

REPUBLIC OF INDONESIA

**SURVEY REPORT ON INDUSTRIAL
ESTATE DEVELOPMENT PROJECT**

August 1971

Prepared for
OVERSEAS TECHNICAL COOPERATION AGENCY
GOVERNMENT OF JAPAN

by

S. IJIMA

N. SATO

Members of Survey Team for
Mining & Manufacturing Industry in Indonesia

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FOREWORD

In compliance with the request of the Government of the Republic of Indonesia, the Government of Japan agreed to undertake a preliminary survey on the industrial estate development in Indonesia, and entrusted the Overseas Technical Cooperation Agency with the execution of this task.

The Agency dispatched

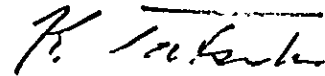
Dr. Sadakazu Iijima, Executive Director, Japan Industrial Location Center

Mr. Nobuhiro Sato, Director, Kyodo Institute of Planning

to Indonesia where they stayed from March 3 to 18, 1971 and conducted the assigned survey as part of the activities of the Japanese Survey Team for Mining and Manufacturing Industries Development Project in Indonesia.

The two-man survey group visited Djakarta, Surabaya, Tjilatjap and Medan districts to study the existing state of the industrial estate development in Indonesia. After its return to Japan, the survey group compiled the survey results into this report which I sincerely hope will contribute to the development of industrial estates in Indonesia.

Acknowledgement is due to the competent ministries of the Indonesian Government, municipal offices of Djakarta and Surabaya, Belawan Port and Harbour Bureau, and the Japanese Embassy in Djakarta for their valuable cooperation with the survey.



Keiichi Tatsuke

Director-General

Overseas Technical Cooperation Agency

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I. PURPOSE OF SURVEY

The development of industrial estates, which is a prevalent global trend, varies from country to country depending on their stage of development, their domestic conditions as well as by the availability of resources. A great diversity is observed in the scale of estates established in many countries as well as in the method adopted for their creation, organization for their development and types of industries located therein.

Just as the advanced countries of the world such as the United States, United Kingdom and Canada are constructing magnificent industrial estates through the application of advanced methods, so are the developing countries exerting all possible efforts in tackling this problem to accelerate the pace of their industrialization.

Incited by the successful development of the Jurong Industrial Estate in Singapore, Southeast Asian countries including Korea, Taiwan and Malaysia have already constructed a number of industrial estates; in Thailand, the Bangchan Industrial Estate Development Project has already been inaugurated to create the country's first industrial estate.

Indonesia and the Philippines, though somewhat behind these countries, are now giving serious consideration to the development of industrial estates.

As for the industrial estate development in Indonesia, no accurate information has so far been available as to its existing state, the system adopted by the Central Government and local public bodies for its promotion or the inroads made by foreign enterprises for estate creation, except that it was known that plans had been drafted for industrial estate development in the Djakarta district (West Java), Surabaya district (East Java), Tjilatjap district (Central Java) and Medan district (Sumatra). Thus the need has arisen to study the purposes and progress of the development now being made in Indonesia by a survey conducted by experts specialized in industrial estate so that Japan may decide on the necessity of providing her technical and financial aids.

The intrinsic purpose of this survey, therefore, was to clarify, through observation by experts, the many problems currently involved in the industrial development in Indonesia which calls for an approach made in an integrated and overall manner.

II. SCOPE OF THE REPORT

Since it is necessary to treat the question of an industrial estate development scheme in a very broad and comprehensive way, this report presents, on the one hand, the opinions and suggestions which are based on the information and findings obtained from the survey, and makes, on the other, a theoretical approach to the planning of an industrial estate with the view to providing basic data on its structure and guiding principles for its development.

Accordingly, one may consider that the report comprises two sections dealing with the following major subjects.

- (I) Existing state of industrial estate development in Indonesia
(Chapter III - Report of Survey Results)
- (II) Fundamental approach to industrial estate development and its application in Indonesia
(Chapter IV - Theoretical Speculation on Industrial Estate Development Scheme)

In relation to the above two subjects, problems are pointed out and recommendations made in Chapter V (Conclusion). Nevertheless, it is believed that the intrinsic purpose of this report lies in the assurance of a common and firm recognition, which is the basic condition for presenting the industrial estate development scheme for any foreign aid, as well as in the suggestion of the future course of development.

Therefore, this report gives due regard to the existing state of development in Indonesia which is considered to be on a pilot planning level; it discusses the need for providing a good climate for making decisions on the development scheme, placing special emphasis on the process to be undergone before reaching a correct understanding of an Industrial estate which is the precondition for formulating a sound development policy or plan. This process is to be understood as an inevitable step to be taken before studying the technical aspects involved in the design of an industrial estate.

III. REPORT ON THE SURVEY RESULTS

The survey was carried out for a period of 16 days from March 3 to 18, 1971 according to the survey itinerary in Djakarta, Surabaya and Tjilatjap districts in Java as well as in the Medan district of Sumatra, with discussions held with the competent officials of the central government and of the local governments and city offices in respective districts.

Discussions with the officials of the competent government offices, which centered on the notion of industrial estate development entertained by the survey group, covered the existing condition and views concerning the development of industrial estates and the related city planning, ports and harbour development projects and infrastructural improvement.

The field survey was conducted in each of the proposed sites of industrial estate.

Fig. 1 - Map of Java Island

Fig. 2 - Traffic Network of Java Island

Fig - 1 Map of Java Island

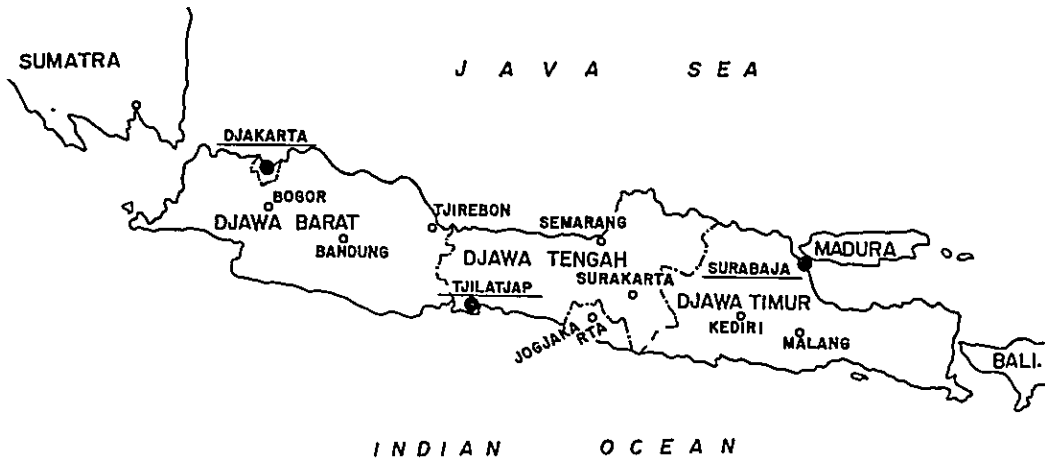
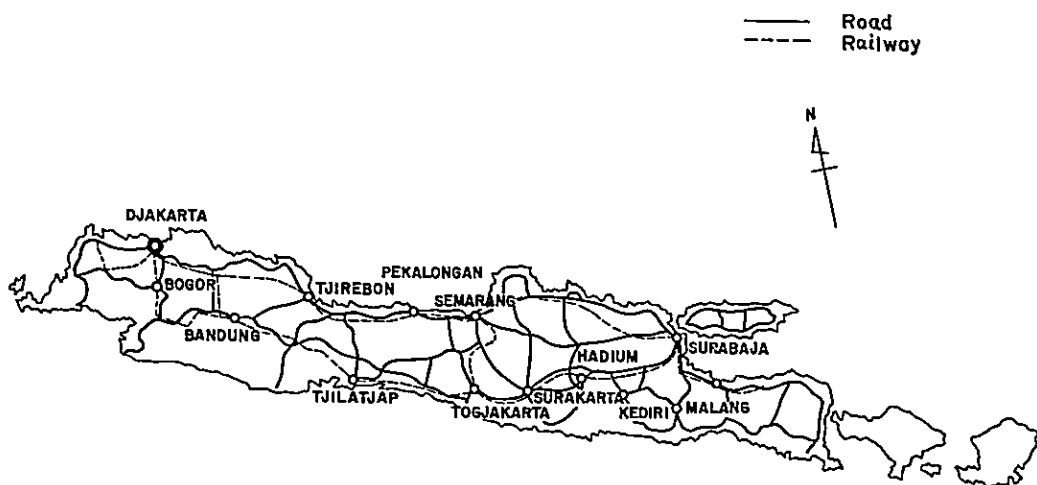


Fig - 2 Traffic Network of Java Island



1. Formation of Survey Group and Indonesian Counterpart Cooperation

Formation of the Japanese survey group is as follows.

Leader	Dr. Sadakazu Iijima	Japan Industrial Location Center Executive Director
Member	Mr. Nobuhiro Sato	Kyodo Institute of Planning, Director

Thanks are due to the Ministry of Industry, the National Development Planning Board and Djakarta City Office, for valuable assistance and cooperation and in particular to the following officials:

DJAKARTA:

Mr. Barli Halim	The Ministry of Industry of Indonesia
Mr. Sjamsuddin Ukardi	"
Mr. Pakki	"
Mr. Harahap	"
Mr. Sutoujo	"
Mr. Selo Soemardjan	The Ministry of State for Economic, Financial and Industrial Affairs (EKUIN)
Mr. Suratno Firag	"
Dr. Emil Salim	National Development Planning Board (BAPPENAS)
Mr. Sugeng Lundjaswadi	"
Mr. Dvernomosrdy	"
Mr. K. Baba	"
Ir. Piek Muljadi	The Municipal Planning Board, Djakarta
Mr. Rachmat Wiradisuria	"
Mr. A. Poerwadi	"
Mr. M. Surihandono S.H.	"

SURABAJA:

Mr. R.M. Arismóenandar	The Ministry of Industry, Propinsi East Java
Ir. M.O.B. Moehtadi	The Master Plan Team of Surabaya City
Mr. Tjiptadi	Alderman of Economic Affairs of Surabaya City

TJILATJAP:

Mr. R. Jaegihardjo	Deputy Bupati Tjilatjap
--------------------	-------------------------

MEDAN:

Ir. T. Bachtiar Manik	The Ministry of Industry, Propinsi Sumatra Utara
Mr. Mohd Kasim	"
Mr. Samantri	Port and Harbour Bureau, Belawan
Mr. J. Tiranda	"

2. Survey Itinerary

The survey was carried out according to the following itinerary.

Date & Day	Time	Description
Mar. 3 Wed.	9:00	Departure from Tokyo.
	19:15	Arrival at Djakarta.
4 Thu.	9:00	Cortesy call and consultation with Minister Arita at the Japanese Embassy.
	12:00	Visit to the Ministry of Industry. Consultation and arrangements for survey schedule with Messrs. Ukardy. S, Pakki, Harahap and Sutoyo.
	15:00	Visit to the Secretary to the Minister of State for Economic, Financial and Industrial Affairs. Consultation with Mr. Selo Soemardjan.
	9:00	Visit to the Ministry of Industry. Arrangements with Mr. Harahap.
5 Fri.	13:30	Visit to BAPPENAS. Consultation with Mr. Baba.
	16:00	Consultation with Mr. Salim at BAPPENAS.
	8:30	Visit to the Japanese Embassy. Arrangements for survey schedule.
6 Sat.	10:40	Visit to Djakarta Municipal Office. Interview and consultation with Mr. Riek Mouladi, the Chairman of the Planning Board, and Messrs. A. Poerwadi and M. Surihandono S.H. on the master plan and industrial estate development of Djakarta City.
	12:00	Inspection of the vicinities of Djakarta City and proposed sites of industrial estate.

Date & Day	Time	Description
Mar. 7 Sun.	6:00	Departure from Djakarta.
	7:00	Arrival at Surabaya.
	10:00	Visit to the Ministry of Industry, Propinsi East Java, and visit to the residence of Mr. R.M. Arismoenandar and consultation with him.
	11:30	Inspection of the southern district of Surabaya.
8 Mon.	8:30	Visit to the Ministry of Industry, Propinsi East Java. Explanations and data on industrial estate development provided by Mr. Arismoenandar.
	10:00	Visit to Surabaya Municipal Office.
	11:30	Inspection of the proposed sites of industrial estate in the vicinity of Surabaya City.
	18:00	Visit to the residence of the Governor of Surabaya. Consultation with the Governor and Mayor of Surabaya City and political leaders.
	9 Tue.	8:00
Mar. 10 Wed.	9:00	Arrival at Djakarta.
	10:00	Consolidation of data collected.
	10:10	Departure from Djakarta.
	11:00	Arrival at Jogjakarta.
11 Thu	14:00	Departure from Jogjakarta.
	19:00	Arrival at Tjilatjap.
	8:30	Visit to the Port and Harbour Bureau, Tjilatjap. Explanation given on the development plan of Tjilatjap Port and industrial estates; inspection of the port.
	10:30	Visit to Tjilatjap Kabupaten Office.
	11:30	Inspection of the Tjilatjap Port iron sand shipping facilities and the iron sand mining station.
	14:00	Departure from Tjilatjap.
	18:30	Arrival at Jogjakarta.
12 Fri.	9:00	Inspection of Jogjakarta City.
	15:00	Departure from Jogjakarta.
	16:00	Arrival at Djakarta.

Date & Day	Time	Description
Mar. 13 Sat.	8:30	Visit to BAPPENAS. Findings of the survey explained during consultation with the officials of BAPPENAS.
	12:00	Visit to the Ministry of Industry. Findings of the survey reported to Mr. Barli Halim during consultation with him.
	13:00	Consultation with the officials concerned of Djakarta Municipal Office.
Mar. 14 Sun	7:00	Departure of Iijima for Japan.
	10:00	Departure of Sato from Djakarta.
	12:15	Arrival at Medan.
15 Mon.	9:00	Visit to the Ministry of Industry, Propinsi West Sumatra. Consultation with Messrs. Manik and Kasim.
	10:00	Inspection of Mary Land, the proposed site of industrial eatate.
	12:30	Visit to the Port and Harbour Bureau, Belawan. Interview with Messrs. Tiranda and Samartri who gave an explanation on the master plan of Belawan Port.
	13:30	Inspection of Belwan Port.
	14:00	Inspection of railways and roads.
16 Tue	8:30	Visit to the Ministry of Industry, Propinsi West Sumatra. Report presented to Mr. Manik with explanation.
	13:00	Departure from Medan.
	15:00	Arrival at Djakarta.
	17:00	Visit to the Japanese Embassy. Final report on the survey presented.
	19:30	Interview with the Master Plan Team of Djakarta City.
17 Wed.	7:10	Departure from Djakarta.
	8:30	Arrival at Singapore.
18 Thu.		Arrival in Tokyo.

The survey group conducted field inspections of planned sites of industrial estates and further held consultations and discussions with the Vice-Minister for Industry, the Vice-Minister for State Economic, Financial and Industrial Affairs, the Governors of Surabaya City, Djakarta City and East Province, and the leaders of Tjilatjap County and Tjilatjap Port and

Harbour Bureau. With respect to a number of proposed sites of industrial estates located in the vicinity of Djakarta, Surabaya and Medan, the survey group elucidated its view and standards for site selection to the officials concerned in each district (ref. Chap. IV; - Theoretical Speculation on Industrial Estate Development Scheme) and discussed with them as to the suitability of respective sites on the basis of the said standards.

3. Existing State of Industrial Estate Development

The Five Year Development Plan (1969 - 1973) envisages the attainment of a 90% increase in industrial production in the initial year of its expansion and construction stage.

The entire period of the Development Plan is divided into two stages; the rehabilitation stage which covers the first two years of the five year period and the expansion and construction stage which embraces the remaining three years. 1971 is the initial year of the latter stage.

In the absence of sufficient data, no detailed description can be given on the industrial development achieved under the plan over the past years. It is obvious, however, that industrial development is being given greater importance than ever together with the infrastructural improvement for primary industry. The fact that the sites for industrial estate development, substance of development and organizations for development were discussed repetitively and at length by the government officials and political leaders concerned at a seminar on industrial estates held in Djakarta in October, 1970 indicates that the development of industrial estates is recognized as an important means to accelerate the pace of industrial development in the existing industrial climate. It may be said that moves are gaining impetus in Indonesia towards the development of industrial estates.

The Ministry of Industry, EKUIN and other pertinent offices of the Central Government are now working to establish an independent and specialized authority which would function on the basis of a unified national policy for industrial estate development. Minor disagreement exists in the opinions of respective government offices concerning the development method, especially in regard to the introduction of foreign enterprises, but they are unanimous for locating industrial estates in areas surrounding major cities such as Djakarta and Surabaya.

