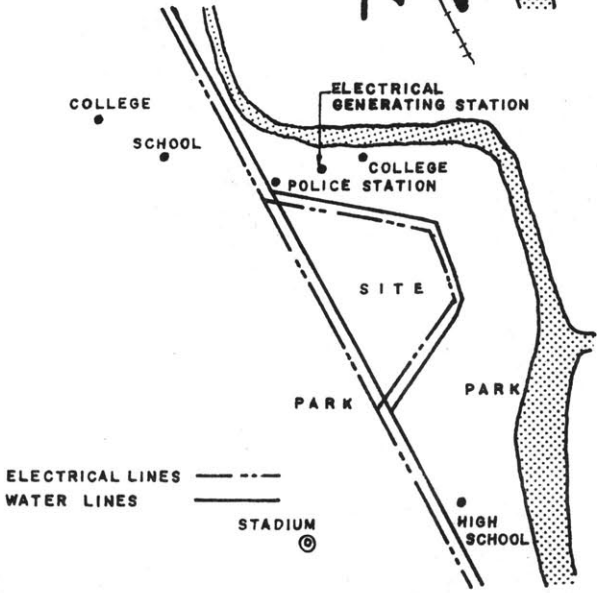
- a. Location: The area of the development is 171 hectares. The site is located in the northern part of Khulna city business district and is adjacent to the Khalispur industrial area.



CIRCULATION AND ACCESS



LAND USE ADJACENT AREAS



UTILITIES AND SERVICES



b. Boundaries:

North: Industrial area and Riverside Park.

South: Industrial area and open space.

East: Industrial area.

West: Railroad track and residential area.

The site is clearly defined by the railroad track and Jessore Road on west side and service railroad tracks and a ring road around it.

c. Topography: The site is almost flat.

d. Land use of adjacent areas:

Industrial areas: located to the north, east and south side of the site.

Residential areas: to the west of the site known as Pabla and Rayer Mahal.

Public areas: Recreation area Riverside Park (25 Ha) on the north; Goalpara Park (17 Ha) on the south.

There is also a large park stadium and exhibition ground (total over 80 Ha) located about 800 meters on the southern side of the site.

e. Access: The site has access from the city by Jessore Road.

Jessore Road also serves access from Jessore and Daulatpur on the north. Bus routes: The site is served by bus routes from the city through Jessore Road. The industrial area has bus service through the ring road.

f. Services:

Police Station: Goalpara Police Station is located on the eastern side of the site.

Fire Station: Located in Daulatpur on Jessore Road about 1 km from the site.

Hospital: A new 350 bed general hospital under construction in Daulatpur about 2 km from the site. Health clinics to be provided on the site, as per government rules.

Education: There are two colleges about 1.5 km from the site. There are also adult education center, a school for music and drama, located on Jessore Road about 2.5 km from the site on the south.

Public transportation: City bus service is available to the site through Jessore Road and Ring Road.

g. Utilities:

Electricity: Adequate power is available from power generating station at Goalpara adjacent to the site.

Water supply: There is piped water supply available to the site. The water lines are in Jessore Road and Ring Road.

Sewerage: A comprehensive sewerage system is under construction in Khulna which is scheduled to be completed in 1973. At present, night soil is collected and disposed, and a number of buildings have septic tanks.

Refuse collection: Inadequate; collected by Khulna municipality.

4.3 PROGRAM

1. Site Development

Area	171 Ha.
Number of families	4,000 - 4,500
Number of people	32,000 - 40,000
Density	200 persons/ha. (approximate)

2. Target Income Groups

	<u>Annual income</u>	<u>Percentage of income group to be provided</u>
Low income	Rs 1,800 - 3,000 (\$ 360 - 600)	60%
Middle income	Rs 3,000 - 6,000 (\$ 600 - 1200)	40%

3. Land Use

Public ownership

a. Circulation

Pedestrian walks (emergency vehicles)	3m - 6m wide
Interior local streets (in residential areas; pedestrians dominate)	12m wide
Local access streets (vehicles and pedestrian mixed; vehicles dominate)	18m wide
Avenues/Commercial streets (primary shopping street)	30m wide

b. Parking

For core houses: 1 parking space 6-10 lots in condominium parking areas

For multi-family house: 1 parking space for 6-8 families, parking on site

For detached units: 1 parking space per lot, parking on site

c. Public facilities

Community center: 1 large center for whole area
Size: 5,000 m²
(with auditorium for 1500 people)
Area:

Mosque: 1 small mosque in each urban unit
Size: For 1000-1500 families
Area: 500-700 m²

Parks: Combined with primary schools

d. Commercial areas:

Approximately 10% of total area of the site
Area: 17 Ha
Types: Market and shopping areas
Location: Vicinal and Local

e. Schools

High school 1 required
1000-1500 students per school
Area: 20,000 m²
(16 m² per student)

Primary school 5-6 required
800-1200 students per school
Area: 16,000 m²
(16 m² per student)

Nursery school 5-6 required
200-500 students per school
Area: 2,500-6,000 m² each
(12 m² per student)

Private ownership

a. Row Houses

Lot frontage 8m; Area range 125-160 sq m (16-20 m depth)
Dwelling: Core houses provided by the government
Tenure: Ownership (long term loans)
Income group: Low income group

b. Detached Houses

Lot frontage 12m; Area range 200-300 sq m (18-25 m depth)
Dwelling: Owner built
Tenure: Ownership; Financing long term
Income group: Middle income group

c. Multifamily Houses

Dwelling: 4-5 story walk-ups
Built by private developer
Tenure: Rental
Income group: Low and middle income groups

d. Commercial Areas/Stores: Initially these will be short term lease; later long term lease or private ownership.

References:

Urban Development Directorate, Government of East Pakistan, Physical Planning Progresses, Dacca (1968).

Nafis Ahmad, An Economic Geography of East Pakistan, Second Edition, Oxford University Press, London (1968).

Minoprio and Spencely and P.W. Facfarlane, Draft Master Plan for Khulna, Government of East Pakistan Press (1961).

Section 5. MATRIX FOR POLICY/GOAL DEVELOPMENT

5.1 Time Context

Development Mode:

Choices:

- a. Incremental
- b. Instant

5.2 Land Use Context

Primary Use:

Choices:

- a. Residential
- b. Parks, open areas
- c. Commercial
- d. Industrial

Target Income Group

Choices:

- a. High
- b. Middle
- c. Low
- d. Balanced

Intensity of Use

Choices:

- a. High density
- b. Medium density
- c. Low density

Land Tenure

Choices:

- a. Rental
- b. Lease
- c. Ownership

Financing Groups

Choices:

- a. Public
- b. Private
- c. Public/Private
mixed

5.3 Circulation/ Infra-Structure

External Circulation

External/Internal
Compromise

Interior Circulation Networks

Main and
Secondary

Utilities

Utilize existing
network.

Source: Horacio Caminos, Reinhard Goethert, Options for the Development of Finca La Marina, San Juan Puerto Rico; Classwork, class notes "Urban Settlement Design in Developing Countries" at M.I.T.; Course 4.161 Fall 1970.

5.1 TIME CONTEXT

5.1.1 Introduction

The policies are formulated within a range of time from 10-15 years. Two development modes must be considered in the formulation of policies in the establishment of the time context: instant and incremental.

The site development may either be instant--**complete development** without periodic evaluation, or incremental--a staged cyclic process.

Two main periods are considered in the development of the site.

- a. Preliminary: initial studies, promotion and planning

Time Frame: 2-5 years

- b. Implementation: site development

Time Frame: 5-15 years

5.1.2 Development Mode: Incremental

The site development will take place incrementally over a period of 5-15 years. The development will be staged in the following cycle:

- a. construction
- b. habitation
- c. evaluation
- d. revision of policies

This cycle will be repeated until full saturation of the site is achieved.

Based on the Bangladesh Census Cycle, four time periods are proposed:

1972	initial study of development
1974	beginning of site development
1979	intermediate stages of development
1984	saturation of planned development

Four different basic aspects will be considered:

Physical Basis: Primary data is based on the Bangladesh census which is updated every ten years. This allows a meaningful basis of change in the scheme of development. Experience in similar projects in Bangladesh points to a 2-5 year lead time before implementation.

Economic Basis: The large volume of possible housing construction does not make instant development feasible. The large impact of the project on the surrounding area is lessened by a slower pace of change in order to allow adjustment to keep a relative balance. Incremental growth allows the development to take advantage of rising land values to help pay for services and facilities.

Social Basis: Staged planning allows a balance of services and facilities with the population served.

Political Basis: Changes of governments with concurrent changes of policies required staged development to allow modification.

5.2 LAND USE CONTEXT

The following topics should be considered in the formulation of land use policies:

- a. Primary land use.
- b. Target income group or groups primarily planned for.

- c. Intensity of land use (density).
- d. Land tenure.
- e. Financing groups who will undertake the development.

5.2.1 Primary Use: Development of a residential community

The primary use of the site will be for residential areas. Residential use implies that the necessary supporting land uses will be included: schools, playgrounds, commercial facilities, and institutional requirements.

Physical Basis: Land for housing is scarce and consequently expensive throughout the Khulna municipal area. The site is conveniently located near the industrial area of the city. The site fits into the long-range plans of residential use by the government. There is approximately 171 hectares for development of residential area.

Economic Basis: There is a large demand for housing on all income levels. The area would prove economical for low and middle income families: a combination of rental walkups, row-houses and unifamily houses, according to housing demands and other developments of the city for middle and low income sectors.

Social Basis: The high population growth and the increase in family size result in a large demand for new housing units; at the same time the squatter settlements around the industrial areas of the city demand new settlements to relocate the population which other government projects do not accommodate.

The site will allow development of a commercial center and a market. Incremental planning will allow a commercial center and the market to re-adjust the size of area required.

5.2.2 Target Income Group

Low and Middle Income Sectors: Lowest income \$240-960/year; medium low income \$961-1920/year; Middle income \$1921-2880/year.

Physical Basis: Approximately 80% of the demand for housing is in the low income sector. The government considers that 60-75% of the land in the site should be used for low-income housing.

Economic Basis: The private housing market cannot or will not supply housing for the low-income market because there is no such housing construction operation for low-income housing. The condition of the site is better for low-cost housing because it is almost flat and has good natural drainage toward the river. In this case low-income sectors will not depress the land value of the adjacent area because all adjacent developments are already for low-income and middle-income families.

Social Basis: The site will accept relocated squatter settlements which other government projects do not accommodate. The site allows easy access to work areas without special commuting routes, because the industrial area is adjacent to it. The development will aim for a balanced community: other income groups will be combined in the site. Government guidelines demand mixed income groups if government financing is to be used in the development. The large development of the site demands a homogeneous community in order to avoid segregated groups.

5.2.3 Tenure

Land use context: Ownership and Rental.