Moves for industrial estate development are also observed in local districts, as for example in Djakarta and Surabaya. Djakarta City has a committee comprising experts specialized in industrial estate development who are deputed by private electric and other industries. In Surabaya, the municipal government and the Ministry of Industry, Propinsi East Java have organized a master plan team which is working on the preparation of a development plan with the aid of consultants. However, development efforts in these districts, when

considered as an undertaking, are devoid of the necessary ties with the Central Government and appear to be hampered by the lack of ability to determine the development priority on the basis of the distribution and priority order to public investment. This lack of consideration for public investment is also noted in the Government's plan for an exclusive industrial estate development authority in which the participation of the Ministry of Public Works is disregarded. However, remedy has already been brought to this defect by the concerted opinion of relevant government offices to run the authority with the participation of the said ministry.

Development efforts being made in respective districts are described in the following items.

The following three figures, which relate to Java Island, are given by way of reference.

Fig. 3 - Population in Major Cities of Java

Fig. 4 - Population Density in Java

Fig. 5 - Industry-wise Population Distribution in Java

Fig - 3 Population in Major Cities of Java

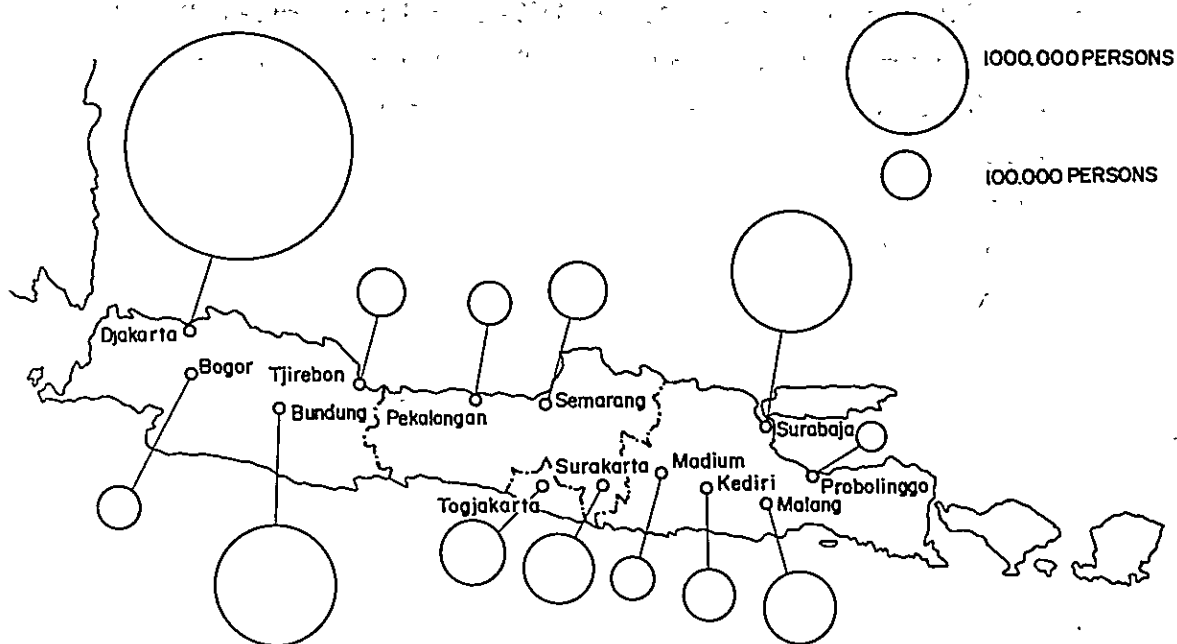


Fig - 4 Population Density in Java

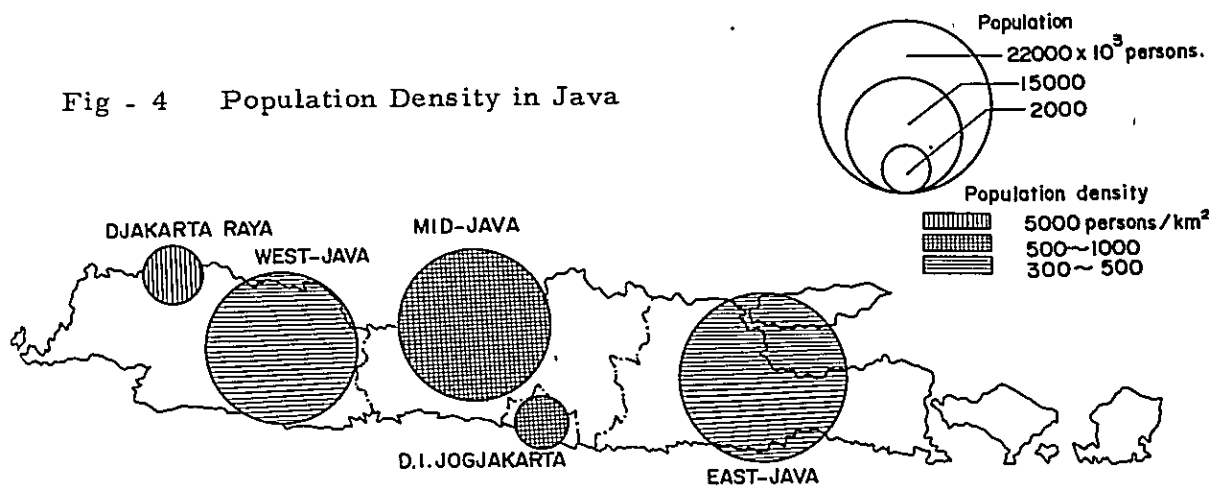
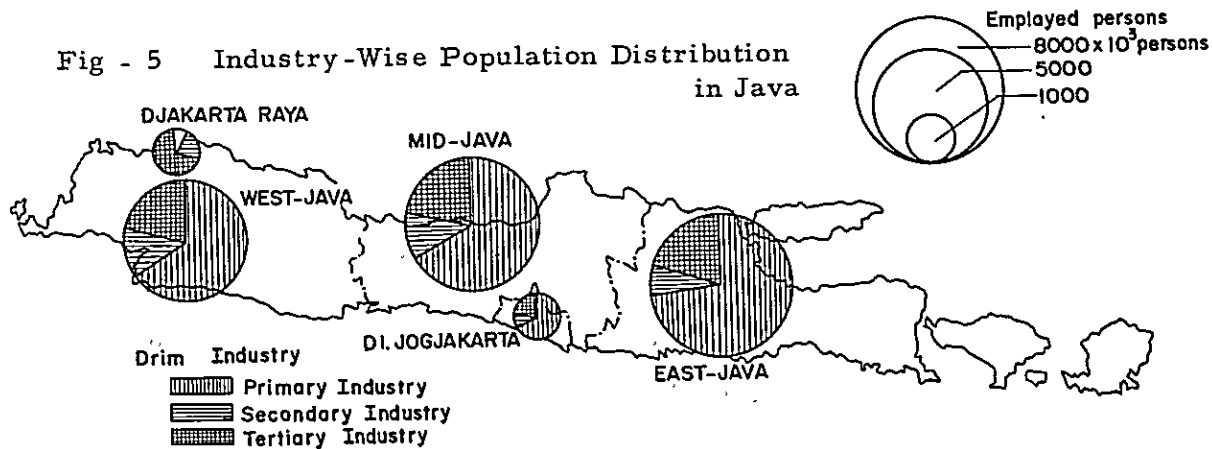


Fig - 5 Industry-Wise Population Distribution in Java



i) Djakarta District

Djakarta, the capital of Indonesia, has a population of three million (1961 census) which is expanding at a high growth rate, and presents an increasing trend for urbanization which has been conspicuous over the past several years. In its suburban areas, most of the established factories are joint ventures with Japan, United States, Australia, Hongkong and other countries. The keen concern observed in this district for industrial estate development is proven by the surveys which the United States has embarked upon recently.

The industrial estate development in the suburbs of Djakarta is given the highest priority by the unified opinion of the Ministry of Industry, EKUIN and other government offices. Djakarta's industrial estate development plan has already been incorporated in the city's master plan for urban development, and part of the land required has already been acquired.

In Indonesia, public works are usually implemented by respective local governments with the budgetary appropriation from the Central Government. For this reason, the planning and implementation of the industrial estate formation scheme in Djakarta district is undertaken by a section of the municipal office which is in charge of the master plan for the municipal area. Proposed sites of the industrial estate selected by the said section are the following six. (See Fig. 6)

1.	Pluit	373 (ha)
2.	Antjol	560
3.	Tjempakutih	253
4.	Pulomas	
5.	Pulo Gadung	500
6.	Gandaria	200
7.	Tjilntjing	

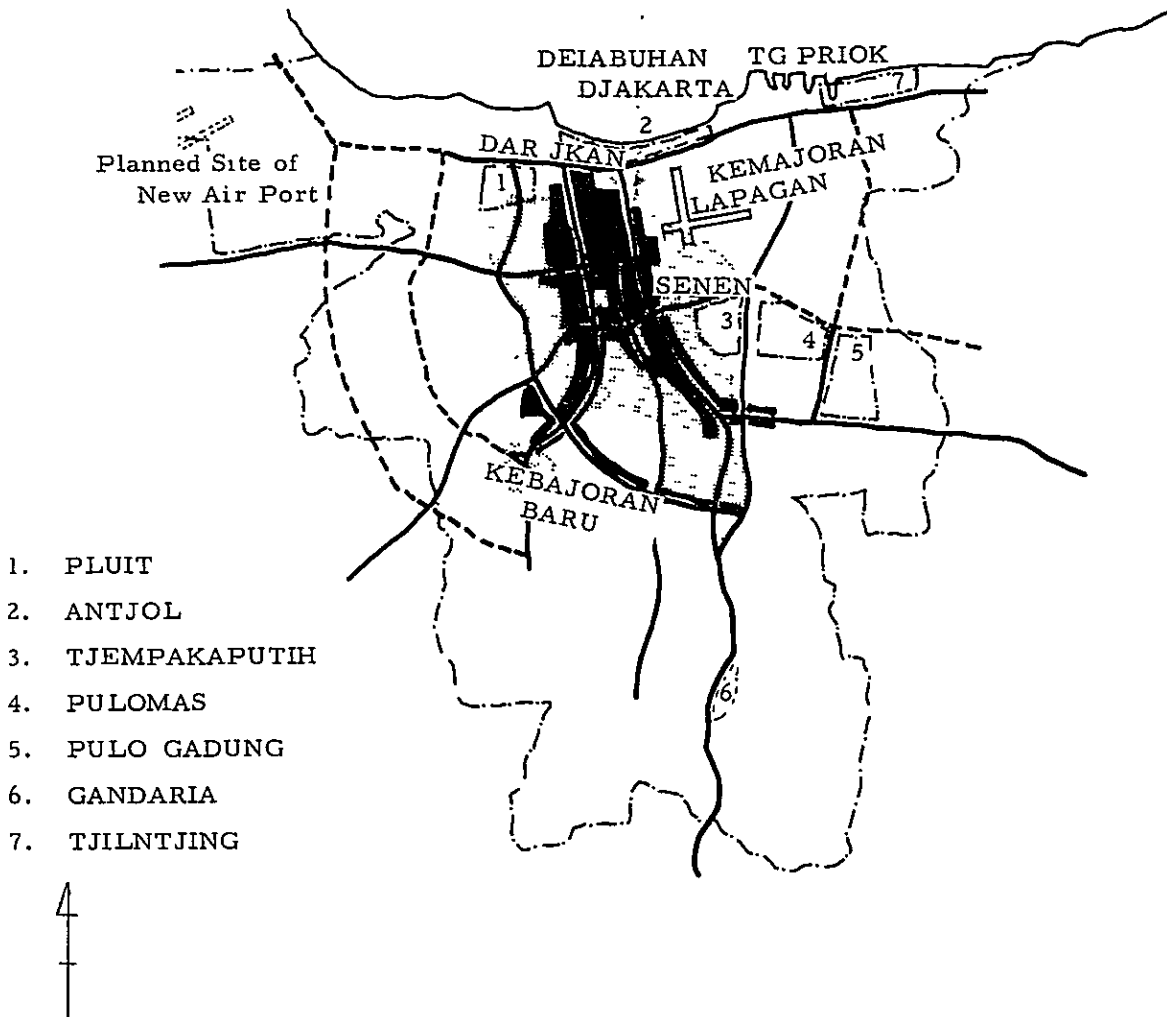
Djakarta Municipal Office is giving the highest priority to Pulogadung district and is currently engaged in the acquisition of land (16 ha), planning, and other activities for the creation of an industrial estate in this district.

When Djakarta's future development and city planning involving roads and other urban facilities are taken into consideration, the said district, which is close to the port, is favourably situated. The survey group agrees with the opinion of the Municipal Office to give top priority to this district.

Gandaria district already has established a number of factories, and the route of the proposed arterial road to Bogor and a main power line pass through this district. These conditions have caused this district to be given second priority. However, Gandaria is already an industrial zone and it appears that the Municipal Office is not fully aware of the essential difference between an industrial estate though the survey group has made clear the purport of developing the latter. Further guidance in this respect is therefore considered necessary.

It was learned that the Municipal Office entertains a plan to create an industrial estate in the area of the existing airport which is planned to be moved to another place. The survey group believes, however, that the creation of a residential district, construction of distribution facilities or establishment of an office district is more commendable for land use in this area.

Fig. - 6 Planned Sites for Industrial Estate in Djakarta District



ii) Surabaya District

Surabaya City, which has developed around its port, has a population of one million (1961 census) and is the second largest city in Indonesia.

The role played by ports is very important in Indonesia where the economic effect derived from the inter-urban or inter-district commodity flow by over-land transport can not be expected. For this reason, factories are invariably located around ports and cities.

The master plan drafted by the Surabaya Municipal Office envisages the expansion of the city area through the construction of a loop road which is planned to be connected with the port for industrial development in the outer periphery of the loop line.

Though full support is given to the industrial estate development plan by the Governor, the Ministry of Industry, Propinsi East Java, the Port and Harbour Bureau and Surabaya Municipal Office, no discretionary actions are taken for the implementation of the plan since it is financed by the Central Government.

Proposed sites of industrial estate are the following two.

- | | |
|------------|----------|
| 1. Tandes | 300 (ha) |
| 2. Rungkut | 200 |

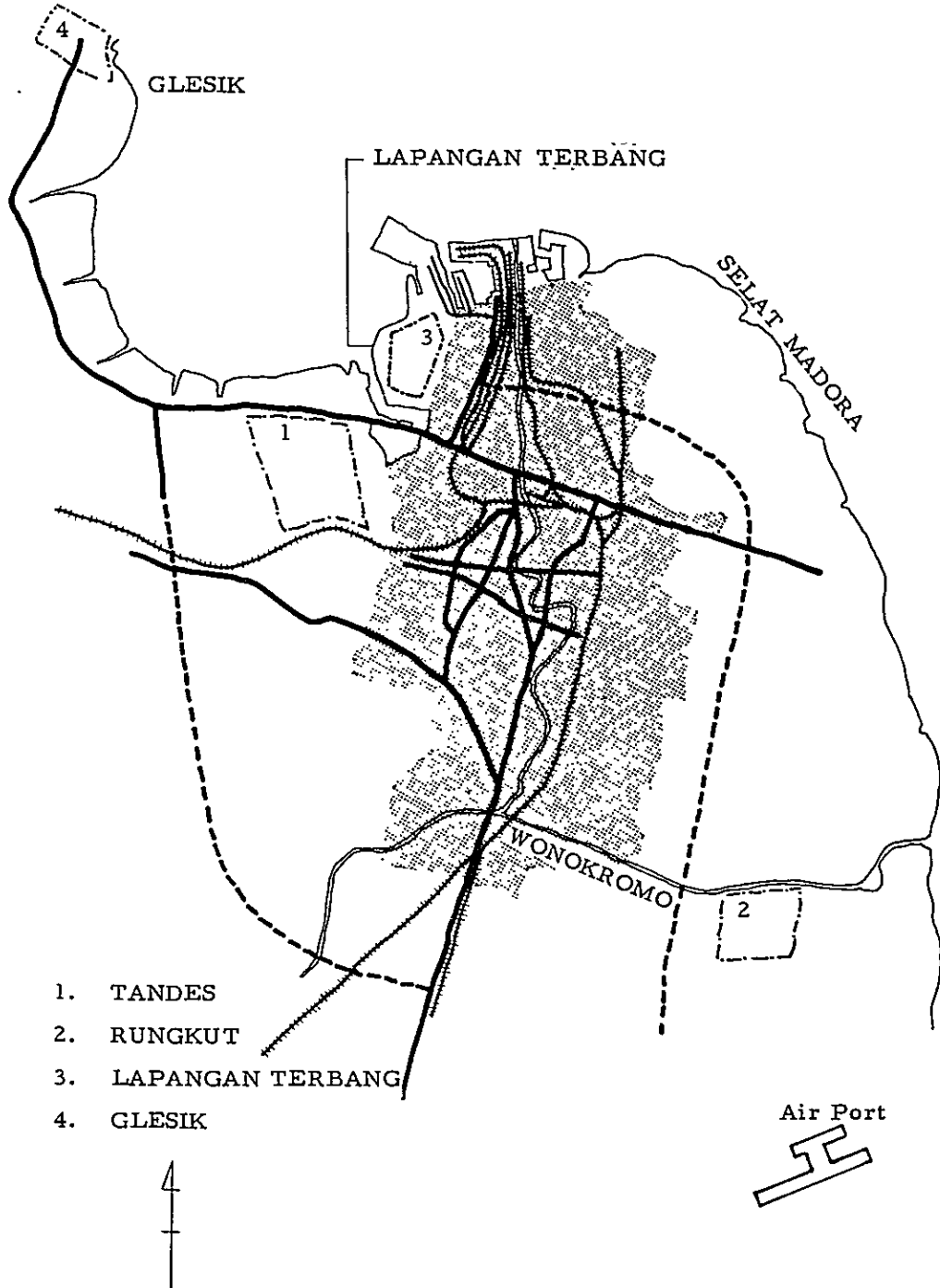
Other than the above two districts, the former airport area of 200 ha (Capangan Terbang) which is adjacent to the port is also available for some type of development. Eventhough, the Municipal Office proposed that industrial development for this area be planned, the survey group recommended instead the establishment of a distribution centre. In Gresik district located about 20 km from the city centre, cement plants and petroleum-oriented plants are established. It is considered possible to develop this district into a new industrial town.