Physical Basis: Rental properties allow quick adjustment to market situations.

Economic Basis: Ownership is the most successful form of investment.

Social Basis: Rental implies low income public housing or middle income apartments. Ownership allows housing projects of all income levels and provides stable areas.

5.2.4 Intensity of Use

Land use context: Medium density = 50-70 fam/hect.; High density = 90-120 fam/hect.

The site will be planned in the first stage of the development for medium densities, and in the second stage for an increase in the density according to the population growth and the demand of the housing in the site developed.

Physical Basis: The new policies of the government aim to increase the density of the city, according to the demands of the population and the economic development of the country.

Social Basis: An increase in the density according to the demands in housing answers many problems: access, services, and facilities for low-income sectors. At the saturation of the project it will have balanced communities of low and middle income sectors.

5.2.5 Financing Sponsoring Groups

Land use context: Both public and private.

Both public and private funds will be used in the development of the project.

Physical Basis: This will encourage private builders and developers to re-direct activities towards low-income housing. The site allows both financing groups because adjacent residential areas are being financed by private groups and government agencies.

Economic Basis: The sale of the land to private developers will pay for services of the site.

Social Basis: This will allow the possibility of mixed development.

5.3 CIRCULATION CONTEXT

5.3.1 Introduction

The circulation network chosen will have a major impact on the use and development of the site. Two types of vehicular circulation elements may be established:

- a. Exterior connections: access to major roads; access to surrounding areas.
- b. Interior networks: main streets for access to exterior connections and to different areas within the site; walks for local residential traffic (may in future be used as secondary streets if the need arises).

5.3.2 Interior Circulation Networks

Circulation context: Main and Secondary.

Adequate internal site circulation will be provided. Two main types of internal circulation should be established. The main routes allow access to interior and exterior points throughout the site's main traffic

streets and become collector streets. Secondary routes accomodate local traffic only.

Physical Basis: Provides a safer major road network; speeds through traffic as well as slowing local traffic.

Economic Basis: Allows more reasonable commercial concentration at intersections.

Social Basis: Allows residential scale of activities without disruption from through traffic.

Section 6. PLANNING CRITERIA

6.1 TIME CONTEXT

6.1.1 Criteria for Development

The site development will take place incrementally in three stages as explained in Section 7.1.6. Two periods are considered:

- I. Preliminary
- II. Implementation.

The implementation will be staged; consisting of the the following cycle:

- a. planning, design
- b. construction
- c. habitation
- d. evaluation
- e. revision of policies.

The implementation should take into consideration of the following:

- a. initially, land uses and circulation patterns are determined to take advantage of existing infrastructure and services, such as highways, adjacent streets, communal service facilities, commercial facilities and schools.
- b. take advantage of increase in land values.
- c. be able to attract private capital.
- d. adjust and be controlled by demand and supply, reflect the policy objective of government.

6.2 LAND USE CONTEXT

6.2.1 Criteria for Urban Units

Urban units will be established to create physical environments that will provide a sense of community, facilitate incremental growth to take advantage of land values and to allow flexibility in development, and match services with residential requirements to avoid isolated developments without the basic necessities. Planning of the urban units is premised on the following:

- a. A unit is defined as being bordered by through streets.
- b. The size is within the range of 800-1500 families (units) to allow the inclusion of an elementary school.
- c. A maximum walking distance of 400 meters from the interior of the urban unit to the through street border is required to allow access to public transportation.
- d. The urban unit will be a residential area with its required supporting facilities.

Components of the Urban Unit:

Residential areas: high density residential/vicinal commercial
middle density residential

Supporting facilities: schools (high school, elementary schools, kindergartens)
parks, recreation areas
local commercial facilities

Infrastructure: streets--neighborhood loop promotes residential
circulation only, as well as reinforcing
vicinal commercial areas
public bus routes--follow main commercial roads,
Jessore Road and Ring Road

pedestrian walkways--allow access to all sections
of the urban unit

utility networks--water, sewer, storm drainage and
electricity follow local street loop

6.2.2 Criteria for Land Subdivision: Lots

Lots should be established with dimensions large enough to permit
the following:

- a. Flexibility in land uses
 - residential
 - residential/commercial
 - light industries
 - schools, playgrounds, parks
 - reserved areas
- b. Flexibility in residential densities and dwelling types within
the same lot structure
 - medium and high densities
 - row, walkups, and detached house combinations
- c. Different types of condominiums
 - walkups: dwelling units under private ownership (or
rental), with land under semiprivate ownership
 - row and cluster: dwelling and lot under private ownership;
playground, parking and access are semiprivate
- d. Minimization of
 - public ownership of land
 - lengths of infrastructure per area served
 - government services
- e. Maximization of
 - private ownership of land
 - private responsibility
- f. Transformation of public rental housing into private ownership
condominiums

Other conditions determining lot sizes are shape and boundaries of
the site, basic circulation network and public areas. The lot sizes that

better satisfy the above conditions are shown below:

	Approximate dimension
a. Residential (for cluster, walkups, and detached house)	120 x 140 m
b. Commercial	120 x 100 m
c. School, community center	120 x 140 m

6.2.3 Criteria for Commercial Areas

Commercial areas are of private ownership. Flexibility in size and location is developed in the design of the individual projects in order to allow commercial change in response to demand. The residential areas may readily be interchanged for commercial use in providing additional stores and shops. Types of commercial areas provided include the following:

- a. Local: size--small, corner store; location--scattered in residential areas; parking--limited public parking provided on the street; clientele--pedestrian, within walking distance.
- b. Vicinal: size--large and small; location--along main streets; parking--public and private spaces; clientele--pedestrian, rickshaw, and automobile.
- c. Market: size--large market; location--along main commercial street and Jessore Road; parking--sufficient private parking; clientele--pedestrian, rickshaw, and automobile.

The Goalpara Main Avenue has a combination commercial/high density residential area. Vicinal (or regional commercial areas) and market areas are located along the main avenue and Jessore Road of the Goalpara development. Commercial areas and market are on both sides of the main avenue and on the northern side of Jessore Road.

6.2.4 Criteria for Public Areas: Parks, Schools, Other Uses

Community services and public areas are essential organs of city life, contributing to health, education and recreation and comfort of the inhabitants. Public areas in the plan follow the accepted standards.

- a. Local Parks: These small parks are internalized within each development.

Use: Primarily for pre-school children and women during the day; men use park in evening.

Location: Within residential blocks; within cluster housing; near local shops and stores.

Access: Small protected area away from through streets for pedestrian access.

- b. Neighborhood Parks: Five primary parks are included in the site plan around which urban units are developed.

Use: For school age children and young adults, for active outdoor sports during the day.

Location: Within the school play areas for maximum space utilization.

Access: Pedestrian neighborhood access.

- c. Area Parks: Located along the main avenue in the form of plazas and other public open spaces.

Use: Primarily for young adults and adults during the day and night.

Location: In vicinal commercial/high density residential areas.

Access: By shoppers with automobiles, and by pedestrians.

- d. Connecting Open Spaces: The open spaces and parks are interconnected for continuous pedestrian access. They are developed to help focus activities in the central spine and the neighborhood centers.

- e. Elementary (Primary) Schools: The plan allows for 5 to 8 schools for approximately 4000 to 8000 children.

- f. High School: The plan allows for one high school for 1500 to 2000 students.
- g. Other Community Facilities: Three mosques are provided, evenly distributed over the new town. A central community center and a health center are also provided.

6.3 CIRCULATION CONTEXT

6.3.1 Criteria for Circulation Layout

The circulation network provides a primary ordering framework around which the site is developed. As well as a circulation function, the network provides the utility spine throughout the site. The land which is utilized by the circulation grid is considered to be under semi-public ownership providing for paths of movement of both pedestrian and vehicular access. The following circulation conditions are considered in the plan:

- a. Pedestrians Only: Exclusive use by pedestrians. Example-- interconnected pedestrian walkway system throughout the site.
- b. Pedestrians and Vehicles Mixed: pedestrians dominate over vehicles; control of traffic frequency, character and speed are mainly established by the street layout and use. Example--local street loop in the urban units for residential traffic.
- c. Vehicles and Pedestrians Mixed: vehicles dominate but do not control circulation; controls are established for the protection of pedestrians: crosswalks, traffic lights, rails, overpasses and underpasses. Example: main commercial avenue.
- d. Vehicles with Limited Pedestrian Mixing: vehicles dominate strongly over the pedestrian; stricter controls are established for pedestrians: rails, traffic lights, crosswalks. Example: ring road on periphery of the site and Jessore Road.

References:

Horacio Caminos, Reinhard Goelhart, Class of Spring Term 1971 MIT/ARUV Project, Options for the Development of Finca La Marina, San Juan, Puerto Rico.

Felix Montes de Oca, Urban Residential Development Model for Low and Middle Income Families in Santo Domingo, Dominican Republic, Master in Architecture Theses, M.I.T. (1971).

Section 7. URBAN RESIDENTIAL DEVELOPMENT MODEL
FOR LOW AND MIDDLE INCOME SECTORS

7.1.1 Development Options

This section presents complete development of a model for the site in Goalpara, Khulna. The development of the model includes:

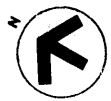
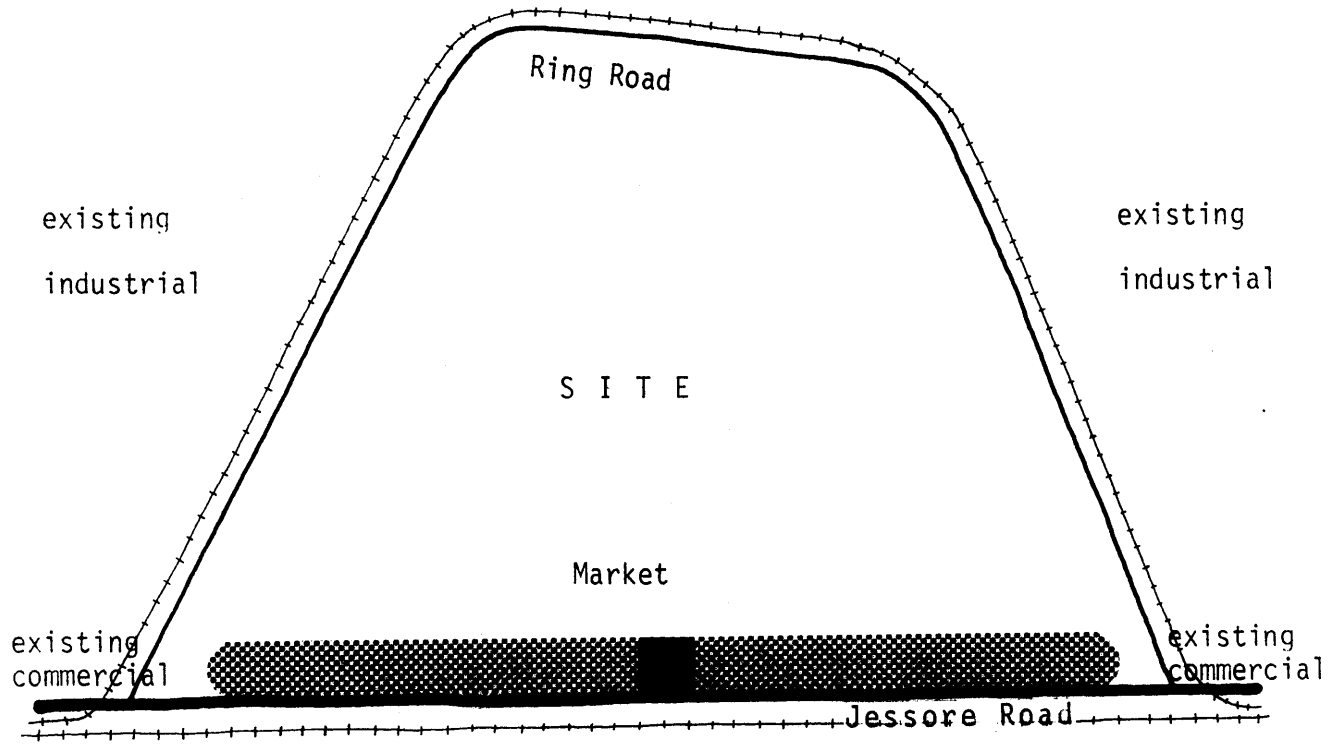
- a. Development of different options for the site based on different criteria.
- b. Then one of the options is selected for development.
- c. The option is further developed as a viable scheme.

The development includes:

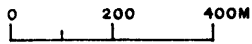
Development of circulation network, land use, land sub-division, site development (staging) and development of a complete segment of the site showing the development in saturated stage.

SITE OPTION A

Jessore Road is developed as a commercial road.



GOALPARA, KHULNA
BANGLADESH

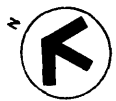
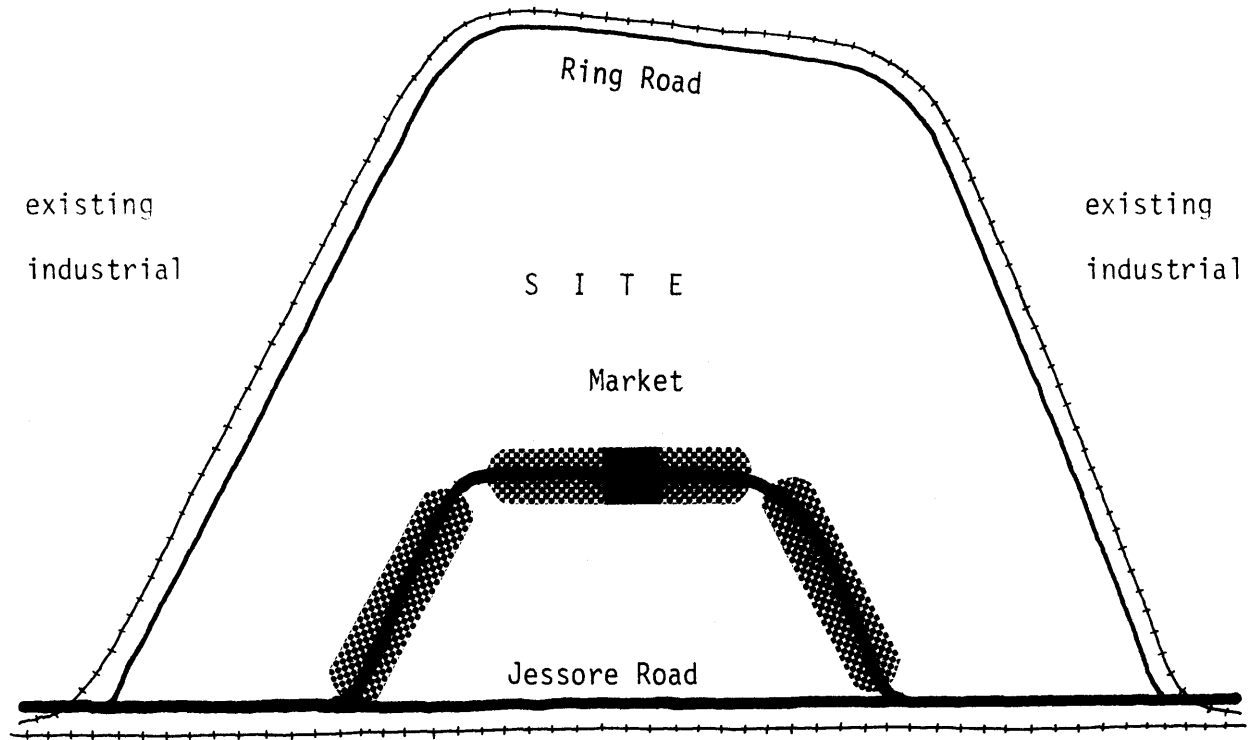


Commercial Areas

- | | |
|-------------------|--|
| Commercial Street | <ul style="list-style-type: none"> a. Jessore Road is developed as main commercial street (existing situation). b. Provides commercial link with existing commercial areas, encourages wider use. c. A market is incorporated to reinforce the commercial road. |
| Land Values | Will create higher land value along Jessore Road. |
| Comments | Market and commercial street is away from the interior of the site. |

SITE OPTION B

A Loop is created from Jessore Road to be developed as Commercial Road.



GOALPARA, KHULNA
BANGLADESH

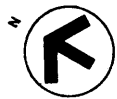
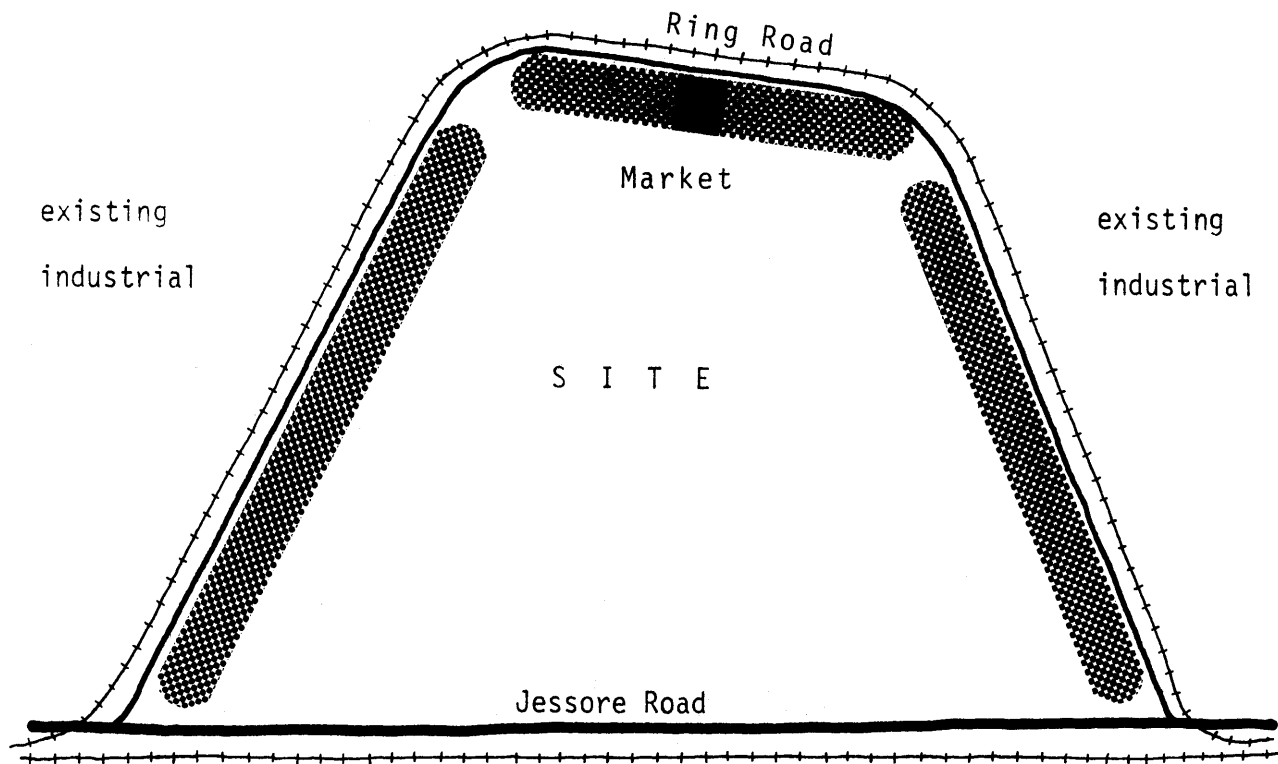
0 200 400M

Commercial Areas

- | | |
|-------------------|--|
| Commercial Street | <ul style="list-style-type: none"> a. Discourage commercial development along Jessore Road by keeping it strictly as "through street." b. Market is incorporated at the center of the site to reinforce a new commercial road; location of the market is convenient to the residents |
| Land Values | Better distribution of land values; however, creates commercial (higher land value) in the interior of the site. |
| Comments | 4-5 story walk-up rental apartments may be developed along the commercial spine, with shops at street level. |

SITE OPTION C

The Ring Road is developed as Commercial Road.