Observing a number of factories located 10 to 15 km far from the city along a highway which leads to the nearby highland area, the survey group felt that the situation in the Surabaya district is fairly matured for industrial development.

Of the afore-mentioned two districts, Rungkut district should be given a higher development priority. Development planned for Tandes district is to be materialized in an area farther west of the city area, not because of the land

condition of the district (which is used as a fish pond) but because of the physical requirement arising from the locational relationship between the district and the city and the proposed expansion project of the port.

Fig. - 7 Planned Sites for Industrial Estate in Surabaya District



iii) Tjilatjap District . . .

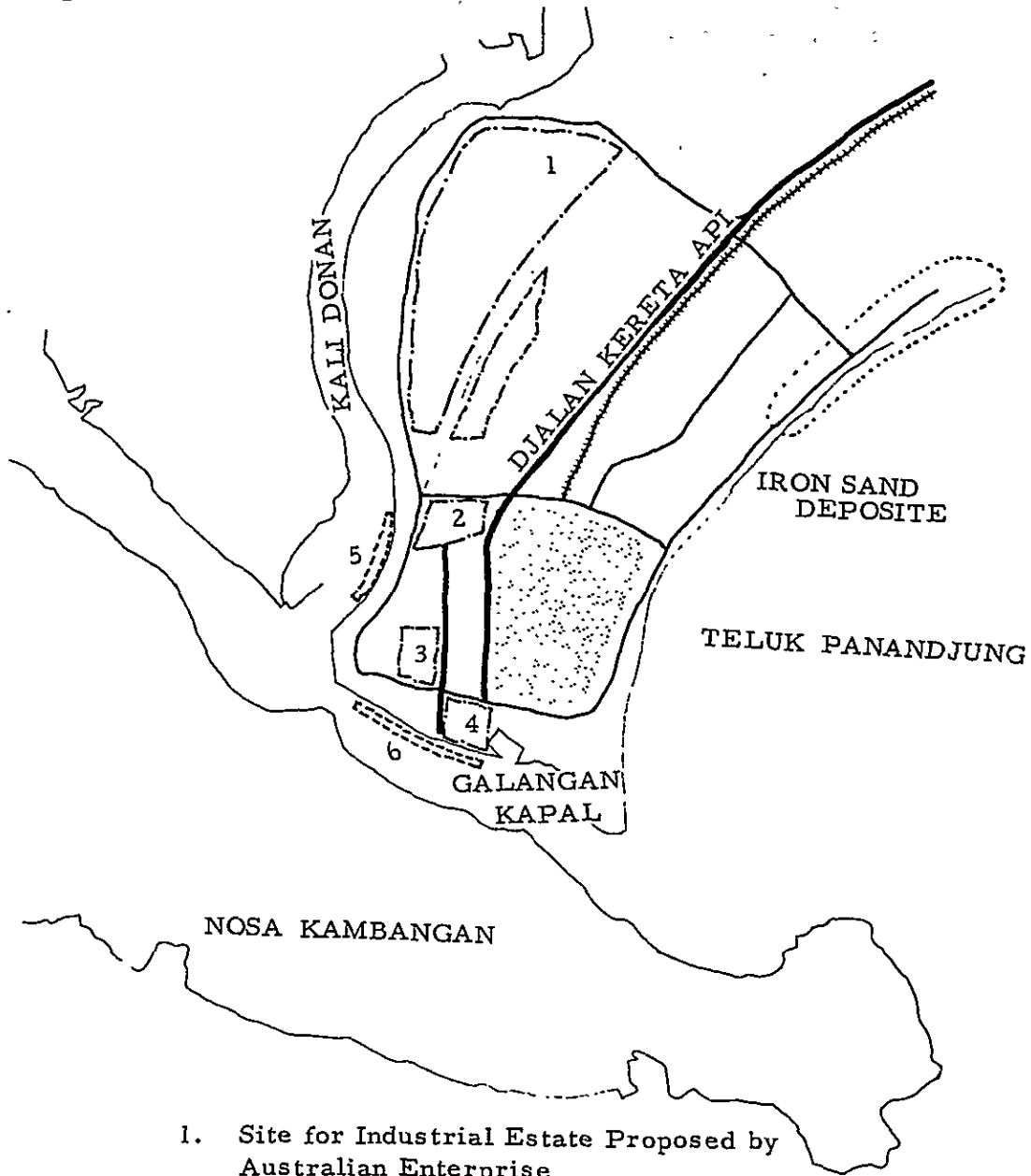
At the outset of its development, Tjilatjap, situated 180 km from Jogjakarta, was a fishing port. With iron sand and other mineral resources available in its vicinities and with no other sea ports found on Java's coast facing the Indian Ocean, great importance is attached to this port, and its expansion project has caused industrial development to be planned in this district.

For Tjilatjap's future development, it is considered necessary to integrate its above-mentioned port expansion and industrialization plans with its many functions such as oil distribution to inland areas and shipment of timber and rice.

The advantage of being the largest and best sea close to Australia has drawn the attention of a group of Australian enterprises (11 enterprises) which are now engaged in the preparation of a master plan to create an industrial estate in the vicinity of the city.

In the suburban area of Tjilatjap, there is a fertilizer plant whose construction work, initiated with Soviet aid, is now suspended.

Fig. - 8 Planned Sites for Industrial Estate in Tjlachap District



- 1. Site for Industrial Estate Proposed by Australian Enterprise
- 2.)
- 3.) Site for Industrial Development in Port Area
- 4.)
- 5.) Sites for Port Facilities Improvement
- 6.)

iv) Medan District

Medan is the central city of West Sumatra Province, one of the six sections into which Sumatra is administratively divided. Though it has a long history, its development into a large, modern city took place only recently. According to the 1961 census, the city has a population of 500 thousand.

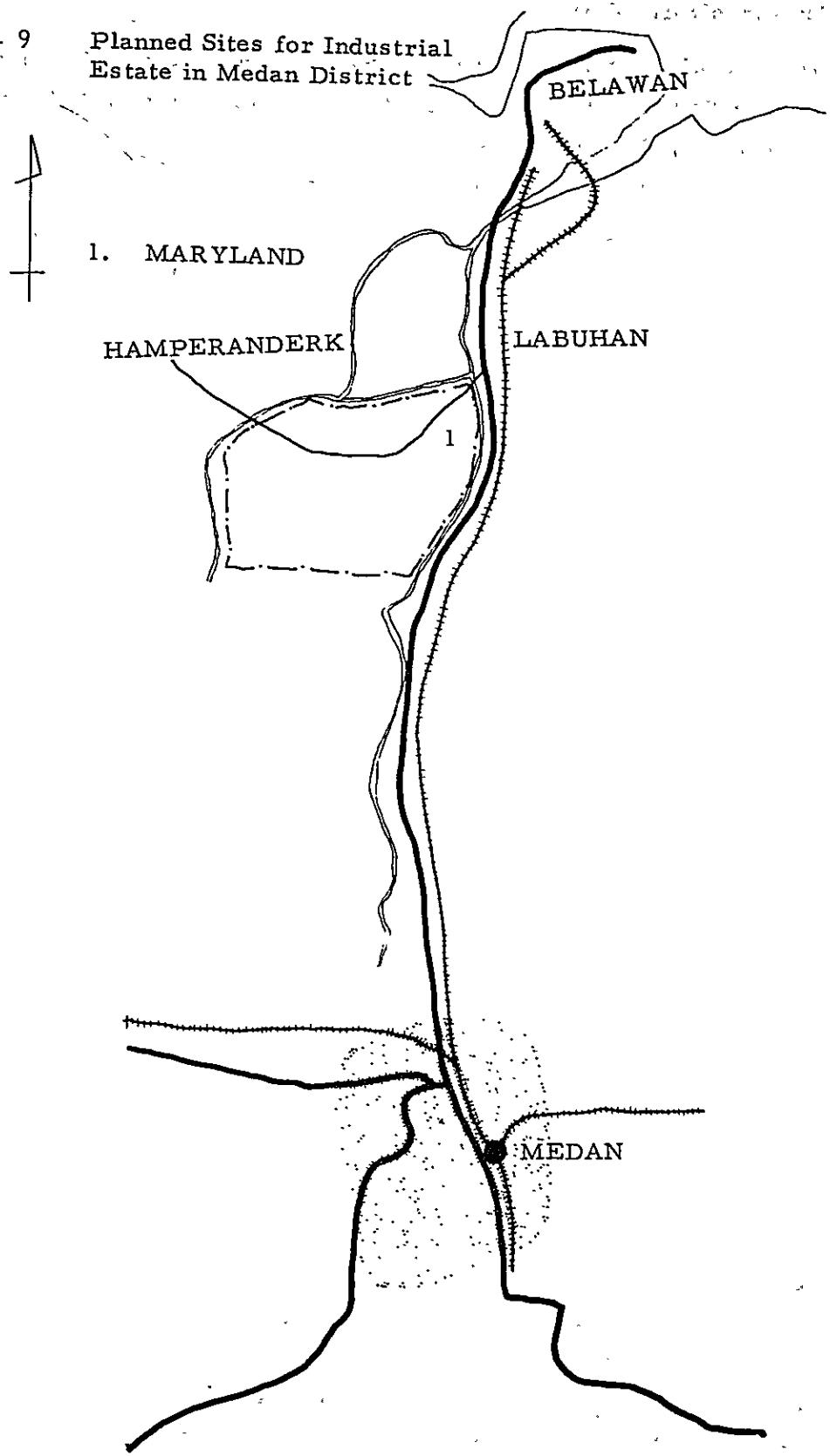
The area surrounding Medan is endowed with rich natural resources such as petroleum and timber, and Belawan, the third largest port in Indonesia located 20 km from Medan and ranking next to Djakarta and Surabaya, functions as a large supply centre of PERTAMINA. There are more than 200 factories established along the arterial road connecting the city area and the port, indicating clearly that the future development of this district heavily depends on industry.

The Ministry of Industry, Propinsi West Sumatra, is planning the formation of an industrial estate which is to cover a 500 ha area midway between the city and the port. Mary Land, the proposed site of the industrial estate development, is state land. The said ministry is planning compensation for some upland fields and houses found on this land. Since the ground, roads, railways and other conditions of the site are fairly favourable for the proposed estate location, the ministry's planning activity may well be considered to be in the pre-master plan stage.

The port expansion is planned under a master plan. Further, development of industrial estates at sites other than Mary Land is contemplated but its feasibility is still very low at present.

Mary Land should be developed into a new town by the systematic accumulation of not only industrial facilities but also other related facilities. Early completion of its master plan is therefore hoped for.

Fig. - 9
Planned Sites for Industrial
Estate in Medan District



4. Summary of Survey Results

(1) Though the industrial estate development scheme in Indonesia is still in the planning stage, the United States, Australia and other countries, evaluating highly its future prospect, are making proposals to the Indonesian Government for its early materialization in a very active way not seen in other Southeast Asian countries.

It is considered that at present, these proposals from outside are being reviewed by the Central Government and by the pertinent provincial and municipal governments. In Java, the foreign proposals are reflected in the study of development feasibility of industrial estates around Djakarta, Surabaya and Tjilatjap. Problems entailed in the Government-base development are the establishment of a single, integrated authority and the budgetary allocation from the National Treasury for the construction of estates. Local governments, on the other hand, are in the stage of selecting the sites of estates and of planning roads, industrial water and power in relation to the future city plan.

The industrial estate development plan is most advanced in the Pulogadung district of Djakarta where the acquisition of land is already in progress. This district is quite suitable for development from the viewpoint of industrial location.

(2) Industrial growth carries heavy weight in the formulation of long-range development plans of a country. In all country of the world, it is the common practice to expect industrial growth to play a vital role within the framework of an economic development scheme.

What is more important for national industrial development, however, is to estimate the area and pattern-wise industrial growth on the regional planning level. This estimation is made on the basis of future prospects of the population distribution, resource distribution and improvement of traffic conditions.

It is to be added that for the accelerated development of large cities, suburban areas of large cities, central cities in local districts, smaller local cities, ports and harbours, as well as resources, increasingly large importance has come to be attached to the nation-wide industrial development through the construction of industrial estates.

Java Island, covering an area of 130,000 km² and inhabited by some 63 million people (1961 census), has one of the highest population densities of the world, but the location of its cities and its traffic network can well justify the establishment of an industrial estate development scheme which will be conducive to the island's industrialization. The future increase in per capita income taken into account, the island could develop into a highly concentrated and advanced industrial society like Honshu Island of

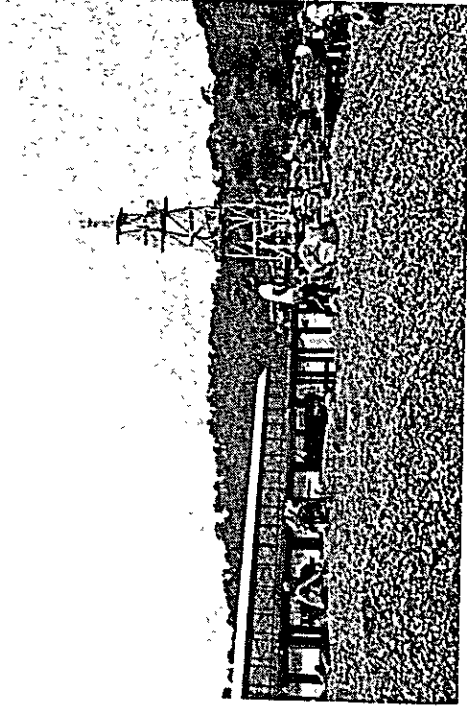
Japan.

Plans now under study for establishing industrial estates in the vicinities of Djakarta, Surabaya, Tjilatjap and Medan came into existence not from the country's over-all development schem but were brought to the attention of the authorities by the foreign investment plans.

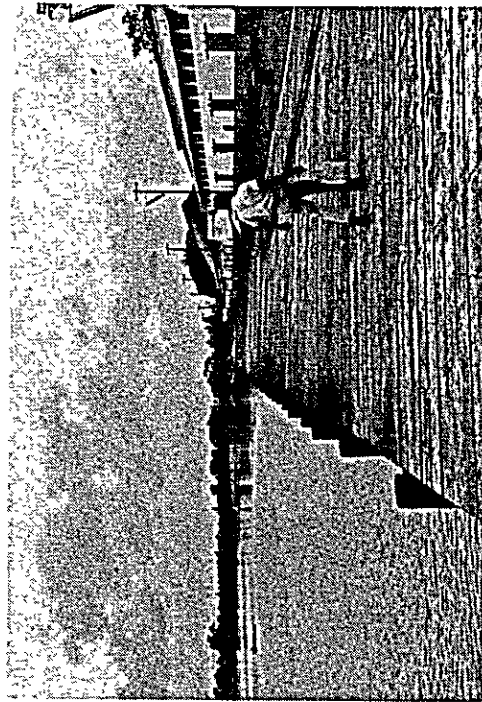
From the population distrubution and the locations of cities, the survey group believes that consideration should be given, among other things, to the establishment of industrial estates in the vicinities of Bandung, Surakarta, Malang and Semarang. It is considered that the formulation of an area-wise industrial development programme should be ensued by the forecast of a vision of nationwide development of industrial estates.