GOALPARA, KHULNA
BANGLADESH

0 200 400M

Commercial Areas 

- | | |
|-------------------|--|
| Commercial Street | <ul style="list-style-type: none"> a. The Outer Ring Road is developed as Commercial Road. b. Jessore Road is retained as "through street." |
| Land Values | Creates commercial land value in the interior of the site; contributes to increase of land value in the interior of the site. |
| Comments | <ul style="list-style-type: none"> a. Would conflict with "natural" commercial growth along Jessore Road. b. External use of the commercial area will be restricted, due to travel distance and proximity (total length of Ring Road is 3.6 Km). |

7.1.2 Development of Option A

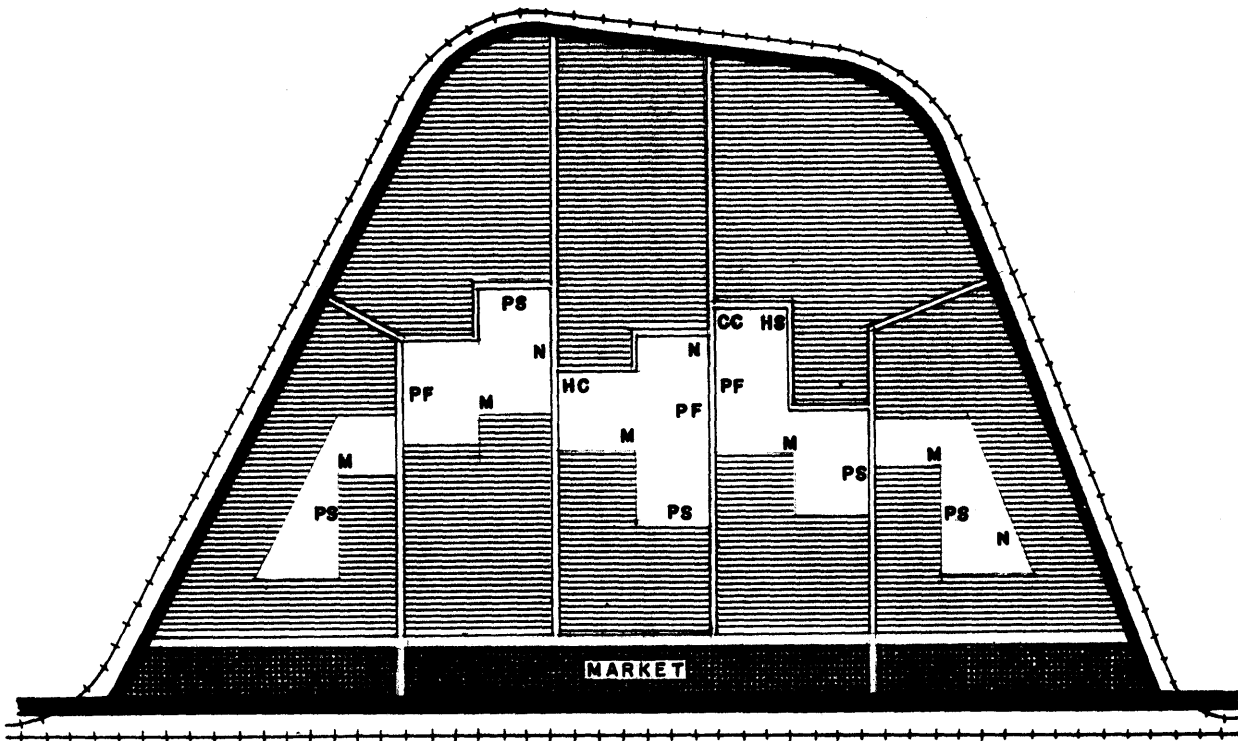
The three options presented earlier show the ways the site can be developed. Of the three, Option A is more viable than the other two for the following reasons:

a. There are existing commercial areas on the periphery of the site on Jessore Road. Site Option A provides the development of Jessore Road as a commercial street which links the existing commercial areas. This also provides for the use of the commercial area by people from other areas, as Jessore Road is a main thoroughfare.

b. A market is incorporated in the commercial area which reinforces the commercial activity. Again, providing the commercial area along Jessore Road gives a continuous commercial spine which will allow a wider use of the commercial area.

c. The Commercial Road created close to Jessore Road allows for both to take increased traffic in the future.

7.1.2a Option A, Land Use Plan

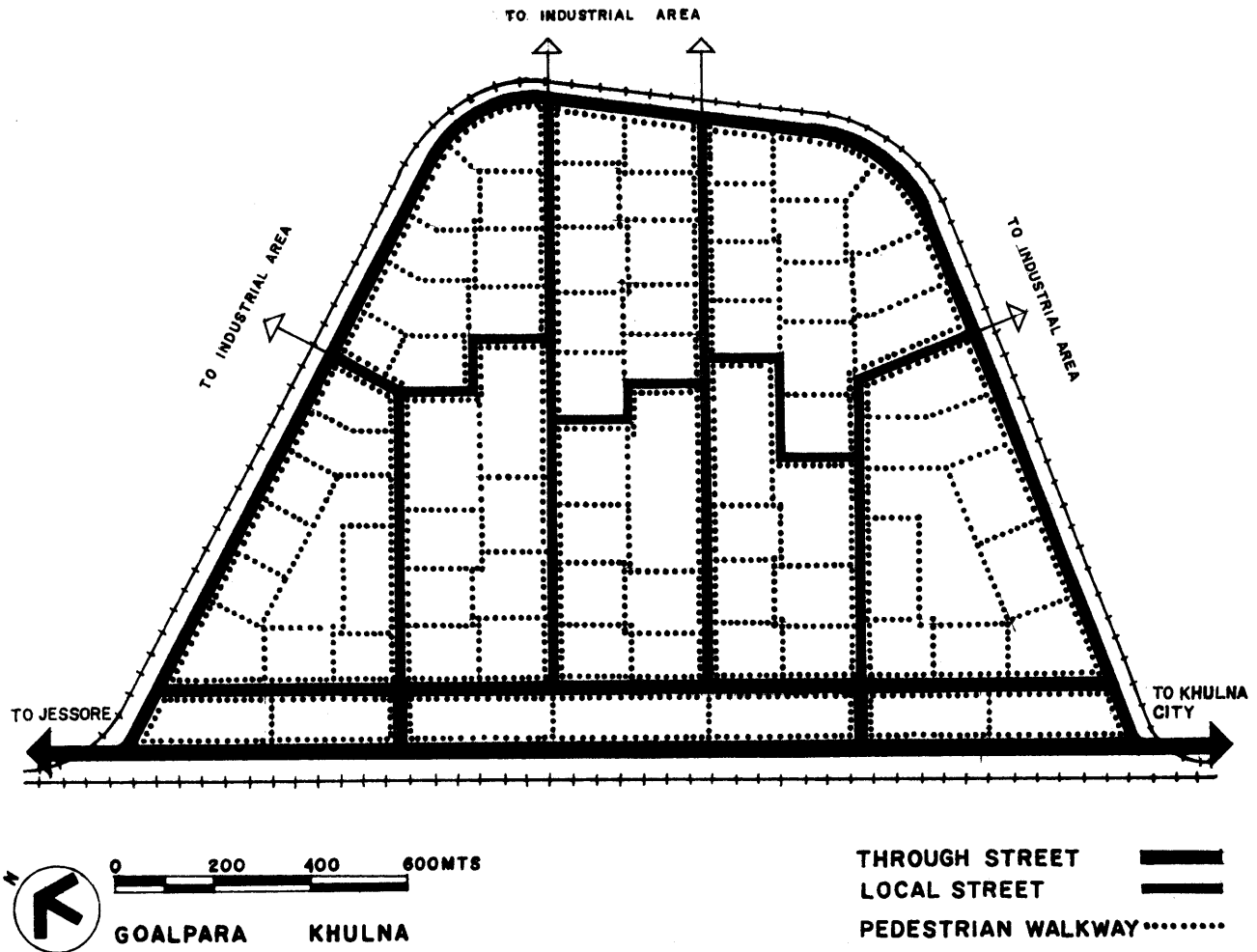


RESIDENTIAL 
 COMMERCIAL 

PS PRIMARY SCHOOL
 HS HIGH SCHOOL
 N NURSERY
 PF PLAYING FIELD
 HC HEALTH CENTER
 CC COMMUNITY CENTER
 M MOSQUE

	Hectares	Percentage
<u>Available Land for Development</u>		
Area of the site	171	100%
<u>Public Ownership Areas</u>		
a. Neighborhood facilities including parks, schools	29	18
b. Streets and walkways	25	15
		33%
<u>Private Ownership Areas</u>		
a. Residential	97	57
b. Commercial/light industry	17	10
		67%
		95.

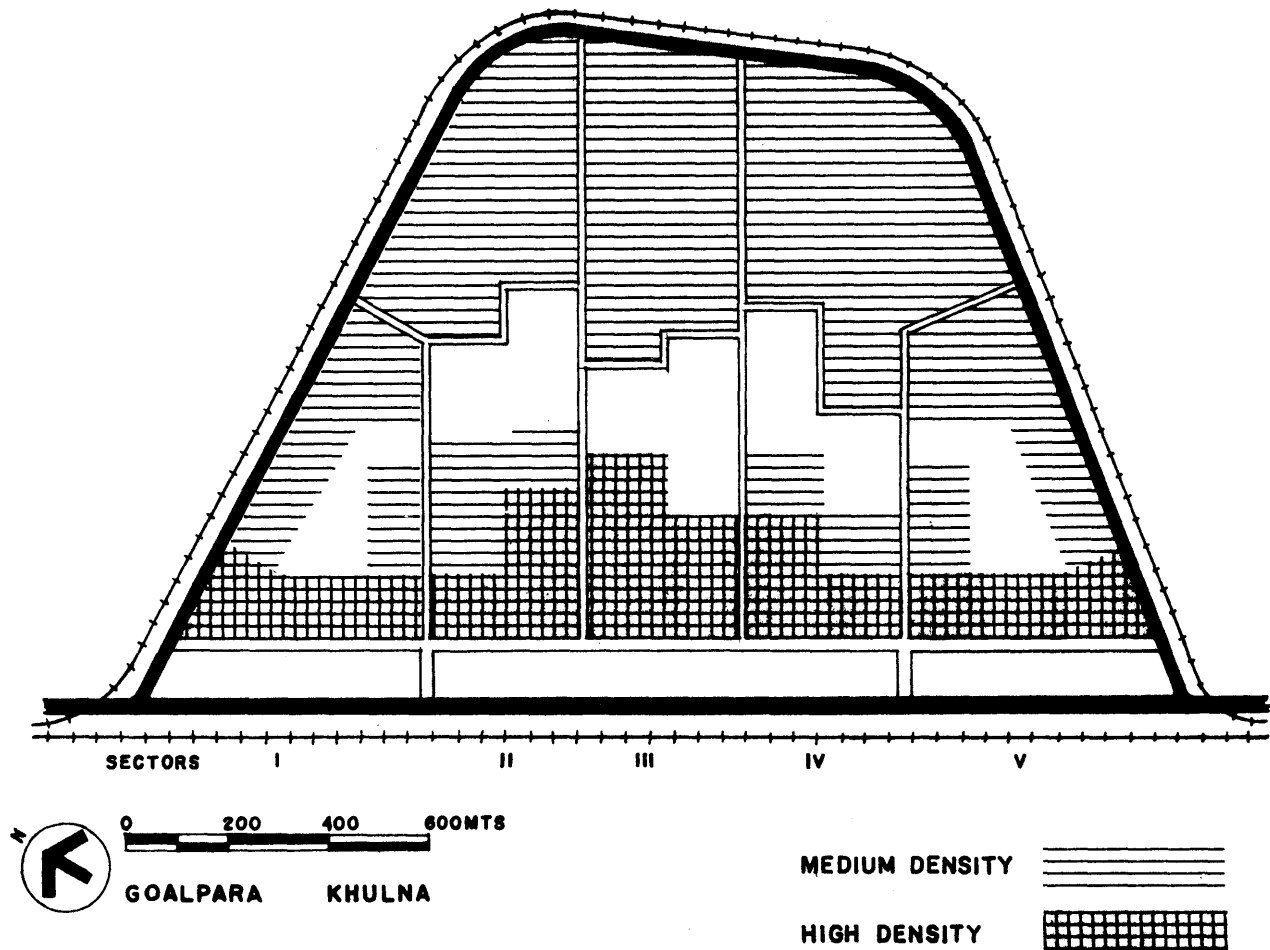
7.1.3 Circulation Plan



Circulation system includes:

- a. Exterior Access: From Khulna city business district by existing major road "Jessore Road" (Mode "c" type of circulation).
- b. Interior Network:
 - Pedestrian only: Exclusive use by the pedestrian (Mode "a" type of circulation). Example: Pedestrian walkways in residential areas.
 - Local streets: Pedestrian and vehicles mixed, pedestrian dominate (Mode "b" type of circulation). Example: local streets in residential areas.
 - Through streets: Vehicles and pedestrian mixed, vehicles dominate (Mode "c" type of circulation). Example: Main Commercial Avenue/Street, Jessore Road

7.1.4 Intensity of Use



Housing Types:

- Medium density includes: clusters 1-2 story dwellings
- High density includes: 4-5 story walk-up apartments.
(Along the commercial street walk ups have retail stores in street level).