PULOGADUNG, Suitable Development Site
for Industrial Estate in Djakarta District



Construction of Iron Sand Shipping
Facilities in Tjilachap Port



10 Thousand Walf in Tjilachap Port



Newly Built Factory in Medan District



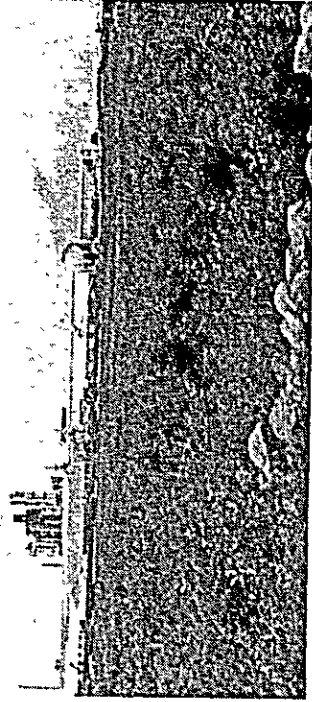
Survey Group in Tandes, Surabaya



Tandes, Suitable Development Site in Surabaya District



Rungkut, Suitable Site for Industrial Estate in Surabaya District



Petro-Chemical Plant in Gresik, Surabaya District

IV. THEORETICAL SPECULATION ON INDUSTRIAL ESTATE DEVELOPMENT SCHEME

In the preceding chapter, the conditions to be satisfied for realizing the industrial estate development programme, suitability of proposed sites in respective districts, and technical problems involved in the desired development were discussed on the basis of the survey results.

Opinions advanced in the preceding chapter should be used as the basis for clarifying the intrinsic nature of an industrial estate and for making a theoretical approach to its planning.

In this chapter, an objective consideration will be made for the planning of an industrial estate through the recognition of its nature, touching partly on its technical aspect. The approach and discussion presented in this chapter are intended to serve as the basic data for mapping out an industrial estate development programme in Indonesia.

1. Concept of Industrial Estate

i) Definition and Characteristics of an Industrial Estate

- Conceptual Recognition -

An industrial estate, which is one of the many forms of industrial location, embodies a diversity of development potentials when it is understood as an aggregate of many industries occupying a certain space in common and engaging in industrial activities in a body. Considered from the viewpoint of a plant to be located in it, an industrial estate promises the rehabilitation of the industry it belongs to, improvement of managerial infrastructure of the said industry if it is a small-scale industry, increased returns to scale arising from the accumulation and agglomeration of the industry, and the benefit resulting from the utilization of common facilities, thus making it possible to anticipate the interaction between the benefit of individual plants and that of the whole industry located in the estate. Development of industrial estates is being pushed forward in many countries of the world since they can be organized into a kombinat which functions as a collective industrial body undertaking not just production but the entire process from product development and research to production and distribution.

Development of an industrial estate also makes it possible to expedite the development of the surrounding area. The greatest importance must be set on this propagation effect when planning an industrial estate development because the improvement of people's welfare and livelihood and the creation of better regional communities are

undoubtedly the ultimate purpose of developing an industry, irrespective of its kind. Accordingly, the development of an industrial estate is a means to guide economic activities through industrial growth and can be defined as a strategic measure applicable for the establishment of a regional community.

When an industrial estate and its surrounding area are considered en bloc, there arises the need for paying attention to the development of an over-concentrated industrial zone, over-populated urban area, public nuisance, and other evils of the over-adaptation to industrial development. Needless to say, an industrial estate must be planned with comprehensive considerations given to both negative and positive factors accompanying its development. An intelligent challenge to provide solutions to the expected minus factors makes the development strategy a realistic and practical means to make a direct approach to the intrinsic object of development which lies beyond the specific development goals of respective areas. Such a challenge also makes the industrial estate an excellent development means of today.

From the above description, an industrial estate can be considered to have the following characteristics.

(1) Rationalized Production Activity

Reorganization of production activity is made possible by accumulation.

(2) Integration of Industrial Structure

The process from production to distribution can be integrated.

(3) Strategic Regional Development

Regional activity can be accelerated by the employment of workers.

(4) Possibility of Mapping Out Comprehensive Plans

Scope of regional development plans, city planning and other comprehensive plans can be delineated.

The description in the following item is intended for the comprehensive understanding of an industrial estate.

ii) Process of Industrialization

To reach a comprehensive understanding of an industrial estate, one must be acquainted with the process of industrialization.

Industrialization is a means adopted and enhanced the world over for development into an advanced country, and is considered to go through the following four stages.

(1) Resources-oriented Industry

Copper, aluminum, petroleum, timber, sugar and food processing.

(2) Primary Consumer Goods Industry

Clothing, sawed wood, furnitures, cement, fertilizers, foodstuff and paper products.

(3) Capital Goods Industry

Iron and steel, chemicals, petrochemicals, and non-ferrous metals.

(4) Durable Consumer Goods Industry

Electrical machinery, machinery, transport equipment, and office appliances and machinery.

Industrialization begins with the full exploitation of the domestic natural resources. In the development of the resources-oriented industry, neither the selection of site nor the government policy counts as a factor of any importance at all.

Industrial production of commodities required for "clothing, food and shelter" develops even in countries where industrialization is not advanced. Such primary consumer goods industry starts with the production of fertilizers, clothing, cement, tiles, sawed timbers and foodstuffs, and gradually develops to produce commodities needed for a higher level of livelihood. As the production of consumer goods of higher quality progresses, it develops into the capital goods industry producing iron and steel, non-ferrous metals and chemicals which eventually come to be put to secondary and then tertiary processing for domestic production of commodities of increasingly higher quality.

In the final stage of industrialization, durable consumer goods such as general machinery, industrial machinery, machines and equipment for public welfare, transport equipment, machinery and precision machinery are produced.

As a country reaches the final stage of industrialization, it enters the era of information handling industries involving mental industry and knowledge industry. As this final stage, techniques are exported and overseas capital investment is conducted with the increase in the national income and shortage of labour force.

It is desirable that an industrial estate development plan be implemented in each of these industrialization stages.

iii) Types of Industrial Estate

Since various types of industrial estate can be conceived of, the means and method of developing a specific estate must be determined by its type.

(1)	Sea-front industrial estate	(Example)
	1-A Natural resources are available.	Houston (U.S.A.)
	1-A Natural resources are not available.	Jurong (Singapore), Ulsan (Korea), Japan, Europort, Dunkirk.
(2)	Inland industrial estate	
	2-A Natural resources are available.	The Ruhr (West Germany).
	2-B Established in the suburbs of a large consumer city.	Industrial parks established around Los Angeles, Chicago and Toronto; Thailand, Malaysia, Tokyo.
	2-C Established in the suburbs of a local city.	U.S.A., Japan, Korea, Taiwan.
	2-D Established for improvement of medium and small scale industries.	Industrial estate established for protection of medium and small scale industries (Japan); India, Hongkong.
(3)	Processing of bonded goods	
	(Government's back-up policy and financial support are required)	Kaochiung (Taiwan), Okinawa.

Suitability to the prevailing conditions considered as the prime factor, industrialization in Indonesia should certainly resort to the exploitation of domestic natural resources such as petroleum, bauxite, iron sand, copper ore deposits, forest resources, etc. The iron and steel industry, if planned for the stage following such resources-oriented industrialization, would correspond to Case 1-B mentioned above and its location should be determined in consideration of the conditions of proposed sites, demand, and industrial accumulation so far achieved.

Inducement of the primary consumer goods industry and part of the capital goods

industry into inland industrial estates is a matter that merits serious consideration for Indonesia's future development. Such inducement should be studied from the policy-making, technical as well as financial point of view. It is considered necessary that industrial estates be planned with account taken of transport facilities, such as ports and roads, as well as urban concentrations, and hence should be established in the peripheral area of large cities like Djakarta and Surabaya to induce the necessary enterprises.

The types of industrial estates to be created around respective cities should be determined with due regard to the nature and master plan of each city and to the Government's policy for industrialization.

iv) Organizations Undertaking Industrial Estate Construction

The following can be enumerated as organizations which undertake the formation of industrial estates.

- (1) Government.
- (2) Corporations established by Government.
- (3) Province, county, city, town or village.
- (4) Corporations established by province, county, city, town or village.
- (5) Joint investment organization comprising a private enterprise and a local public body or Government.
- (6) Private developer.
- (7) Cooperative association of enterprises.

In the United States and Canada, most of inland industrial estates are constructed by private developers. The industrial estate of Cabot, Cabot and Forbes Co. established along Loop-Line No. 128 which surrounds Boston is well known as an estate of this type. (Detailed description of this estate will be given later in this report) The Dawnmills Industrial Estate of Toronto is also well known as a self-contained industrial park constructed by a private developer.

In Britain, a corporation established by the Government is engaged in the creation of new towns which are located in the suburbs of large cities to serve the dual purpose of solving urban problems and meeting the purpose of the Distribution of Industry Act and the Local Employment Act.

In Japan, a government corporation is undertaking the industrial estate development in government-designated areas (National Capital Region, coal-field areas and areas designed for public nuisance prevention), whereas local public bodies or corporations established by them are responsible for regional development. Private developers are yet to embark on their activities in Japan.

Industrialization or industrial estate development policies of Southeast Asian countries are being implemented by the government, as for example in Singapore, Thailand, Taiwan and Korea.

As for Indonesia, it is desirable that the industrial estate development be carried out either by the Central Government or by local public bodies. However, since huge investments in other fields are required for the country's future development and offers have already been made by foreign concerns, it may as well be recommended that the industrial estate development be carried out by the joint investment of a foreign capital and the Government or a local public body. The development could even be left to a foreign enterprise entirely if the purposes of that enterprise conform to the Government's development policy and its activities are placed under the administrative control of the Government.

2. Theoretical Approach to the Planning of an Industrial Estate

If an industrial estate, the concept of which is explained in the preceding section, is to be actually realized on the basis of its initial conception, it is essential to prepare a comprehensive development plan to be followed by implementation.

An attempt to use an industrial estate as a means of development must be preceded by the important process of planning its physical structure in full recognition of the propensities of the state or the region including its political, economic and ecological processes.

Of the variety of industrial estates listed in the preceding section, those which are resources-oriented are located and developed in an area where the necessary resources are available to yield benefits to the state or the region through the economic process, whereas sea-front industrial estates with no natural resources available in nearby areas are developed with the port facilities taken into account.

Successful establishment of an industrial estate in an inland district where no exploitable natural resources are available generally depends on the demand arising from the urban concentration. This type of development calls for the clarification of the relationship between

the estate and the region where it is to be constructed. Besides this relationship must be reflected in the development plan, particularly when an industrial estate is planned as the object of an intentional action, the regional development. In other words, the spatial arrangement of facilities and land use are the factors bearing heavily on the regional development since it inevitably leads to the areal expansion, reorganization and other physical changes of the region to be developed.

Industrial estates not intended for regional development are planned according to the national need, feasibility study and technical suitability, whereas those aimed specifically at regional development must be planned with account taken of an amplified city planning in addition to the said planning criteria.

The theoretical basis for planning an industrial estate is described below with attention directed to its overall significance.

i) Regional Development and Industrial Estates

A region which is taken as the object of development has a certain physical and spatial extension in which man lives and carries out his various activities; political, economic, social, cultural, etc.

These activities of human being are carried out by the free will of individuals or groups of individuals on different levels, i.e., independent individuals, families, enterprises, administrative organs, State, etc. Considered from the viewpoint of spatial composition, these activities are sometimes causing such phenomena as disorderly location or diversified urban problems. It therefore follows that regional development, in its basic notion, is a development which enables these activities to follow a most suitable and at the same universal pattern in the long process of forming a regional community. Development of an industrial estate can be defined as one of such activities. To explain in more detail, industrial development efforts for satisfying the demand from large cities (large consumer centres), when concentrated in an industrial estate, produce an otherwise unattainably large production capacity which enhances the employment and spatial expansion of the region to be developed. Further, since large scale industrial activity can be planned and manipulated by such a concentration, the infrastructural improvement and the propagation effect by the development of related industries make it possible to attain the target set under the city planning.

In developing an industrial estate established to attain the above-mentioned chain effects, the following three points must be borne in mind.

(1) Priority of public investment should be given to industrial estate development because of its strategic value.

- Need for recognition of the political and economic process -

(2) Spatial arrangement of the development should be systematically planned in full and thorough recognition of urban functions, so as to be able to map out a suitable programme for regional development.

- Need for recognition of the ecological process -

(3) Careful consideration should be given to the design criteria which are set for achieving optimum returns to scale.

- Need for recognition of the technical process -

Though all these three points are very fundamental conditions, it is to be noted that their careful observation ensures the possibility of developing an industrial estate without regard to the social or economic level of the country or the region where the estate is to be located.

ii) Concept of Economic Process

- Consideration of Strategic Value of Preinvestment -

The significance of an industrial estate development, as clarified through a theoretical approach to its planning, should be understood against the background of the economic process. In particular, the strategic value of the industrial estate development scheme in a developing country and the need of preinvestment for its implementation must be made clear.

The general notion concerning the development of a country or a region must therefore, be one in which its practical value can be explained by how the important problems involved in development policies can be solved.

Studies on economic development, in which many diversified arguments have been advanced, have covered the many factors and conditions of the system under which the effective demand can be increased according to the principles of behavior concordant with the economic suitability. The scope of such studies has been so widened that subjective and immeasurable phenomena arising from the social background are now included into the subjects of study in addition to objective and measurable subjects.

It has long been maintained that the feasibility of economic development of a

given country depends on the availability of natural resources in that country. This theory later gave way to the idea that the development feasibility depends on two measurable factors, the development policy and the capital. Of late, however, increasing attention is directed to the benefits derivable from various inputs such as capital input in a human being as a production factor and introduction of new techniques, besides giving consideration to the strategic value of capital. If the supply of capital and techniques is to eventually lead to development, capital must be invested simultaneously in a group of complementary industries so that they will interact to provide market and support for each other. Such simultaneous investment in a number of complementary and related industries is indispensable in assuring their balanced development as well as in coping with the national or regional demand.

Assumption of such a balanced development calls for the affirmation of the logic that industrial development should not go too far ahead of agricultural development to avert the shortage of supply incidental to a growing economy and that the maintenance of a high growth rate or the acceleration of development pace cannot be attained without such adjusted and balanced development of all economic sectors and the provision of transport facilities, energy, water and other basic conditions. The only conclusion derivable from this logic by applying it to the realities in developing countries is that no developing country can expect to achieve the desired development unless it fills the conditions it cannot fill. The question which the developing countries are actually faced with, however, is not to satisfy the exacting conditions mentioned above but is how to cope with the environmental conditions which are not necessarily favourable for industrial development. It is the question of finding development-warranting conditions in the social structure in which people's economic behaviours do not necessarily have economic justifiability. To put it in other words, no development can be started unless changes are effected in the value notion of the constituent people of the society or the region to be developed.

The said question leads, of necessity, to the introduction of social aspects with respect to social changes, and at the same time necessitates the method of inducing changes in social values and the consideration of the propensity of the community to maintain altered values. In this connection, it is empirically known that if the change in social values is favourably accepted in the traditional social structure, then a behaviour quite divergent from that of others often serves as an important strategic measure for development.

Further, the proposition that economic development is subjected to the vicious

cycle that "development must first be achieved to fill the conditions for development" means that once development is set under way, then the conditions for further development can be readily fulfilled.

What is important is the existence of the propensity which is empirically capable of justifying a development that has taken place in the face of a specific measure of value judgement with no capital, technique or other prerequisites being provided in advance. What is needed, therefore, is a new opportunity for economic development which is to be ensued by people's acceptance of the resultant new values. It is believed that if people are induced to accept both the motive and the phenomenon through an approach made by a method of behavioural science, they are ready to unite their actions towards the set goal according to the "social rationality."

If one considers the said propensity as a prerequisite to development, one would note that developing countries, though devoid of idle capital and skilled labourers, have the partially unemployed available in the agricultural sector, diversified local techniques as well as industrial techniques imported from advanced countries. These are the development factors to be interwoven.

Development must proceed in such a that the first development basis established will invite an induced investment which leads to the establishment of a second development basis. It is believed that a safe "take-off" for economic development can be assured for a given region only when that region is confirmed to be conditioned for such propagative development.

In an industrial estate where it is possible to make use of the accumulation of various economic resources, the resultant feed-back effects increase the usable amount of respective resources.

In the case of natural resources which cannot be replenished once exploited, no such feed-back effect can be expected, but it functions, as is well known, in the case of capital investment. It is important to note that investment in one project serves to promote the capital formation of another project.

It is to be recognized that such an economic process functions satisfactorily by the fulfilment of the feasibility level conditions in the vicinity of large cities and by public investment such as the one intended for the overall and comprehensive regional development. What is important is to determine the investment in an industrial estate not by its direct and measurable value to economy alone but by the value to the development of the entire region embracing the estate. Further, raising the level of the

decision-making organization of public investment from the project level to the regional level, which is a need arising from the implementation of development policies, should be given due consideration.

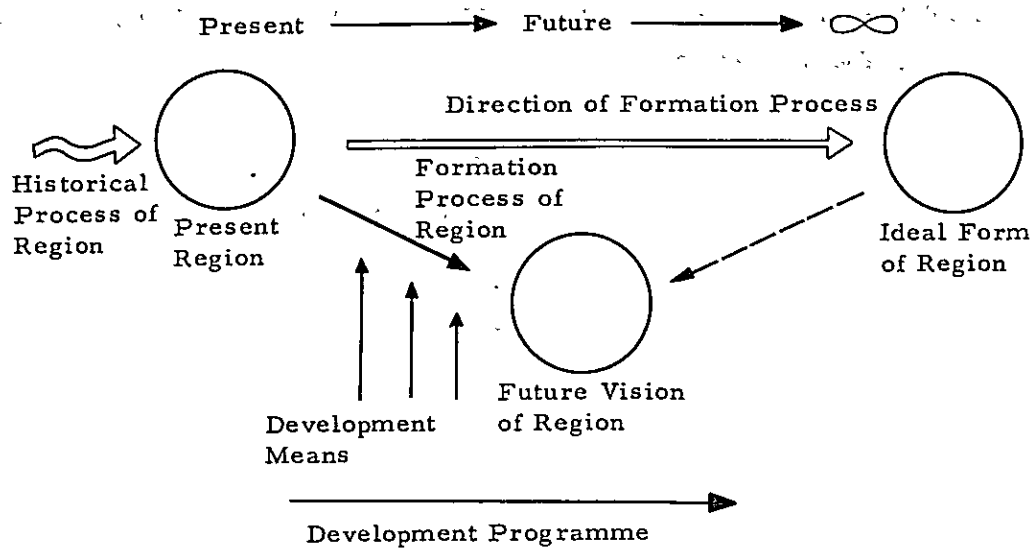
iii) Concept of Regional Formation Process

- Consideration of Relationship between Estate and Region -

In the foregoing discussion, a region is understood as an aggregate existing as a form of geographical distribution of various human activities. The points to be clarified with respect to its formation are therefore its location and the mode of change in its location if it is considered in terms of its geographical extension, whereas the type of social structure and the mode of its change-need to be clarified if it is considered in terms of its function as a community in which various human activities are carried out.

In this connection, the ecological process leading to the formation of a region must be correctly recognized as the logical basis for the establishment of higher level processes. In this item, the physical process of formation will be described on the basis of the ideal form of region which sets the direction of its formation. In this item, also, the various human activities are considered in connection with the geographical structure of a region within which they are carried out, and two models involving the above-mentioned proposition are presented from the viewpoint of regional development in pursuit of the optimum land use planning.

Regional development aims primarily at the formation of a region. A region has an areal extension of the basic pattern established by the urbanization, and regional development serves as one of the means to form a region. Accordingly, regional planning determines the ideal form of the region in question and a programme for realizing the said ideal form with whatever development means available, and further, envisions the state of that region at a certain time in future.



In many of development plans, methodological arguments are advanced for evaluating various development goals conceivable, and attention is directed not so much to presenting such goals as to devising the means to attain the predetermined goals. This remains true with the many development plans so far presented despite the fact that proposals with respect to people and society or the control thereof are the hypothetical basis from which the ideal form of a region can be physically derived. Here lies the realistic value of industrial development as a means of high level regional development and the need for giving consideration to the aforementioned economic process as a background of such development.

A regional development plan can be logically elucidated by means of the following two models (Regional Structure Model and Regional Formation Process Model)

(1) Regional Structure Model

When considered from its physical aspect, a region can be construed in terms of its geographical extension as well as of its functions as a community. When viewed from its geographical extension, it involves the problem of spatial composition, and from its functions as a community, the problem of social structure. If it is assumed to be a society of settled inhabitants, then it can be considered to possess a structural pattern that can be treated as a general notion, and this consideration is substantiated by various fundamental studies.

In reality, a region is subjected to many deformations attributable to its

geographical, social and other conditions as well as to its past history, but it is an unescapable fact that the purpose of its formation or its goal basically lies in making a closer approach to the said structure.

The structural model presenting the ideal form of a region as the final goal of its formation process is prepared by the integration of its spatial structure and its structural pattern rationally representing the movement of people, commodities, energy, information, etc., with the empirical process added to its spatial units and their composition.

(2) Regional Formation Process Model

The planning of a future region aims at the attainment of the goal presented by the above-mentioned structural model. It is therefore necessary that the development programme for the formation of a region be mapped out with due regard to the inherent and other characteristics of the region, its existing propensities, and applicable development means. Suitable development sites are selected on the basis of the regional formation process model.

(i) Regional Structure Model

a. A region is formed around the city centre and has a certain areal extension to perform its functions. The size of this areal extension, which comprises a number of regional unit areas, is assumed for the formation of both city and region. The structural model of such a region is shown in Fig. 10.

Regional Unit Area I : Urban area extending around the city centre
(detailed explanation will be given later).

Regional Unit Area II : Suburban area extending in the outer periphery
of the urban area and suited for large-scale
industrial development for strategic regional
formation.

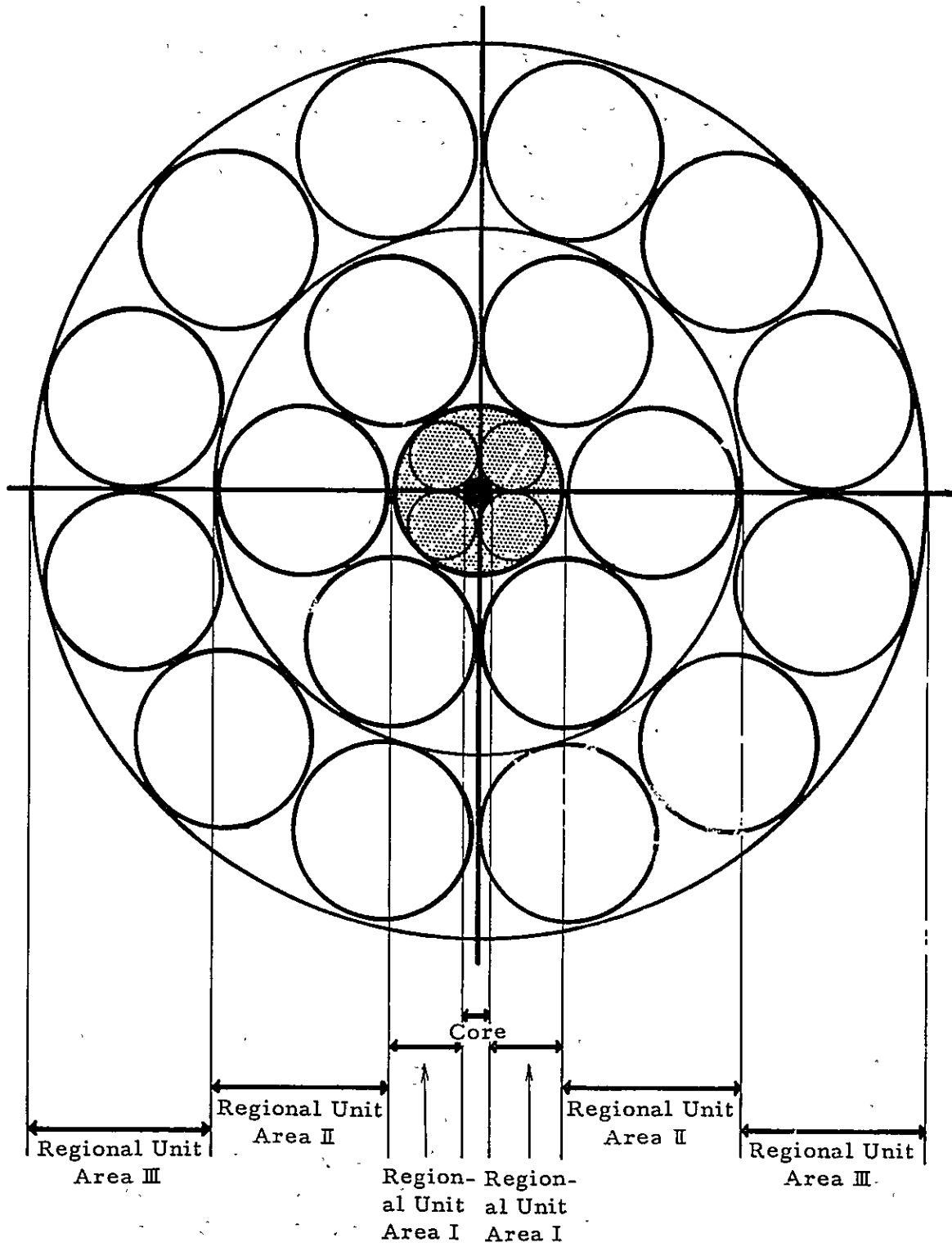
Regional Unit Area III : Area outside the suburban area where nature
is better preserved relative to the city centre,
promising the agricultural and forest develop-
ment.

It is considered that the concept of national land is to be construed as a group of regions defined above.

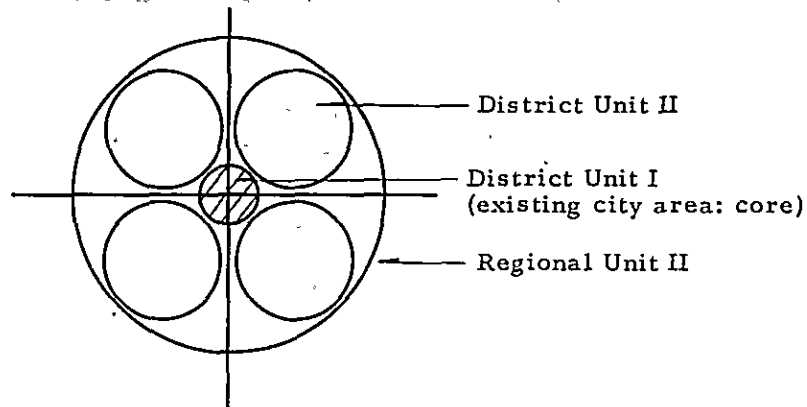
The structural model shown in Fig. 10 provides the basis for formulating a regional development plan, and serves to chart the course of regional development specially in its initial stage.

The purpose of the regional development under consideration, when studied on the basis of the model shown in Fig. 10, lies in the developmental formation of the regional unit area I.

Fig.- 10 Model of Regional Structure



The regional unit area I is usually composed of district units as illustrated below.



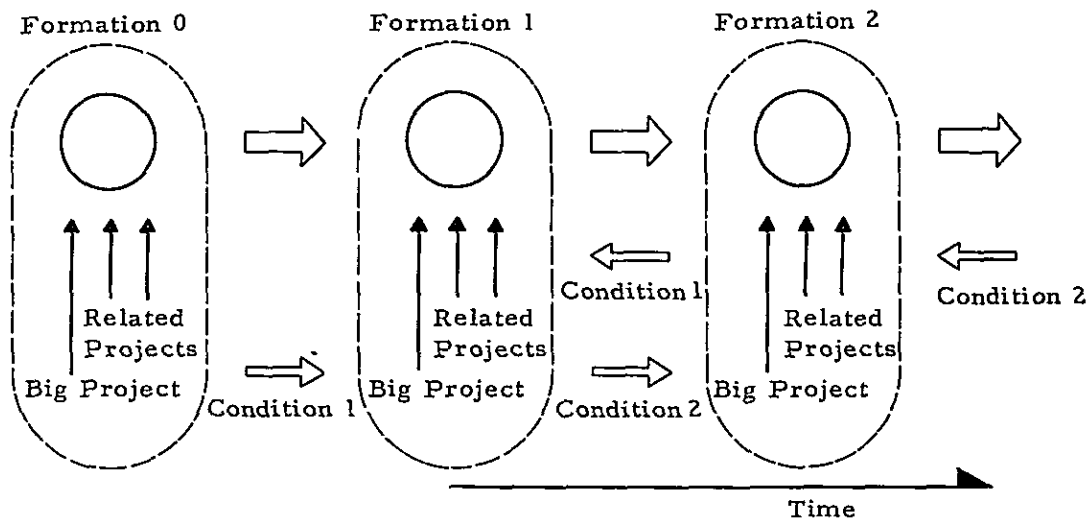
- District Unit I : District unit I is the core of the regional unit area I, and is also the densely populated part of a city including the city centre. It is considered as a district with a population convergence of more than 100 thousand. A large city may be considered as a confluence of such districts.
- District Unit II : This is the structural unit of communities around the core, covering a flat extension of land of 600 ha (dia: 3 km) not divided by highways, rivers or railways. This district is suited for the creation of residential zones and other facilities needed for daily life, with a population of 50 to 60 thousand. If the area of a region is to be expanded in future, the 600 ha area is to be adopted as the unit district area for the formation of communities.
- Regional Unit Area I : A region formed around a district unit I has a certain areal extension. It is considered that the assumption of district units is necessary for planning a rational structure of a region and for the efficient land use. It is also considered that in the course of areal

expansion of a region, there will be established additional cores. Regional development is to be planned for the formation of these district unit areas and regional unit areas.

(ii) Regional Formation Process Model

The formation of a region is carried out so as to attain the closest possible realization of the goal presented by its structural model, with large projects such as for industrial estate construction as the major motivation.

It is to be noted that a region is formed not in a wholesale and concerted manner but through the development of suitable sites which is carried out with account taken of the conditions of the respective sites and according to the mechanism of formation.



The model shows that by the formation of a region, if supported by the necessary and sufficient considerations and the groups of motivating projects, can be measured at some temporal section.

Development of a large strategic project such as one for an industrial estate, when considered in relation to the regional structure, involves the problem of site selection. Conversely, a region embracing development sites involves the problem of determining the suitability and priority order of their development.

In planning an industrial estate development, it is generally required to assume a unit development area of 100 ha and an overall

area wider than that because the number of common facilities that can be established within an estate depends on the magnitude of accumulation and also because an industrial estate development is essentially intended, on the one hand, for the fulfilment of social functions by the installation of not only industrial facilities but also such other facilities as for distribution and storage which are required for production activities, and to obtain on the other hand, economic effects derivable from the intensive land use.

An area to be designated for industrial estate development should allow for the conversion of land use purpose and for easy land formation and should not be located across a river or in an inclined land, village, city area or other lands already in use.

Needless to say, the site of an industrial estate has propensities quite divergent from that of an industrial zone since it is to be developed by a comprehensive planning.

The development of a certain district unit area, when considered in relation to the region in which it is embraced, varies by the propensities of the latter. In other words, the type and priority order of its development varies by the scale of the region to be developed.

(a) The development of the suburban area of a large city, where there is a strong trend for urbanization, is carried out for the regional development and reorganization of urban functions. When development takes place in the suburbs of a city with a population of more than 300 thousand, it is generally possible to create the basis of the succeeding development by the functional employment of the linear circular system.

(b) In smaller cities, respective regional unit areas have a lower degree of independence and the accumulation of industries and population is not sufficient. Development of a region surrounding such a small city must therefore be planned with due account taken of its strategic value, unless that region is connected with other regions by highways or other means.

(c) In a region which is completely devoid of accumulation, development efforts must be directed towards the construction of a new town. For this reason, if the development is planned for

the entire region which embraces a number of regional unit areas, the unit area having the largest accumulation is given the top development priority.

When the structure and the spatial propensities of a region are considered from the series of discussions evolved above, the relationship between the formation and the development of that region can be expressed by the model shown in Fig. 11.