Number of Dwelling Units:

Sector I	1,010 dwelling units
Sector II, III, IV	5,740 dwelling units
Sector V	1,045 dwelling units

Population:

At saturation (1988) 25,000-40,000

Densities:

	Number/Ha.
Dwelling units/families	52
People	185-265

7.1.5 Land Subdivision: Blocks

This section on land subdivision concentrates on a few examples of block layout. Blocks are areas bounded by lines of public streets and pedestrian walks. The block layout for the development illustrated in this section are based upon:

- Minimizing: public ownership of land;
lengths of infrastructure per area served; government burdens, responsibilities, and services
- Maximizing: private long lease/ownership of land;
private responsibility

The above policy leads to a type of land subdivision called "horizontal condominiums" or "clusters", where lots are grouped around a common court that serves an access space as well as a semipublic open space. This court is owned in condominium by the lots' occupants who control, share the use and the responsibility of the maintenance of the court. The blocks contain the following categories of lots:

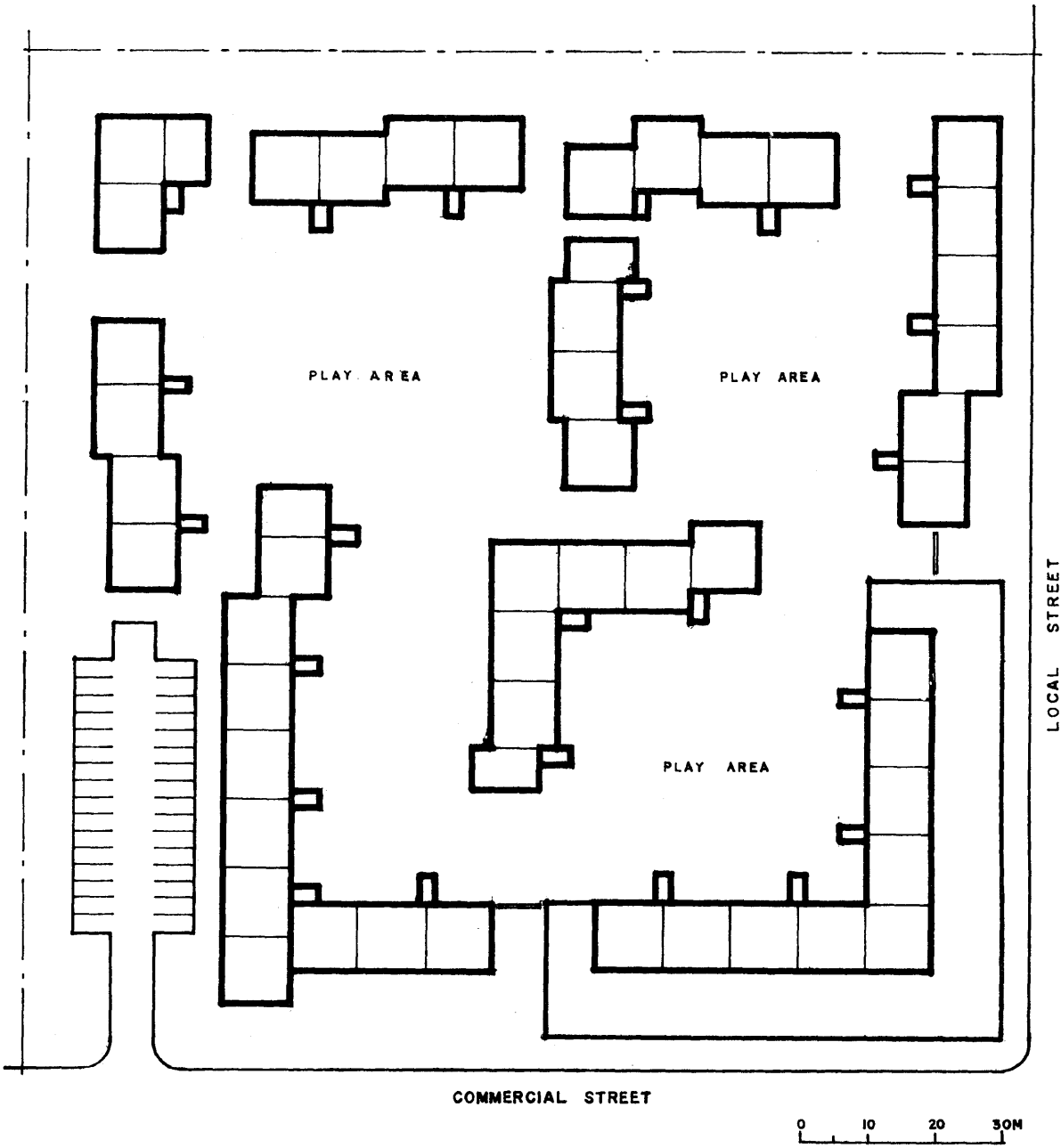
Exterior lots: Those having only access to public streets

Interior or cluster lots: Those having access to condominium court

Exterior/Interior lots: Those having access to both public streets and condominium court

The walk-up apartment complexes are also based on the same principle.

The blocks included in this section are only a few of the infinite variety which can be provided to match different social or community requirements.



Walk-Up Apartments and Commercial:

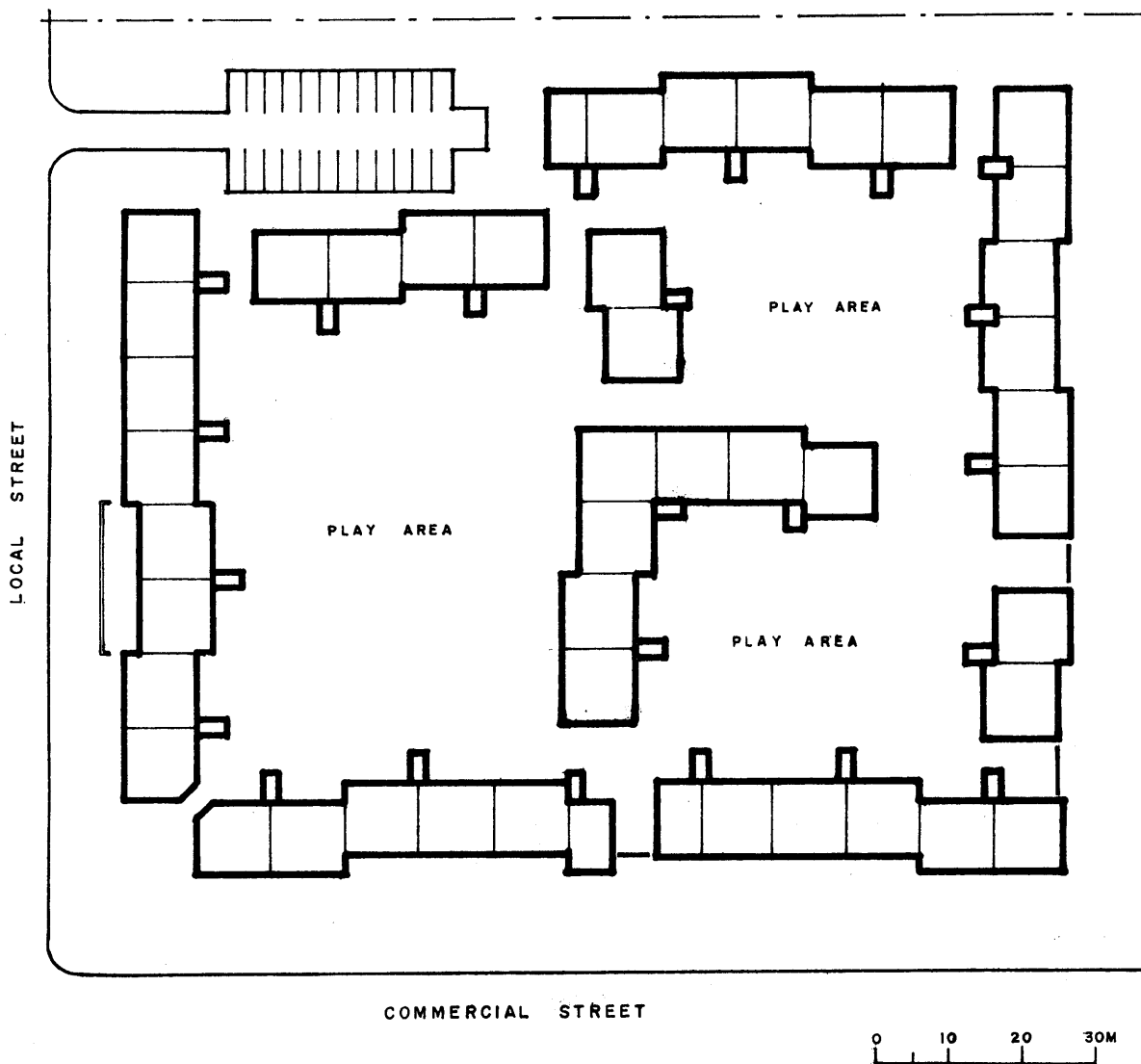
Number of stories		4-5
Total dwelling units (families)		212
Number of parking spaces		32
Total commercial area		2700 m ²

Land Use:

Dwellings	0.44 Ha.	19.5%
Parking/streets	0.10	4.5
Open space/other	1.71	76.0

Density:

Number of families/lot area = 94 families/Ha.