Fig. - 11 Model of Selecting Suitable Development Sites

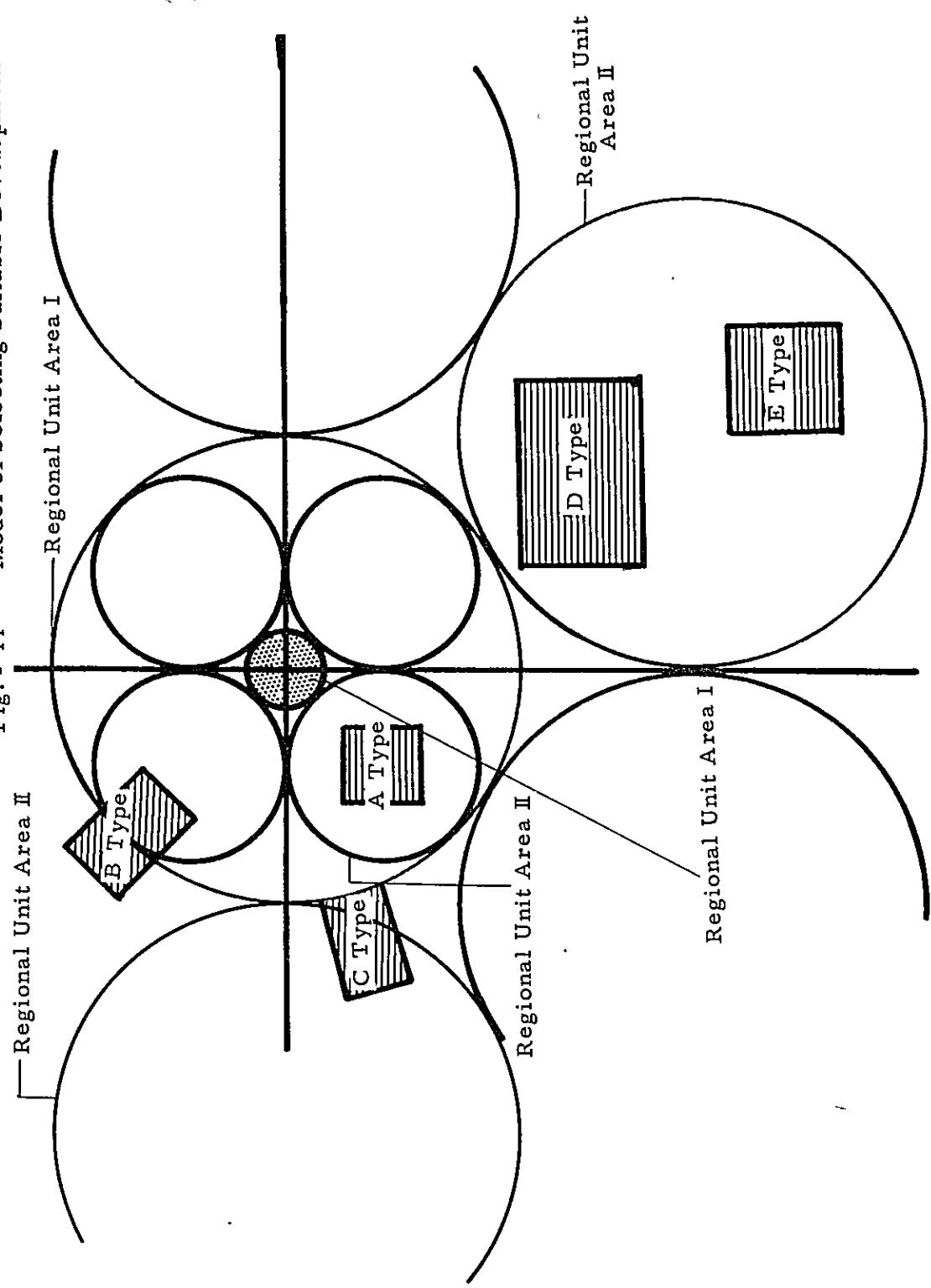


Fig. 11 illustrates the various types of sites which can be considered for development. If, for example, an industrial estate is taken as the object of development, Fig. 11 serves for the selection of a suitable estate site. Development lands A to E shown in this figure have their respective types of development suitability according to their location.

- Type A : Development land within one of the district unit areas surrounding the core and serving as the object development.
- Suited for development of a residential zone, urban facilities, facilities needed for daily life, recreation facilities, etc. -
- Type B : Development land lying across one of the district unit areas surrounding the core and serving as the object of development.
- The land within the district unit area is suited for the developments cited for Type A lands, and that outside the district unit area for industrial development.
 - The land extending along the linear circular boundary of the district unit area is suited for the establishment of distribution facilities. -
- Type C : Development land lying outside of, and adjacent to, one of district unit areas which are the object of development and surround the core.
- Suited for industrial development and construction of industrial estates. -
- Type D : Development land larger than 600 ha and located within a district unit area having no core.
- Suited for the development of a new industrial town equipped with living facilities. -
- Type E : Development land smaller than 600 ha and located within a district unit area having no core.
- Suited for the development of agriculture and recreation facilities. -

The above discussion relates to the development means which are to be resorted to in realizing the basic structure of a region through the basic process of its formation. The model shown in Fig. 11 involves, in its spatial units and structure, the expansion of activities responding to regional development as well as the problems arising from land use (such as environment destruction).

iv) Concept of Technical Process

In the foregoing pages, development of an industrial estate is understood to be one of the means of regional development, and its substance is regarded as a functional aggregate which is based on urban concentration.

The arguments already advanced are the basis for the actual planning and designing of an industrial estate, and here lies the significance of planning techniques. Since the regional development plan is required to be mapped out so that the synthesized progress of higher level processes (political and economic) and the lower level physical process will be realized, it is preferable that the planned development stages be successively followed. When the establishment of an industrial estate is planned, the substance and scale of its development are determined against the national or regional economic and social background, but the spatial arrangement of its production activity is determined by the conditions of the selected estate site. Since the kind of industry to be developed, the scale of its development, and its location are the interrelated questions, it is necessary to adopt a process in which a number of conditions are initially given equal consideration to establish the first stage of development and then each are given detailed consideration for special treatment.

A development plan must be worked out on the basis of a sound judgement. The objective validity of this judgement can be tested by basic studies and universal measurability, though the judgement is partly made by empirical generalization. This constitutes one of the characteristics of theoretical evolution in social science, and is a factor incidental to a programmed formulation intended to cope with a social phenomenon. It is to be noted, however, that since a region to be developed comprises a multitude of people, its development plan should essentially reflect the will of the whole regional population. And here lies the significance of utilizing techniques in the planning stage on the basis of the principles adhered to in the process of judgement, as well as the reason why the strategic activities can have a realistic value and be incorporated in the plan.

The planning stages of an industrial estate development are described below.

(1) Stage before Drafting Industrial Development Policies

In this stage, the following studies are made.

- o Understanding of an industrial estate.
- o Study of an industrial estate in regard to its suitability to the fundamental development goal intended (such as regional development and

economic development).

- o Study of the development feasibility in relation to the domestic and overseas situations.

(2) Stage of Mapping Out Policies for Industrial Estate Development

The following studies are made in this stage.

- o Consideration of the substance of development.
- o Consideration of the areas to be developed.
- o Study of financial problems.
- o Study of the development plan in regard its suitability to the higher level plans such as the national land development programme.
- o Selection of the development regions.

(3) Stage of Formulating Industrial Estate Development Plan

- Stage of Pilot Planning -

The following activities are made in this stage.

- o Study on the types of industrial estates.
- o Planning of the substance and scale of respective estates and the type or types of industries to be located therein.
- o Determination or establishment of a central organ for industrial estate development.
- o Selection of sites.
- o Study of the development plan in regard to its suitability to the regional propensities and city planning.

(4) Stage of Formulating Industrial Estate Development Plan

- Stage of Master Plan Preparation -

The following activities are made in this stage.

- o Formulation of a plan for distribution of facilities within the estate (Land use plan).
- o Planning and designing of the distribution of facilities within the estate.
- o Formulation of an energy plan.
- o Formulation of a development programme.
- o Establishment of the development organization.
- o Execution of a feasibility study.

- o Estimation of development cost.
- o Formulation of maintenance and management programme.

3. Technical Approach to Industrial Estate Development

The activities for industrial estate development in Indonesia are considered to be in the transitional period from Stages 1 & 2 to Stage 3 mentioned in the preceding section. Activities for Stages 1 & 2 which have so far been made in Indonesia must be reorganized with reference to the explanation given in the foregoing pages. It is also to be noted that in Stages 1 & 2, detailed plans must be worked out on the basis of various surveys and a review of the development policies. These activities should be carried out in an integrated manner, and whenever the employment of techniques makes it possible, the plans should be organized into a firm and stable form.

The object of this report lies not in the formulation of an actual industrial estate development plan but in the elucidation of the process which must be undergone to assure the objective validity of the plan. Accordingly, in the following discussion, which is advanced in an attempt to make a technical approach to industrial estate development, the standards for selecting suitable sites in the pilot planning stage will be introduced together with the application of the standards in Indonesia, with explanations also given on the preparations to be made before proceeding to the master plan formulation stage.

i) Standards for Selecting Suitable Development Sites

As will be clear from the foregoing explanations, selection of suitable development sites carries a heavy weight in the pilot planning stage. Steps to be taken before selecting suitable sites are therefore elucidated below. (Ref. Chapt. IV "Theoretical Speculation on Industrial Estate Development Scheme," Sec. 2 "Theoretical Approach to the Planning of an Industrial Estate," Item iii) "Recognition of Formation Process of Region.")

1st Step

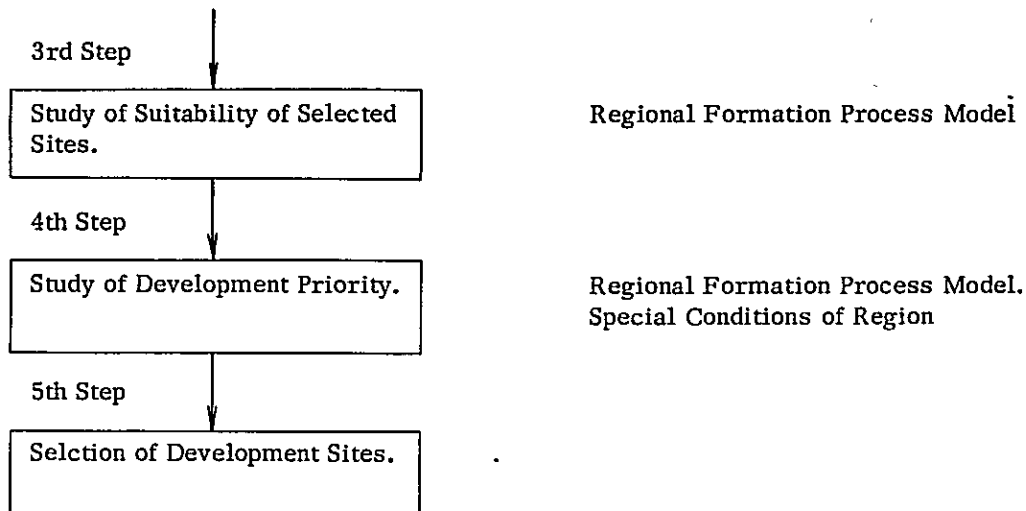
Establishment of Regional Unit Areas in the Region to be Developed.

Regional Structural Model

2nd Step

Selection of Development Lands.

Regional Formation Process Model
(Standards for Selecting Development Lands)



1st Step: Establishemtn of Regional Unit Areas in the Region to be Developed

Regional unit areas are to be established on the basis of the regional structure model (Fig. 10), with district unit areas arranged on the outer periphery of the city centre of the development region having an urban population accumulation of more than 300 thousand.

The regional units thus established have an aeral extension which provides for future regional formation.

2nd Step: Selction of Development Lands

Extensive lands which meet the following conditions and are either not in use or capable of being converted for new land use purposes are to be selected within an area spreading out to a radius of 30 km from the centre of the region to be developed.

Standards for Selection:

(1) Natural Conditions

- (i) Inclined lands with a gradient exceeding 1/30 are to be excluded.
- (ii) Rivers, lakes, ponds and swamps are to be excluded.
- (iii) City areas are to be excluded.
- (iv) Villages are to be excluded in principle.
- (v) Lands on which immovable structures are built are to be excluded.

(2) Social Restrictions

- (i) Parks and other preservation areas as well as good farm lands are to be excluded.
- (ii) Existing development areas are to be excluded.

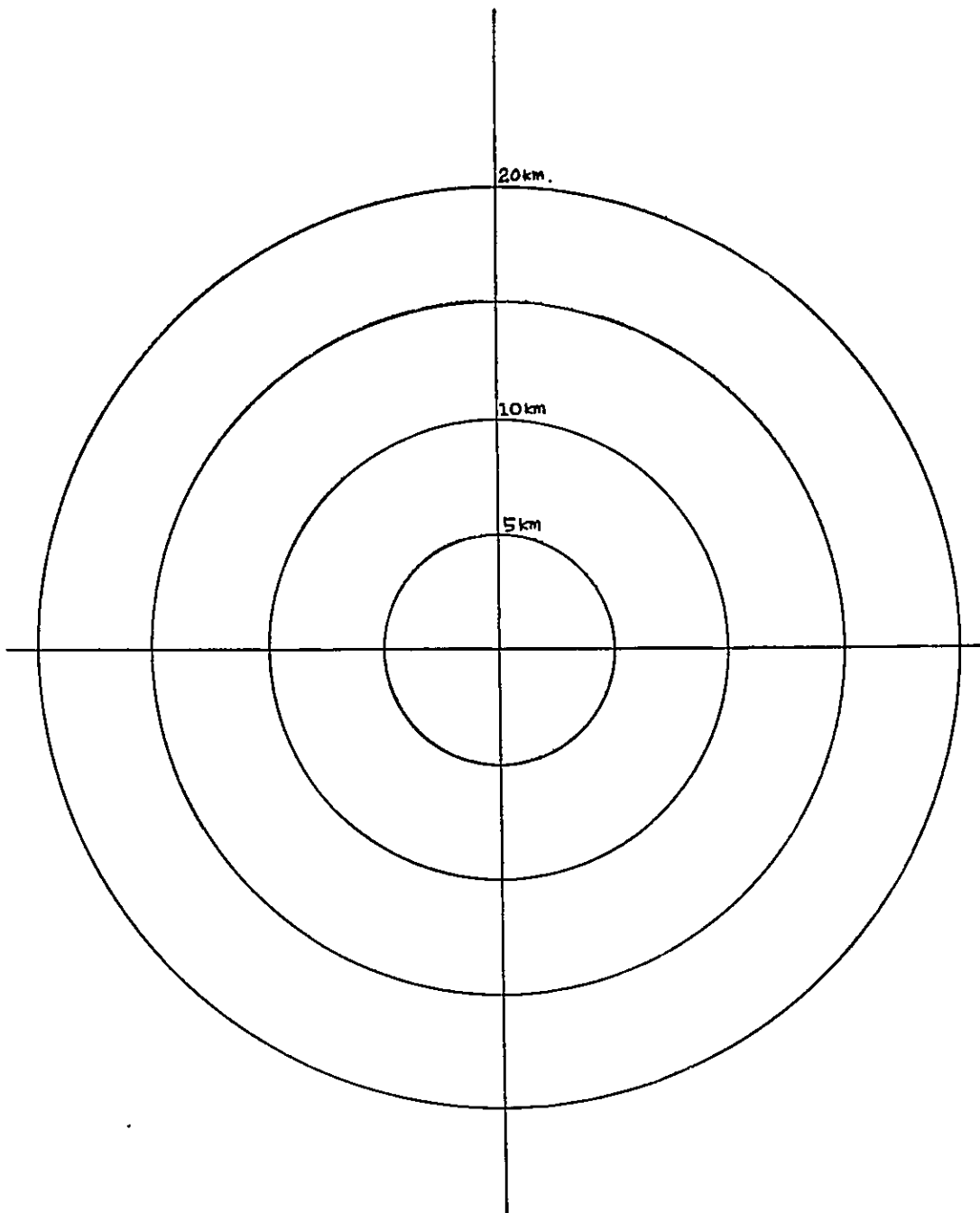
(3) Standard Acreage














Idle lands each covering more than 100 ha are to be selected.

The selection is to be conducted on the basis of air photographs (scale: 1/20,000), topographic maps (scale: 1/50,000) and field surveys. It is preferable that field notes (See Table 1) be made use of in carrying out field surveys.

Table - 1 Field Note I — Region —
Check sheet for a study of Suitable Site for Development

No. of region: :	name of region:	year:
------------------	-----------------	-------



selected site	No.:
population(total) (1000 persons)	
employed persons (1000 persons)	
ratio of population of primary industry	%
ratio of population of secondary industry	%
ratio of population of tertiary industry	%
population of the inner city(1000 persons)	
mountain and hill	
river, lake, pond	
road	
railway	
port and bay	
airport	
historic spots	
electric power plant station	
dam site	
resources	
factory	
residential area	
agricultural area	

3rd Step: Study of Suitability of Selected Sites

The selected development lands are to be studied with reference to the suitable development sites manifested by the model for regional formation process.

4th Step: Study of Development Priority

(1) Priority Study on the Basis of the Regional Formation Process Model Type C has the highest suitability for the industrial estate development, then comes Type B. Type D needs to be reviewed separately.

As for the development of residential districts which will be required to cope with the population increase arising from industrial estate development. Type A has the highest development priority, followed by that portion of Type B which is situated within the regional unit area I.

(2) Priority Study on the Basis of Special Conditions of the Development Region

When two or more development sites of a same type are available within a single development region, the development priority should be determined after making a thorough study on the special conditions of the region. In the pilot planning stage, the study of such special conditions is to be left to the judgement of experts.

(3) Study of Development Conditions of Selected Sites

The following conditions are to be studied for the development of large selected sites.

1 Land Conditions

- (i) Acreage
- (ii) Topography
- (iii) Land category
- (iv) Geology
- (v) Existing structures and facilities on the site.

2 Traffic Conditions

- (i) Distance to the arterial road
- (ii) Distance to the railway line
- (iii) Distance to the railway station
- (iv) Scale of and distance to the sea port
- (v) Scale of and distance to the airport

3 Urban Conditions

- (i) Distance to the region's central city
- (ii) Population of the nearest city
- (iii) Distance to the nearest city
- (iv) Land use in the neighbourhood of the site

4 Supply and Disposal Conditions

- (i) Distance to the reservoir, and the storage capacity and water quality of the reservoir.
- (ii) Distance to the river available for water supply, and the volume and quantity of river water obtainable
- (iii) Distance to the flowing water vein and the river available for pumping-up water supply
- (iv) Distance to the river available for drainage
- (v) Distance to the power plant and to the substation as well as the power output available.

5. City Planning in the Development Region

- Notes:
1. Data on topography, land category and geology facilitate the judgement of difficulties involved in the industrial estate formation.
 2. Compensation must be made for structures and facilities existing on the selected site.
 3. The distance to the arterial road serves for the judgement of the necessity and the length of an access road.
 4. The distance to the railway line serves for the judgement of the length of a side-track.
 5. The distances to the railway station, sea port and airport serve for the judgement of the available traffic facilities.
 6. The distance to the central city of the region and to the nearest city, and their population serve for the judgement of the benefit derivable from the urban functions.
 7. The land use condition in the neighbouring area serves for the judgement of the need for environment preservation and measures to be taken to avoid public nuisances.
 8. The storage capacity of the reservoir, the volume of river water obtainable, and water quality serve as data for judging the quality of industrial water available.
 9. The distance to the reservoir and to the river serves for determining the scale of water supply facilities required.
 10. The distance to the river available for drainage serves for determining the scale of drainage facilities required.
 11. The distance to the power plant and to the substation as well as the electric power output available serve for determining the scale of power supply facilities required.
 12. The city planning which is in the stage of a detailed programme helps map out the future infrastructural improvement plan.

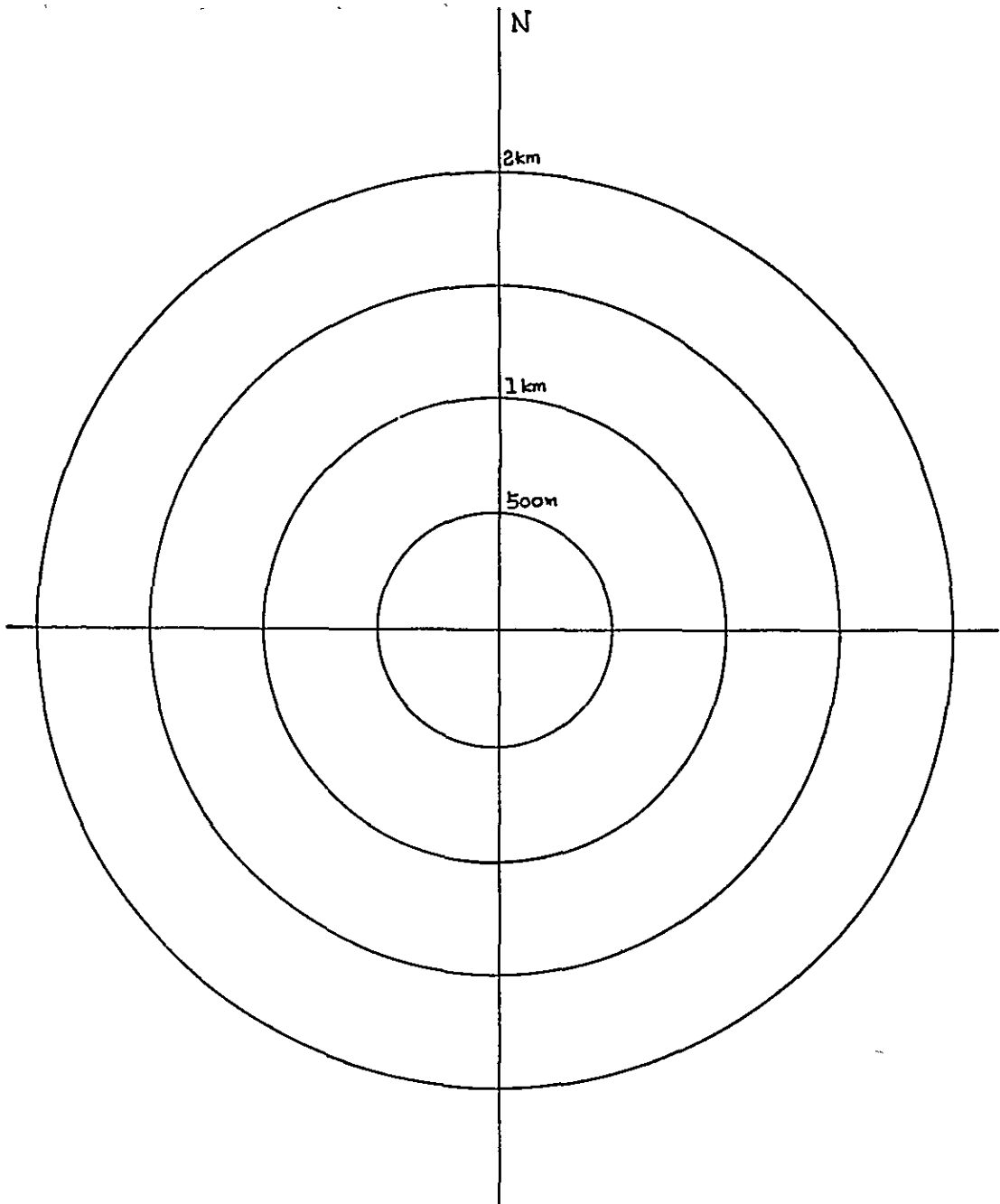
The studies mentioned above are to be made by means of maps and other materials and on the basis of field surveys in which the Field Note II shown in Table 2 should be made use of.

Table - 2 Field Note II — Site —

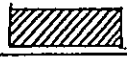
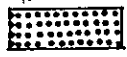



Check Sheet for a Study of Suitable Site for Development

estate no.:

name of site:



... ..

land condition	area	
	land category	paddy, farm, wood
	height level	m.
	undulation	yes, no
	owners of land	governmental, private
	price of land	m ² /Rupiah
traffic condition	distance to main road	km.
	possibility of using railway	yes, no
supply and disposal condition	water for industry	underground, supply
	possibility of using the river for drain	yes, no
	possibility of using electric power	yes, no
environmental condition	land use	village 
		paddy farm 
		hill mountain 
		temple 
		main road 
possibility of development	type of suitable site	A, B, C, D, E
	type of development	A, B, C
	time of development	
the other information		

Carrying out these studies in a mechanical manner does not count for much. What is most important is to produce a clear-cut picture of the region's structure which is required in the future process of its formation. It is to be noted that the structure of the entire region is liable to be deformed if efforts are directed solely to formulating development plans on the basis of existing conditions. An industrial estate develops over a long period of time, and the most important condition for its location is that its development contributes to the rational formation of the region in which it is located. If, for example, a river flows near an estate, its utilization alone cannot justify the plan for the estate's development just because "it is there." Many past examples show that such an approach does not produce good results in the long run. The prerequisite to a strategy which truly works as a strategy is the process of subjecting all factors to a comprehensive judgement. The term "experts' judgment" appearing in the foregoing explanation is employed in this sense.

If water supply and drainage, energy, and other requirements of an industrial estate are to be fulfilled by the effective utilization of the geographical conditions of the selected site, then the input of highly advanced techniques can never be dispensed with, but the introduction of such techniques should be determined from the objective viewpoint described above.

(4) Selection of Suitable Development Sites

Development sites are to be selected on the basis of the considerations described in the foregoing pages. Since the conditions and standards mentioned above will assure that the selected sites have both the need and priority of development, their selection should be ensured by the preparations for proceeding to the stage of master plan, paving the way for the realization of desired industrial estate development.

ii) Selection of Suitable Development Sites in Indonesia

To apply the aforementioned selection standards to Indonesia in full recognition of the significance of site selection, suitable sites should be selected in the Djakarta, Surabaya, Tjilatijap and Medan districts and each of the selected sites should be studied with respect to the type and priority of its development.

In this item, however, the study of the type and priority of development will be made for the sites which have already been proposed for development. In the following study, each region is treated as an independent economic bloc. It is to be noted that the development of each such region should be directed towards an overall industrial development on the national level.

The population distribution by cities as revealed by the 1961 census indicates that the largest population centers, exceeding 300 thousand persons, are in Djakarta, followed by Surabaya, Bandung and Medan. The census also reveals that the population increase in Medan, Djakarta and Bandung is conspicuous.

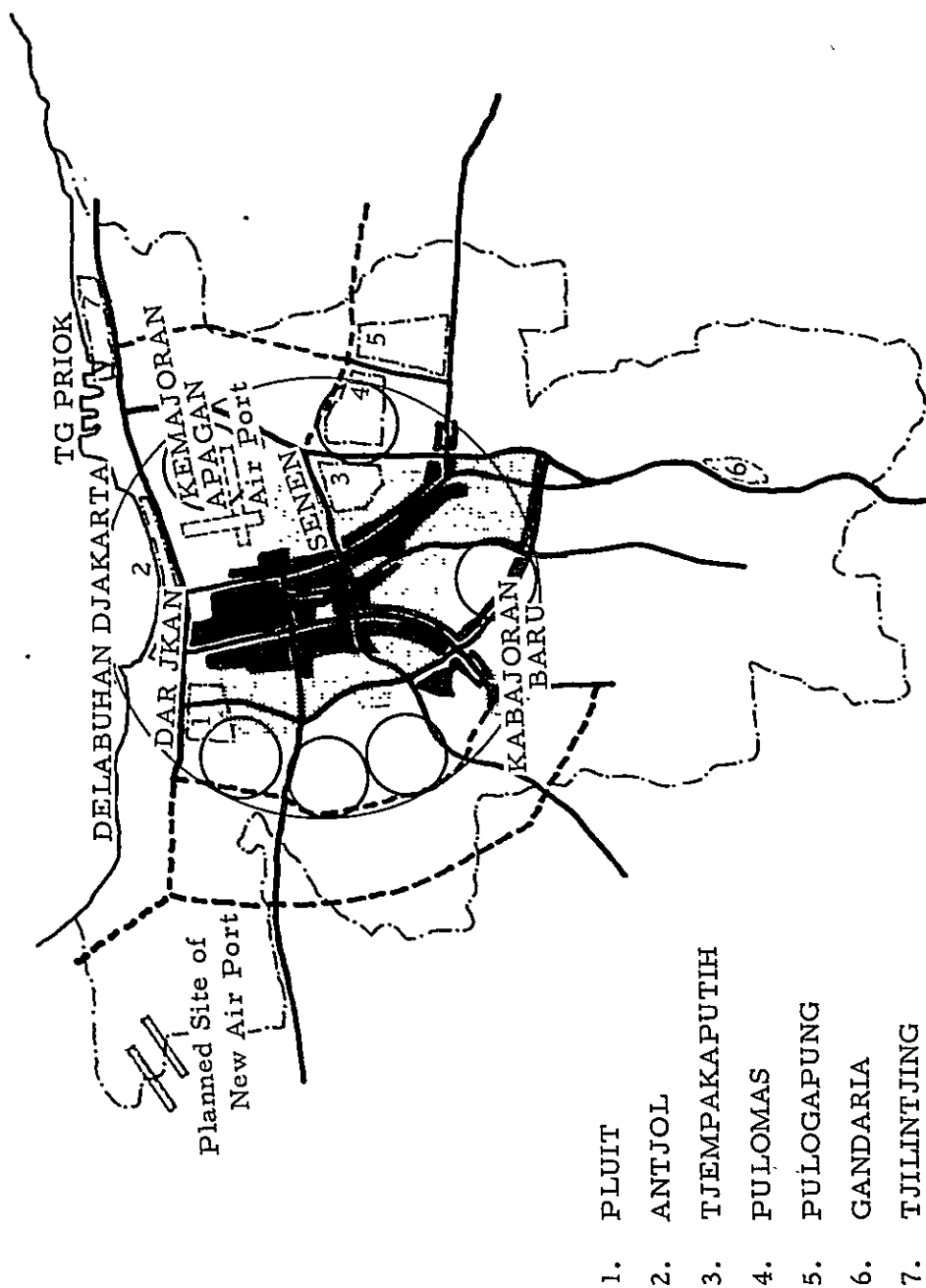
(1) Djakarta District

Step 1: Determination of Regional Unit Area

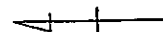
Djakarta's population increased by 5.58 times during the period from 1930 to 1961. Its city area of 577 km² is inhabited by as many as 2,973 thousand people. Its heavy population convergence is manifested by the population density of 5,152 persons to square kilometer. While most of the population is concentrated in the neighbourhood of Tandjung Priok and in Kabajoran Baru and Tibet districts, the city has an increasing tendency for urban sprawl.

Djakarta's city planning envisages the construction of a network of radial and loop roads and aims at the development of almost the entire area of Djakarta Raya. By the application of the linear circular system which is employed for the establishment of the district units for community formation, it is possible to assume seven district unit areas around the urban accumulation of the core. One of the seven units is the area of the existing airport which is planned to be moved to another place. The regional unit area embracing these seven district unit areas is shown in Fig. 12.

Fig.- 12 Proposed Sites for Industrial Estate in Djakarta District



- 1. PLUIT
- 2. ANTJOL
- 3. TJEMPAKAPUTHI
- 4. PULOMAS
- 5. PULOGAPUNG
- 6. GANDARIA
- 7. TJILINTJING



Step 2: Selection of Development Sites.

Site selection is omitted since development sites have already been proposed.

Step 3: Study of Suitable Type of Development of Selected Sites.

Types of development suitability is studied in the following table for each of proposed development sites in Djakarta district on the basis of the regional formation process model.

	<u>Acreage</u>	<u>Type</u>	<u>Development Suitability</u>
1. Pluit	373	A	Development of residential zones and urban facilities needed for daily life.
2. Antjol	550	A	"
3. Tjempakaputih	253	A	"
4. Pulomas		B	Type A development for the area within the regional unit area, and industrial development for the area outside the regional unit area; and development of distribution facilities on land lying along the linear circular.
5. Pulogadung	550	C	Industrial development (manufacturing industry)
6. Gandalia	200	E	Industrial development, and other developments conforming to the district characteristics.
7. Tjilintjing		E	"

Step 4: Study of Development Priority.

The priority of industrial estate development as indicated by the model building is to be given to Type C and then to Type B. Therefore, Pulogadung district may be considered to be most suitable for an estate development. Type of suitable development of individual districts is studied from their various conditions shown in Table 3.

Table 3 - Regional Characteristics Recorded Field Notes

District	(Land Conditions)					(Traffic Conditions)					(Other Special Conditions)		
	Acreege (ha)	Land Category	Elevation	Undulation	Owner-ship	Land Price (Rp/m ²)	Distance to Arterial Road (km)	Possibility of Using Railways	Water Supply Condition	Drainage Avail-ability	Availability of Electric Power		
1. Pluit	373	Partly covered by paddy fields	0	None	Public & private	500	0	Impossible	Lake water	Not available	Available	Situated close to a small port.	
2. Antjo	560	Paddy fields, upland fields & forests	0	None	Public		0	Possible	Groundwater	Available	Not available	Partly occupied by a recreation zone and facing the coast line.	
3. Tjempakpuith	253	Upland fields		None	Public & private	1,000	0	Impossible				Partly occupied by residential zone.	
4. Pulomas		Upland fields		None	Private		0	Impossible				Partly occupied by residential zone.	
5. Pulogandung	500	Paddy fields		None	Private	1,000	0	Possible	Groundwater & city water	Available	Available	Acquisition of land partly completed.	
6. Gandaria	200	Upland fields		None	Private	2,000	0	Impossible	Groundwater	Available	Available	Factories are located.	
7. Tjilintjing												Situated close to the port.	

Suitable type of development of each district, as studied from the characteristics and conditions listed in Table 3 above, is given below.

1. Pluit : Residential and recreation zones
2. Antjol : "
3. Tjempakaputih: Residential zone
4. Pulomas : Residential zone and distribution facilities
5. Puloagung : Industrial estate
6. Gandaria : Industrial area
7. Tjilintjing : Industrial estate of a free zone type because of its proximity to the port and its location outside of the regional unit area

Step 5: Selection of Suitable Development Sites

- 1) For industrial estate development, Puloagung district should be given top priority
- 2) Development of Puloagung district should be accompanied by the development of a residential zone in Tjempakaputih district. A free zone development in Tjilintjing district is desirable as an independent project.