Walk-Up Apartments:

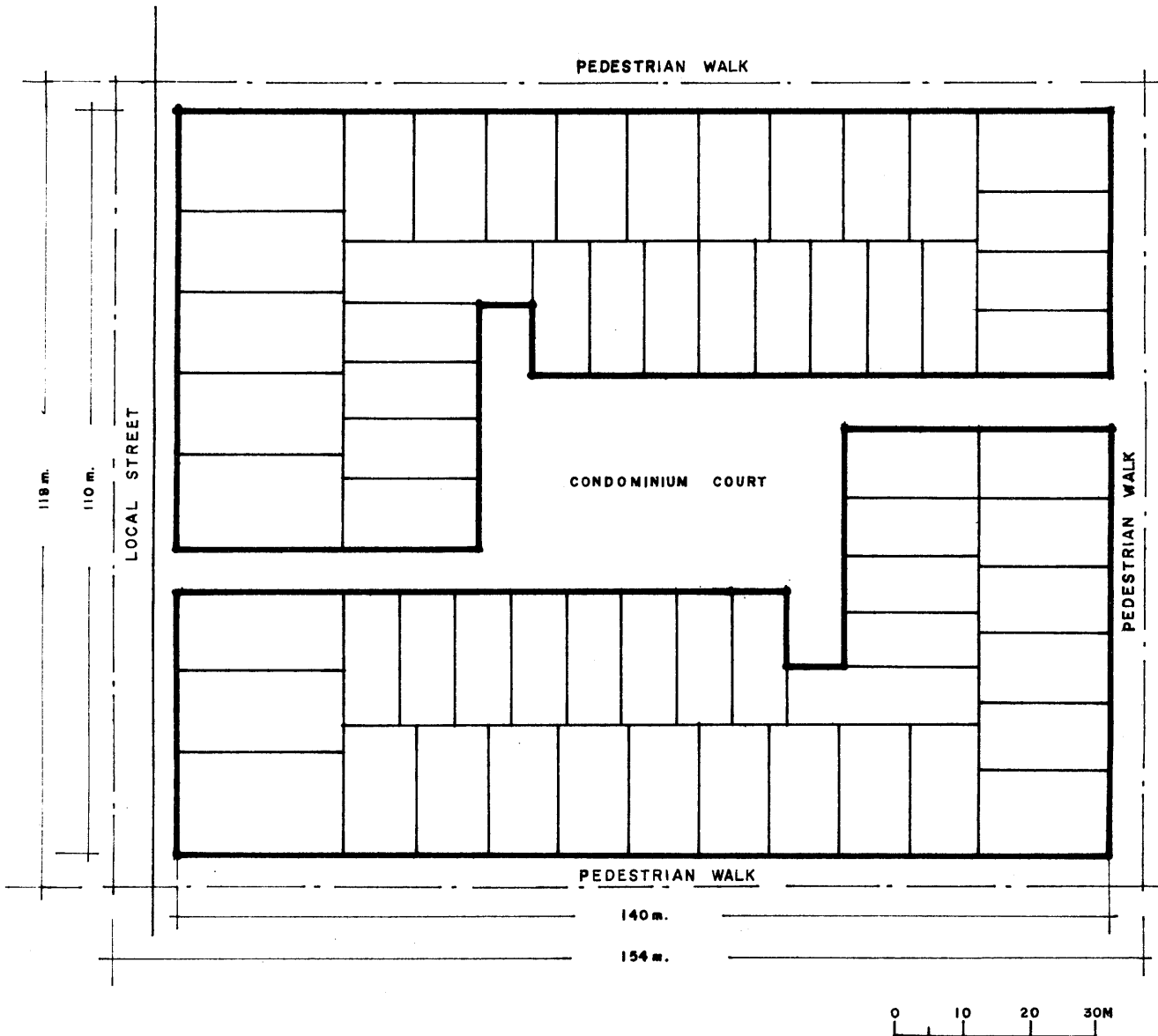
Number of stories	4-5
Total dwelling units (families)	188
Number of parking spaces	24

Land Use:

Dwellings	0.47 Ha.	27%
Parking/streets	0.08 Ha.	6
Open space/other	1.18	67

Density:

Number of families/lot area = 108 families/
Ha.



Cluster Subdivision:

Total lots 62; (Number of families 98)

Land Use:

Private areas (lots)	13,200 m ²	71.0%
Semipublic areas (condominium court)	2,310	12.5
Access/street	3,100	16.5

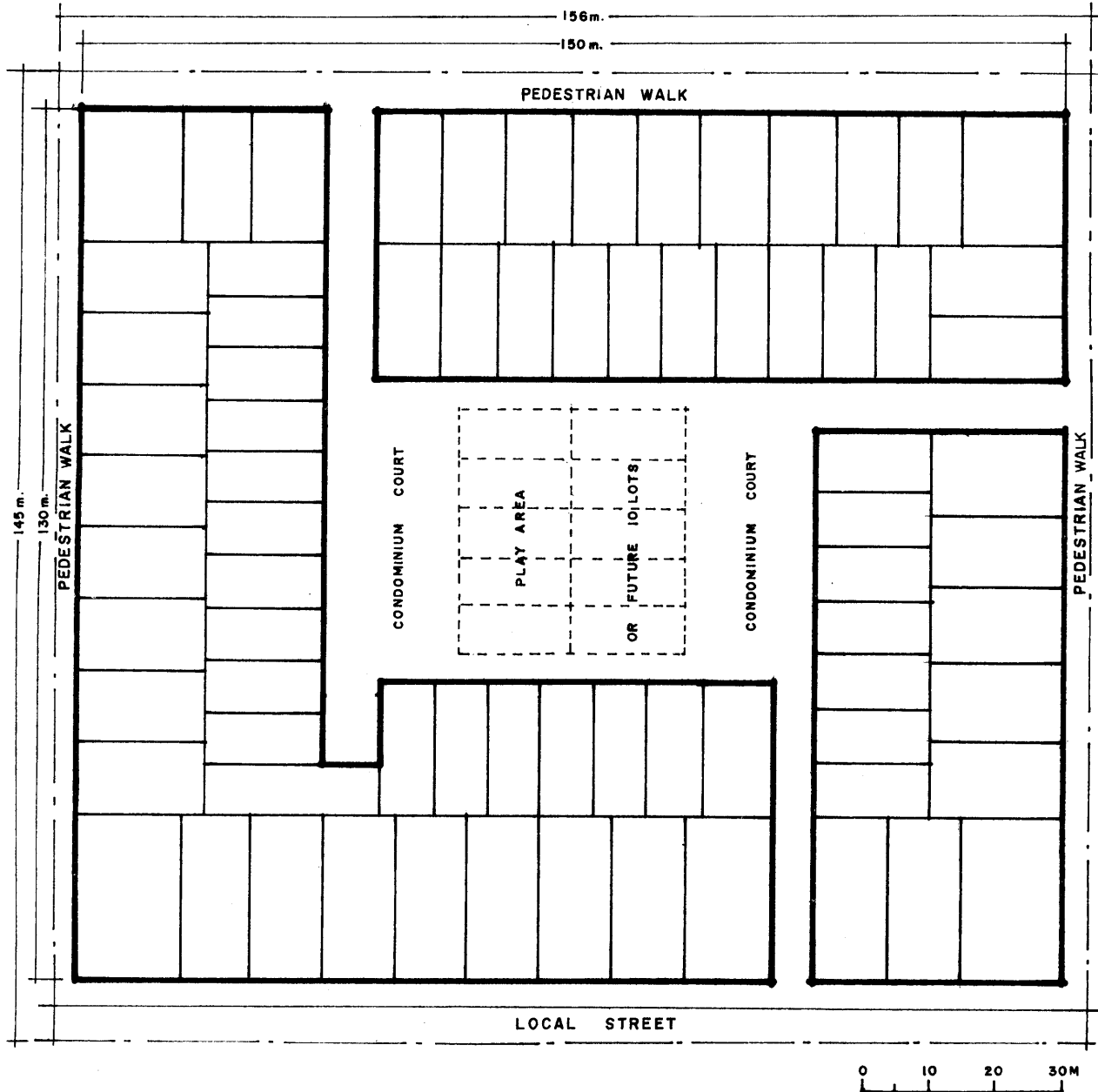
Average Lot Area:

Private area/number of lots = 207 m²

Density:

Number of lots/area of block = 41 lots/Ha.
 = 55 families/Ha.

(Types of housing: 1-2 story detached and row housing.)



Cluster Subdivision:

Total lots 86; (Number of families 126)

Land Use:

Private areas (lots)	16,800 m ²	71.5%
Semipublic area (condominium court)	2,550	11.0
Access/streets	3,300	17.5

Average Lot Area:

Private area/number of lots = 220 m²

Density:

Number of lots/area of block = 38 lots/Ha.
 = 54 families/Ha.
 (Types of housing: 1-2 story detached and row housing)

7.1.6 Site Development: Staging

STAGING OPTION A

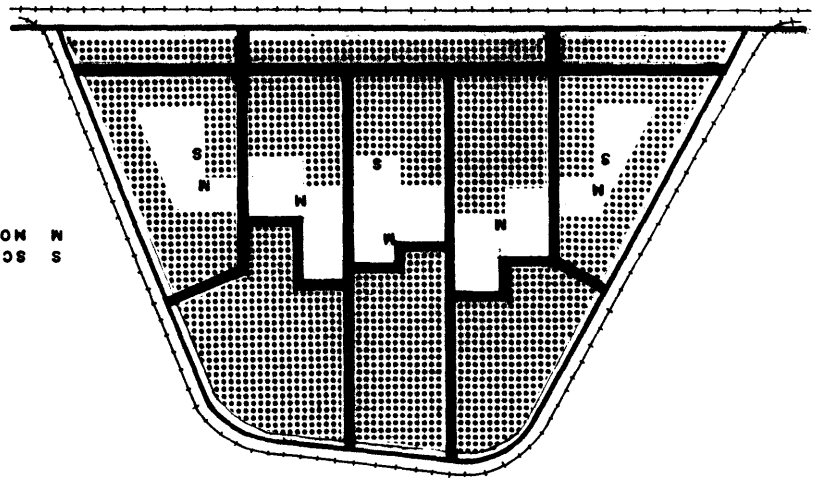
Develop Part of Commercial Area and Emphasize Commercial Area

<u>STAGE I</u>	Upto 1977 (5 years)
Population:	7,000-8,000 No. of dwellings/families 1400
Characteristics:	Land and circulation layout takes advantage of existing infrastructure and services: streets, adjacent community facilities, commercial areas, employment, schools.
Areas:	Sectors I and V
Circulation:	Part of commercial Road is developed; existing bus route is used.
Housing:	Partial lot development with walk-up apartments and cluster.
Commercial:	Stores and shops of adjacent areas are used; commercial stores may develop in street level of walk-up apartments.
Public Services:	Two elementary schools and open spaces.
<u>STAGE II</u>	Upto 1982 (5-10 years)
Population:	15,000-18,000 No. of dwellings/families 3200
Characteristics:	Consolidation of areas developed initially and start of new areas; this takes advantage of increase in land values.
Areas:	Parts of Sectors II, III and IV
Circulation:	Completion of major portion of internal network.
Housing:	Development of walk-up apartments and cluster lots.
Commercial:	Reinforcement of earlier stages and market started. Part of commercial area as reserve.
Public Services:	2-3 elementary schools and development of parks.
<u>STAGE III</u>	Upto 1988 (10-15 years)
Population:	28,000-40,000 No. of dwellings/families 7800
Characteristics:	Development of clusters and consolidation of earlier stage.
Areas:	Parts of Sectors II, III and IV
Circulation:	All internal network completed; overbridge on railroad.
Housing:	Cluster developments; consolidation of earlier stage.
Public Services:	Expansion of existing schools and 3 more elementary schools.

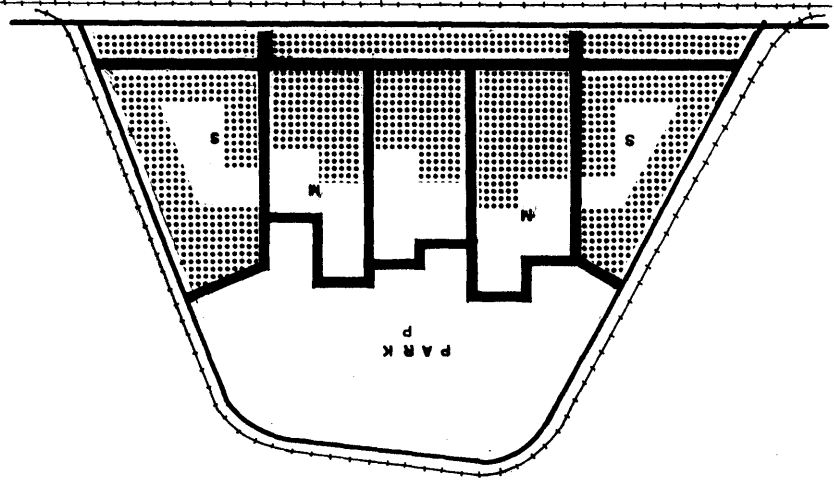


STAGE III

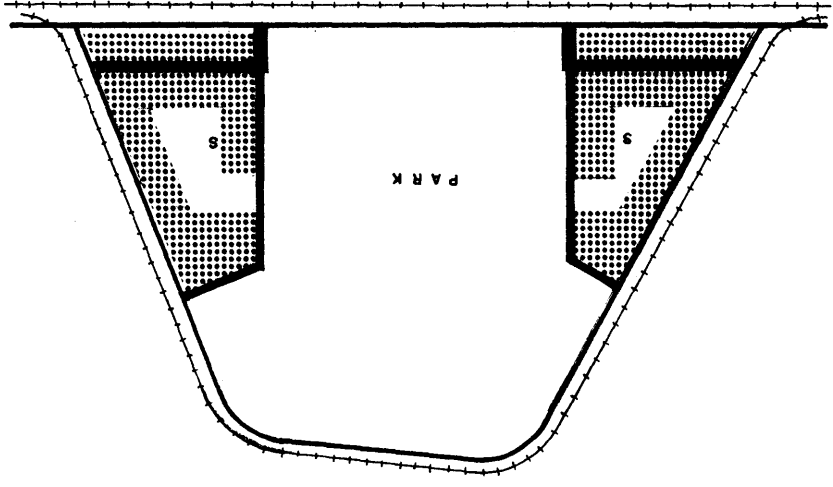
S SCHOOL
M MOSQUE



STAGE II



STAGE I

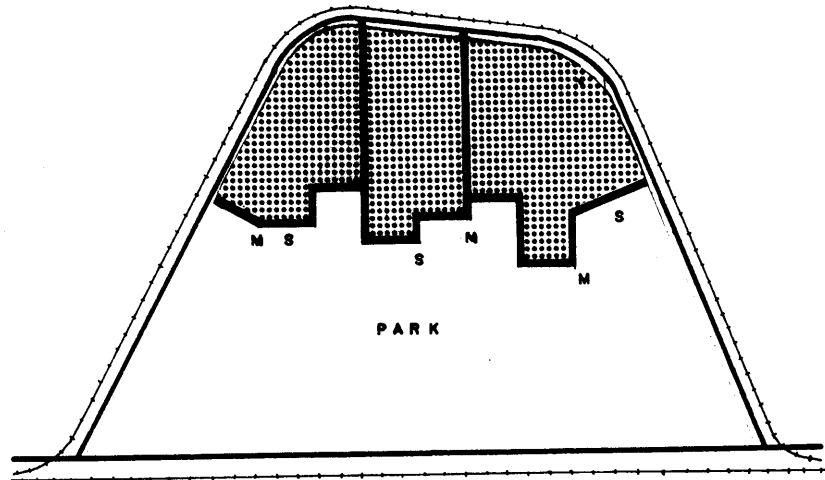


STAGING OPTION B

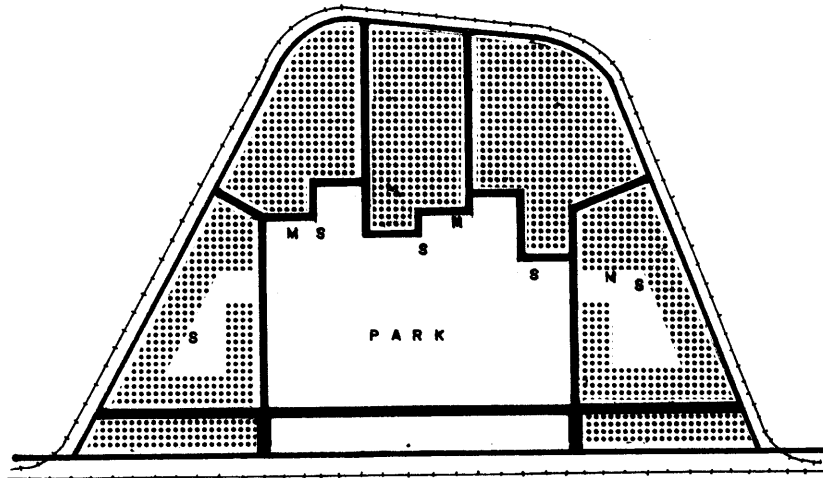
Hold Prime Commercial Land Until Land Values Rise; Then Sell.

<u>STAGE I</u>	Upto 1977 (5 years)
Population:	8,000-12,000 No.of dwellings/families 2000
Characteristics:	Land and circulation layout takes advantage of employment location and existing infrastructure.
Areas:	Parts of Sectors II,III and IV
Circulation:	Takes advantage of existing Ring Road.
Housing:	Cluster developments (on lower land values).
Commercial:	Use of existing commercial area on Jessore Road.
Public Services:	2-3 elementary schools and parks.
<u>STAGE II</u>	Upto 1982 (5-10 years)
Population:	15,000-22,000 No.of dwellings/families 3400
Characteristics:	Consolidation of earlier stage; the layout takes advantage of employment location.
Areas:	Sectors I and V
Circulation:	Takes advantage of existing circulation; Commercial Road is built.
Housing:	Cluster and partial building of walk-up apartments.
Commercial:	Partial development of commercial areas.
Public Services:	2 more elementary schools and development of parks.
<u>STAGE III</u>	Upto 1988 (10-15 years)
Population:	28,000-40,000 No.of dwellings/families 7800
Characteristics:	Consolidation of earlier stage and development of prime areas. Takes advantage of rising land values.
Areas:	Sectors II,III and IV
Circulation:	Internal circulation network is completed.
Housing:	Walk-up apartments and clusters.
Commercial:	Market and other commercial areas being developed.
Public Services:	Expansion of schools and construction of community facilities.

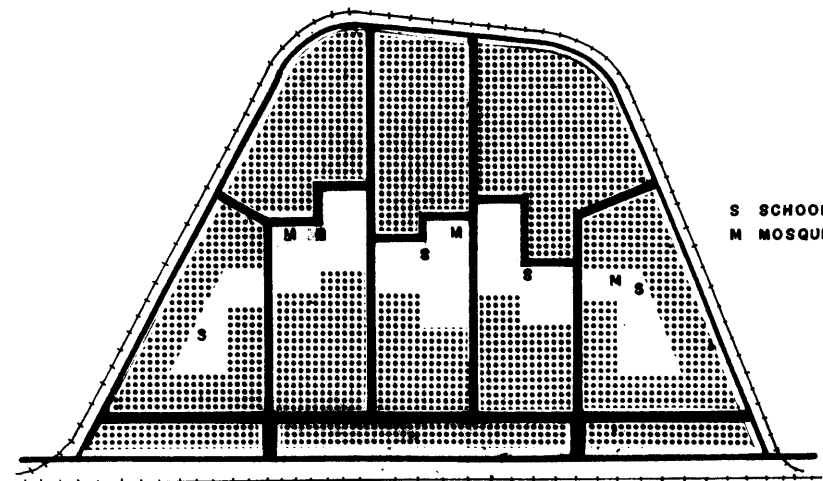
STAGING OPTION B



STAGE I



STAGE II

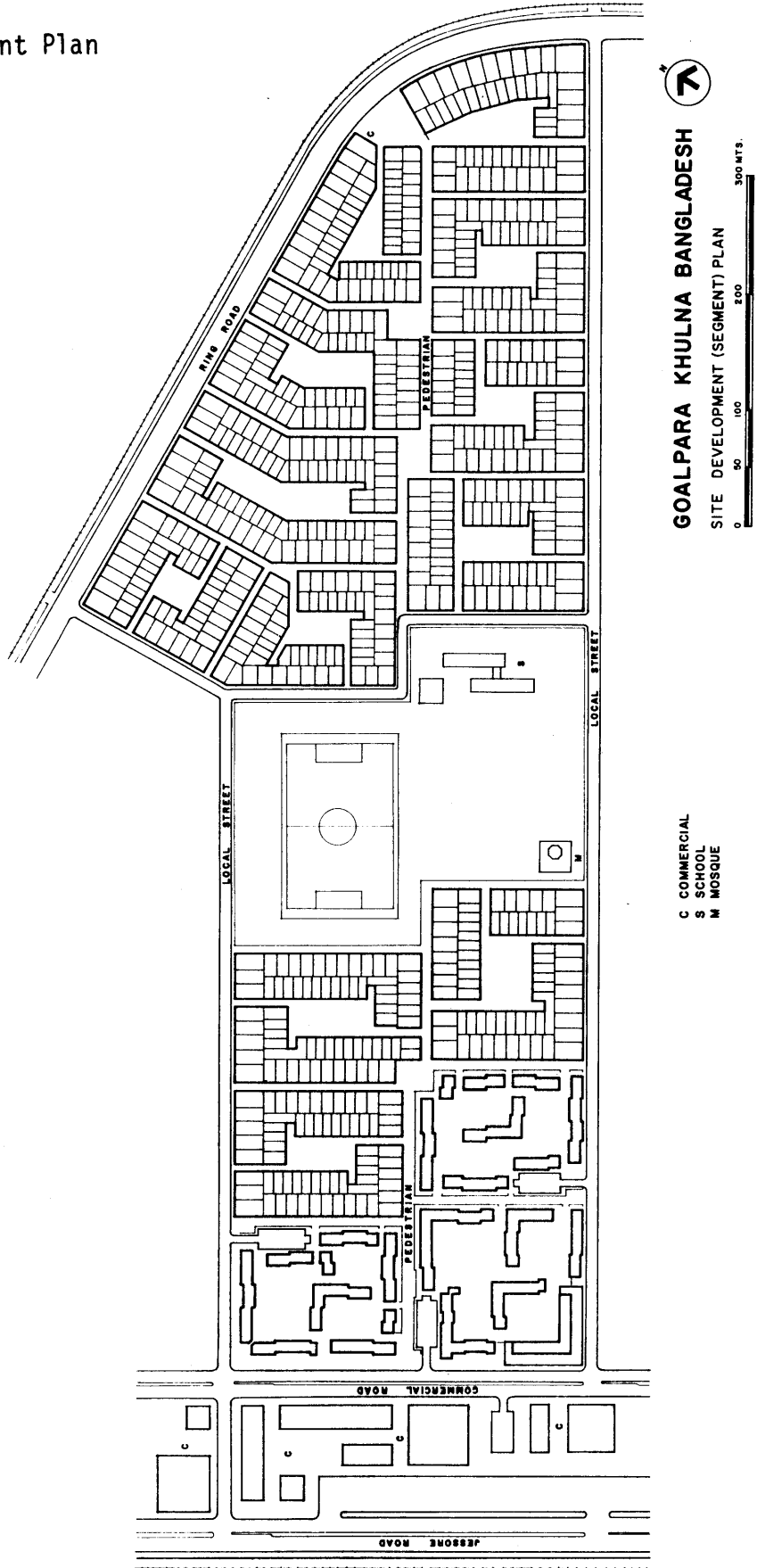


STAGE III



GOALPARA KHULNA
0 200 400M

7.1.7 Segment Plan



References:

Horacio Caminos, Reinhard Goelhart and Masters Class of 1970-71 in the Program "Urban Settlement Design," Department of Architecture, M.I.T. Pre-Application Proposal, La Marina, a New Town in Town, San Juan Metropolitan Area, Puerto Rico, 1971.

Horacio Caminos, Reinhard Goelhart, Interim Urbanization Project, Nairobi, Kenya, Education/Research Program: Urban Settlement Design in Developing Countries (1972).

Caminos, et. al., Classwork, Notes etc.

Felix Montes de Oca, Urban Residential Development Model for Low and Middle Income Families in Santo Domingo, Dominican Republic, M.I.T., Master in Architecture Thesis (1971).

David Ordorica, Layout Studies of Clustered Dwelling Lots for Urban Areas in Developing Countries, M.I.T., Master in Architecture Thesis (1971).

Section 8. APPENDIX

EVALUATION OF A GOVERNMENT PROGRAM: GOALPARA, KHULNA

Documents Available

The following are the documents available that were used as a basis for evaluation.

1. REPORT: Physical Planning Progresses
Prepared by Urban Development Directorate
Government of East Pakistan
Dacca: August 1968
2. REPORT: Low Cost Public Housing Programme
Prepared by Works (Housing and Planning) Department
Government of East Pakistan
Dacca: August 1968

Report 1 includes the following

Plans of site and service schemes (called Housing Estates)

The plans were originally drawn at 1"-165'-0".

They were photographically reduced for the report.

In some cases the plans also include charts showing percentages of land use, size of lots, number of lots, etc.

Report 2 includes the following

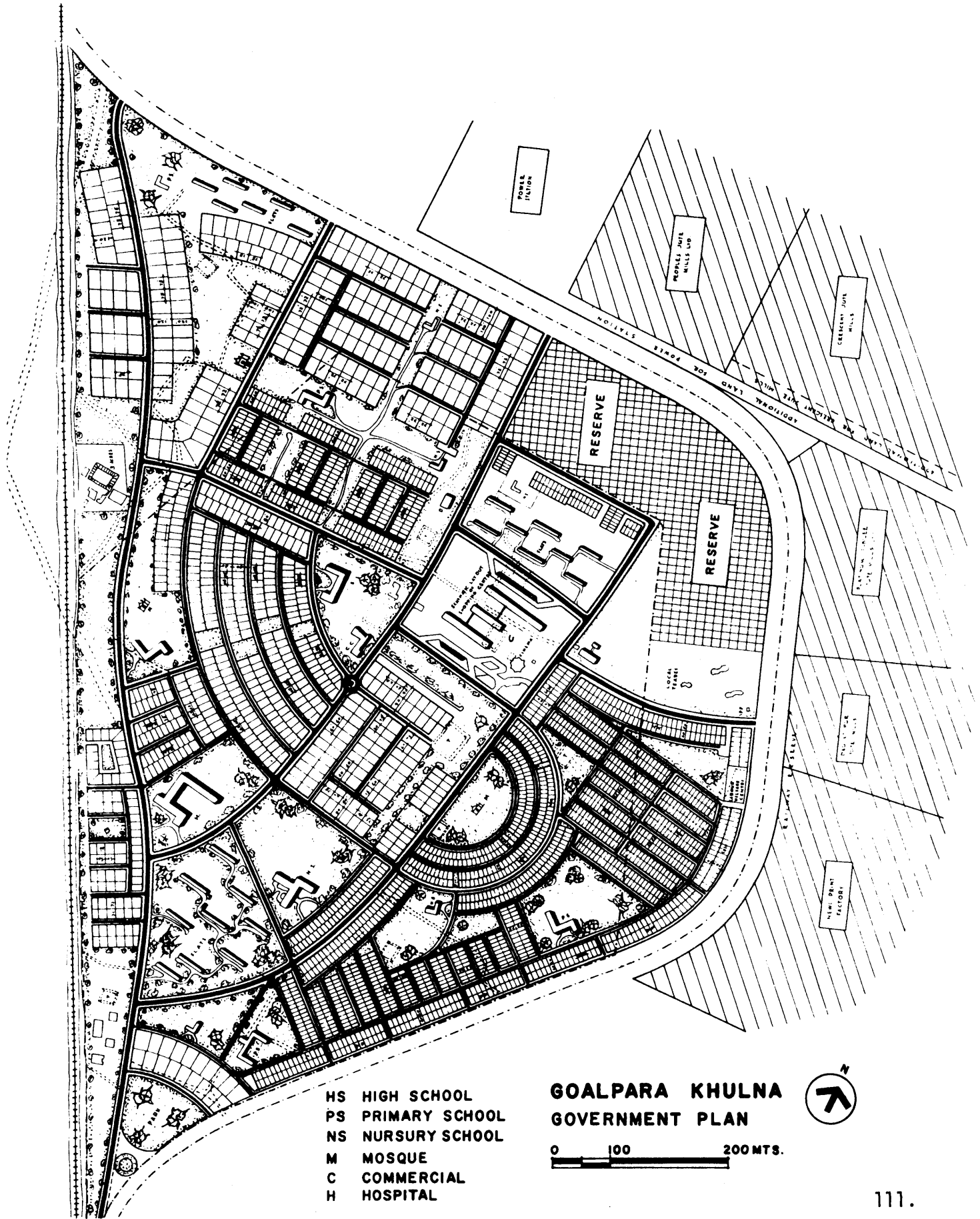
Chart showing Project summary of development of urban land and construction of public housing including refugee housing in various urban areas of Bangladesh, including the cost of different projects.

Plans of site and services schemes.

The plans were drawn at 1"-165'-0" and were photographically reduced for the report. As graphic scale was not used in the original plans, it is extremely difficult to scale these drawings.

Plans of site and service schemes (called Housing Estates) of

Goalpara Development, Khulna was selected for evaluation; they were converted to scale and used for physical evaluation.



- HS HIGH SCHOOL
- PS PRIMARY SCHOOL
- NS NURSURY SCHOOL
- M MOSQUE
- C COMMERCIAL
- H HOSPITAL

**GOALPARA KHULNA
GOVERNMENT PLAN**

0 100 200 MTS.



Summary of Project Data

See attached Plan: Goalpara, Khulna.

Site Location: Within the municipal boundary of Khulna town (see Section 4). The site is surrounded by Khulna-Jessore railroad and Khulna-Jessore Road on southwestern side and on north, east and south side by service road and service railroad to the industrial area. The site is surrounded by the main industrial area of Khulna, consisting of jute mills (burlap), newsprint mill, etc.

Access: West side: Existing access for Khulna Jessore Road
North, south and east side: From the ring road

Area: (approximate, measured from the plan)

437 acres

177 Ha

Main Features: Relatively flat land

Information available: Electrical power station of Khulna

Information not available: On water supply and other services

The Plan: Information derived from site plan; originally drawn at scale 1"-165'-0" which was photographically reduced for reproduction purposes

Project Type: Site and services

Land Use: Calculated from the plan as mentioned. The following chart shows percentages of the land use in the project and accepted standards (for similar urban residential situations).

	<u>Area Ha</u>	<u>Percentage</u>	<u>Accepted Standards Percentage-Range</u>
Lots	65	36.5%	50-60%
Schools, Centers, etc. Undefined Green Areas	47	27	20-30
Circulation	65	36.5	20-30

Comments on Land Use

The chart above is significant because it shows the extravagant use of land.

Lot areas in the project are only 36.5%, which is extremely low when compared with accepted standards for similar projects (50-60%).

Circulation areas in the project are 36.5% which is extremely high when compared with accepted standards (20-30%).

Most of the green areas in the project are unspecified.

The provision of an excess area for circulation at the expense of areas for lots, schools, centers, etc., points to a deficient use of land and economic land development: provision of utilities and services, maintenance and administration.

The situation is much more critical in the present case of sites and services programs. In other types of developments that provide the complete package, including dwellings, costs are distributed in many different items. This is not so in sites and services; therefore the economics as well as the administrative managerial aspects of the program rely heavily on the efficiency of the design.

Finally, it should be pointed out that the cost of basic utilities is more or less a constant for any kind of development and depends on layout efficiency. Therefore, the higher the cost of land, the less critical the cost of utilities and inversely lower the cost of land and more critical the cost of utilities.

Intensity of use

The project has the following density:

Total units: 3139

Intensity of use: $3139/171 = 18.3$ lots/Ha

The density of the project is low when compared with accepted standard densities for similar projects.

Population

As per plan and information = 15,700.

General facilities

As per plan:

- 1 High School
- 5 Primary Schools
- 1 Middle School
- 5 Nursery Schools
- 4 Mosques
- 1 Health Center
- 1 Community Center
- 1 Shopping Center
- 1 Cinema