(2) Surabaya District

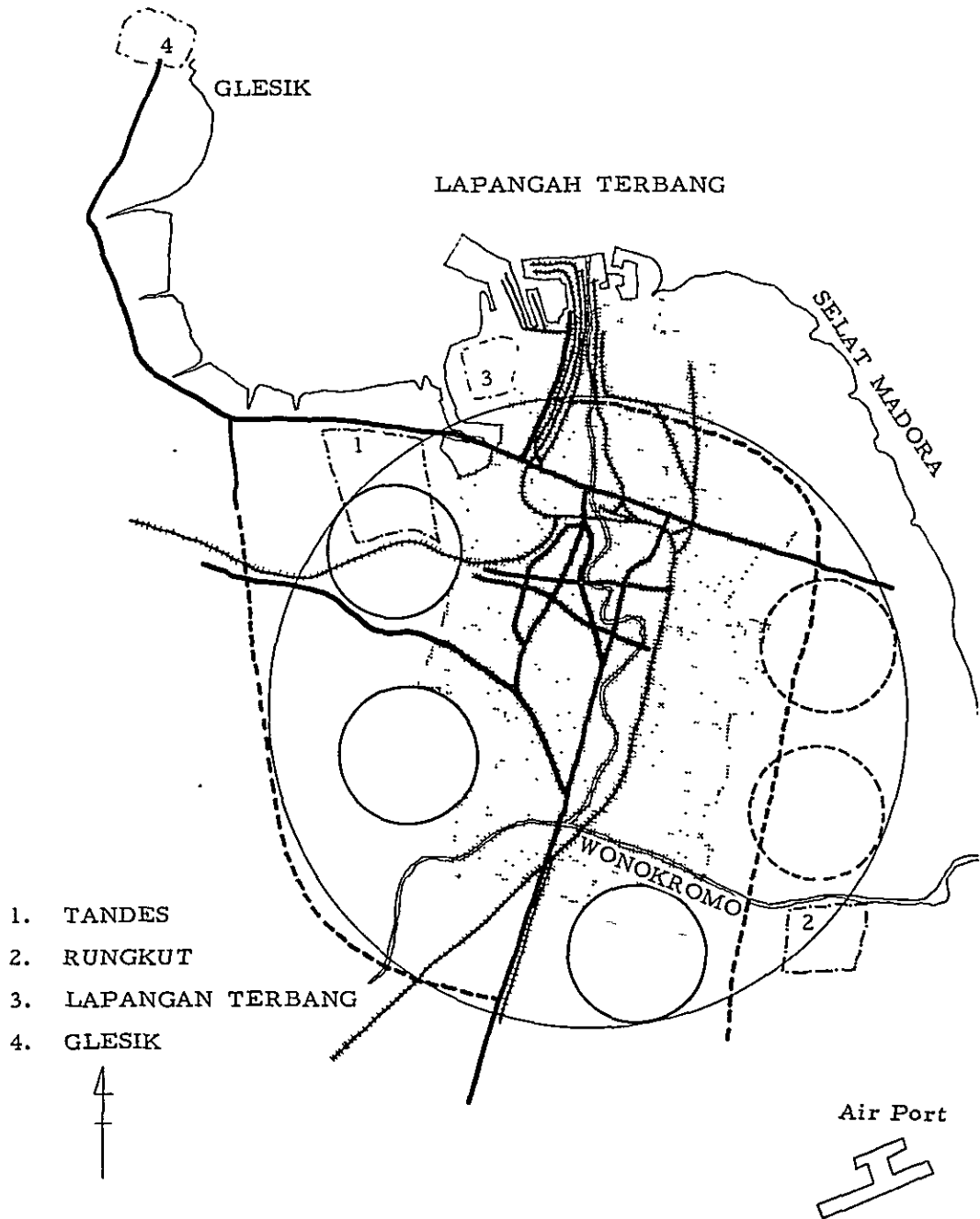
Step 1: Determination of Regional Unit Area

The cause of the population increase from 1,008,000 persons registered in 1961 to 2,049,692 persons recorded in 1968 is not clearly known. It is known, however, that the greater part of the increase was caused by social mobility, and that the city area is rapidly expanding. Surabaya has fertile farm lands extending from its suburban areas, and has developed mostly because of commercial activities being the gateway to outside world with railways and roads connecting to sea routes. Hence, there is a marked tendency toward for urbanization, and 4.8% of its employed workers are engaged in the manufacturing industry. This rate is fairly high relative to other cities of Indonesia. Its master plan envisages an industrial development which will absorb 280 thousand workers, or 1.8 times of the present number of industrial workers, in 20 years.

The city's master plan also envisages the construction of a loop-road to expand the city area. Development of the area facing the sea must be accompanied by flood protection works since the area is liable to flooding because of its low ground level and because of the Brantas River which flows through it.

With these conditions taken into consideration, the composition of the future regional unit area has been assumed to be as shown in Fig. 13.

Fig. -13 Proposed Sites for Industrial Development in Surabaya District



Step 2: Selection of Development Sites.

Development sites selected by the municipal government are the following two.

1. Tandes : 300 ha
2. Rungkut : 200 ha

Step 3: Study of Suitable Type of Development of Selected Sites.

	<u>Acreage</u>	<u>Type</u>	<u>Suitable Development Type</u>
1. Tandes	300 ha	B	The area within the regional unit area is suited for the development of residential zone, urban facilities, etc. which are needed for daily life.
2. Rungkut	200	C	Industrial development (manufacturing industry)

Step 4: Study of Development Priority.

From the study of the model, development priority can be given to the Rungkut district. Suitable type of development of the two districts as studied from the region's characteristics shown in the following table is given below.

1. Tandes : Residential zone and recreation zone.
2. Rungkut : Industrial estate.

	(Land Conditions)					
	<u>Acreage (ha)</u>	<u>Land Category</u>	<u>Elevation (m)</u>	<u>Undulation</u>	<u>Land Ownership</u>	<u>Land Price (RP/m²)</u>
1. Tandes	300	Fish pond	0.5 - 1.0	None	Mostly public	200 - 300
2. Rungkut	200	Paddy field	1.0 - 2.0	None	Private	300 - 500

(Traffic Conditions)					(Special Condition)
Distance to Arterial Road	Possibility of Using Railway Traffic	Water Supply Condition	Drainage Availability	Availability of Electric Power	
0	Possible	City water	Available	Available	Currently used as fish pond; ground condition poor.
0	Possible	City water	Available	Available	

Step 5: Selection of Suitable Development Sites.

1. Rungkut district should be given top priority for an industrial estate development.
2. Construction of a loop road connecting Rungkut district and the port is desirable for industrial estate development.
3. The residential zone which will be constructed in parallel to the development of Rungkut district should be located within the regional unit area I.
4. The 200 ha area of the existing airport lying adjacent to the port, which was described in Item ii), Section 2, Chapter III, should be used for construction of a distribution and processing centre.
5. Development of a residential zone in Tandes district deserves a priority order next to the development of the inland area with better ground conditions.
6. Development of an industrial new town in Gresik district merits consideration, though it is not included in this study. (A master plan should be formulated for this development)
7. Development of a sea-front industrial zone in the western area lying outside the regional unit area I and adjacent to the Tandes district deserves consideration for industrial development besides those mentioned above.

(3) Tjilatjap District

Tjilatjap's industrial estate development plan should be integrated with its port facilities improvement plan. The Australian proposal for promoting the industrial estate development should be considered as an incentive to the regional planning of improvement of the port facilities and of an industrial estate in the port area.

(4) Medan District

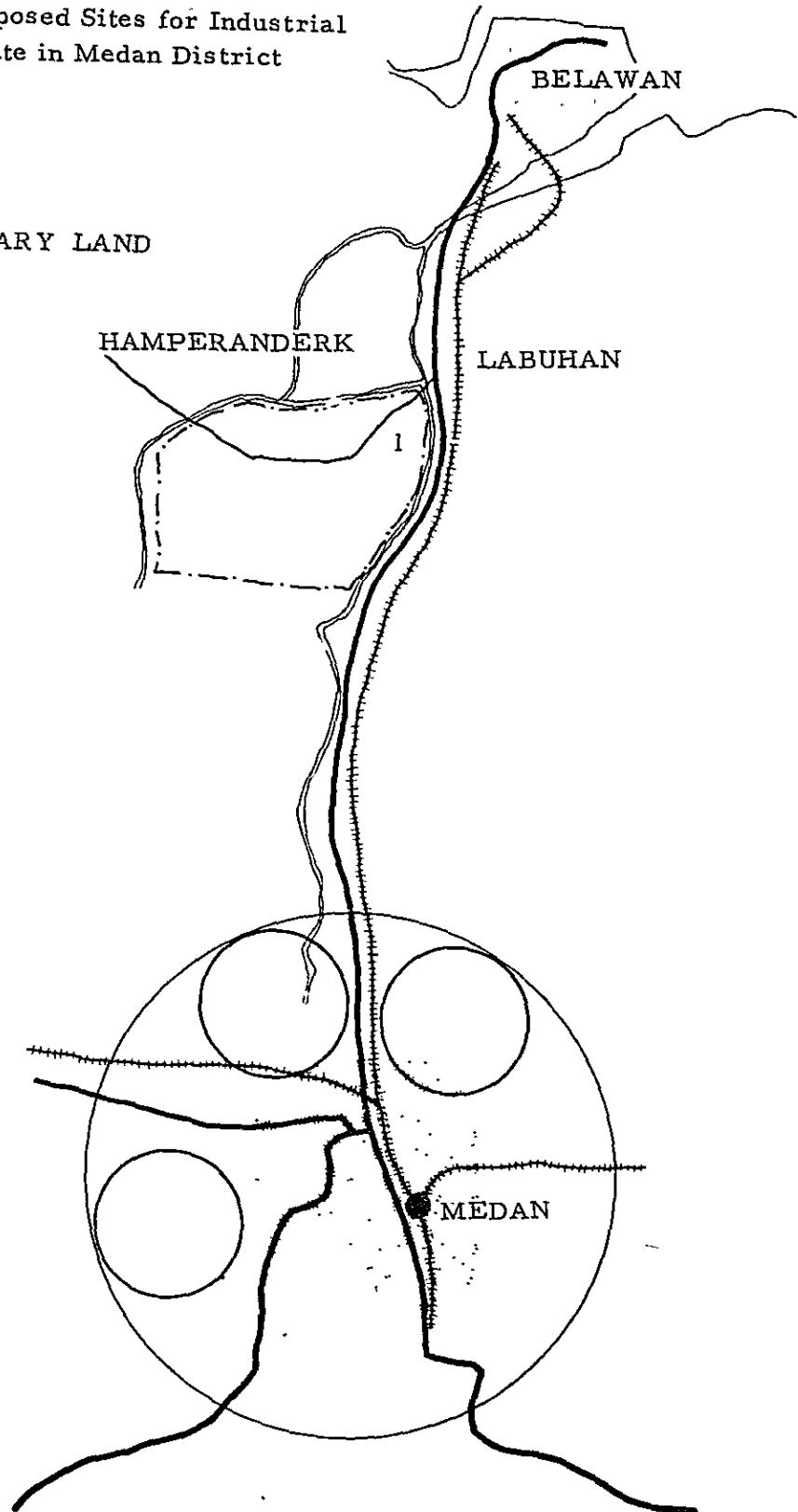
Step 1: Determination of Regional Unit Area.

Sumatra, the largest island in the archipelago, has Belawan port which is the largest port in Indonesia next only to Djakarta and Surabaya. With an abundance of natural resources in its neighbourhood, Medan has developed, largely by industrial production, into the third largest city in the country. Around the city's connecting point of roads and railway lines, there is a plenty room for expanding the city area (See Fig. 14).

Fig. 14 Proposed Sites for Industrial Estate in Medan District



1. MARY LAND



Step 2: Selection of Development Sites.

The site proposed for development by the Ministry of Industry, Propinsi West Sumatra, is Mary Land which covers an area of 500 ha.

Step 3: Study of Suitable Type of Development of Mary Land.

	Acreage	Type	Suitable Type of Development
1. MARY LAND	500 ha	D	Suited for the development of an industrial new town provided with residential zones and facilities for daily life.

Step 4: Study of Development Priority.

From the existing state of development achieved in this district, it is justified to give a high development priority to Mary Land.

(Land Conditions)						
MARY LAND	Acreage (ha)	Land Category	Elevation (m)	Undulation	Land Ownership	Land Price
	600	Upland field	15	None	Public	

(Traffic Conditions)					(Special Condition)
Distance to Arterial Road (km)	Possibility of Using Railway Traffic	Water Supply Condition	Drainage Availability	Electric Power Availability	
1.5	Possible	Groundwater	Avilable	Available	Industrial estate construction can be initiated immediately due to the virtual absence of houses.

Step 5: Selection of Suitable Development Sites.

1. Mary Land should preferably developed into a new town because of the availability of an urban center, port facilities, advantageous infrastructural and land conditions, and the extent of industrialization achieved in the surrounding areas.
2. A master plan should be drafted for the said development.

iii) Preparations for Proceeding to the Stage of Master Plan

A master plan is far more detailed than a pilot plan and aims at the construction of an industrial estate. Natural as well as social and economic conditions cited in the following items should therefore be given due technical review during the stage of master plan.

However, since the concept and methodology of industrial estate development required up to the stage of pilot planning are given the major emphasis in this report, the description given in the following items is devoid of explanations on the process of master plan formulation and is intended solely for the presentation of data and technical surveys required.

In the stage of master plan, it is required to coordinate the special conditions of respective development districts with the types and scale of industries to be introduced, with the urban development programmes and with the development policies of local communities and urban areas surrounding the industrial estate. It is also required to make a careful study on the overall construction schedule.

The following two items deal with the fundamental and essential conditions that must be fulfilled in planning an estate construction :

(1) Natural Conditions

- a. Topography: Selection of suitable development sites presented in this report was made from a macroscopic viewpoint using topographic maps of 1/50,000 scale. To make a further and detailed study on the extensive area of the selected sites, it is advisable to make use of the latest air photographs. Since it is a common practice to select an extensive flat land as the site of an industrial estate, it is imperative to give a close attention to the topography of the site to ensure perfect drainage of rain water and industrial waste water after the construction of the estate.
- Further, topographical maps of different scales including those of a scale of 1/200,000 and 1/500,000 must be made available in planning the land use and development of cities in the neighbouring area.

- b. **Geology:** Geological condition of the site must be carefully studied since it largely affects the construction of the estate, construction period and foundations of structures. It is desirable to conduct boring surveys at as many points as practical.
- c. **Meteorology:** The wind direction most prevalent throughout the year and the changes in atmospheric temperature and humidity are one of the factors affecting the production activities of factories. Particular attention must be directed to the fact that industrial air pollution affecting the surrounding areas varies by the wind direction.
- d. **Water Supply:** Volume and quality of both groundwater and river water must be clarified in advance. As to the source of industrial water and city water, its planning must be made in consideration of the supply of agricultural water.

(2) **Social and Economic Conditions**

- a. **Land:** Fluctuation of appraised land value in various regions should be clarified in advance. It is also necessary to study how the purchase of land is made easier or harder by the development prospect of respective regions, the scale of development plan and the purchase method.
- b. **Traffic Condition:** Studies must be made for satisfactory connection of the commodity traffic routes to the estate's factories and the traffic routes of the entire estate with the traffic routes outside the estate. The traffic routes of the estate must be planned so to as be ideally connected with the outside traffic network including the commuting traffic.
- d. **Relationship with Region's Inhabitants:** It is to be emphasized that the construction of an industrial estate should be planned with the support and understanding of the inhabitants of the surrounding communities and should never result in the destruction of their living environments.

- e. Relationship with Nearby Cities: The functional relationship between the planned industrial estate and nearby cities must be clarified in advance. In other words, it must be determined whether the estate is to depend on nearby cities in various aspects of its activities or to be developed into an independent urban area; and if it is to depend on the existing urban functions in developing the existing smaller scale industries and in the fields of commerce, transportation, communications, finance, recreation, administration, etc., the degree and pattern of such dependence must be studied and determined in advance.
- f. Relationship with Regional Economic Bloc: This is one of the important factors affecting the location of an industrial estate. To be more precise, the location of an industrial estate must be planned in consideration of the locations of different related industries already in existence, migration and commuting distance of labourers, availability of freight traffic facilities including goods stations and ports.
- g. Coordination with Regional Development Plan: An industrial estate development plan must be coordinated with the comprehensive development plan of the region where the estate is to be located. Further, construction and operation of the estate so planned as will be carried out by a public organization on the basis of a sound financial plan.

iv) Preparation of Basic Construction Plan for Industrial Estates

When the location of an estate and scale and types of industries to be induced therein are determined, a basic plan for the estate construction must be worked out as hereunder described.

(1) Review of Development Policies

- 1) The characteristics of the district where the estate is to be located and the course of its development should be reviewed in relation to the desired industrial development.

- 2) The suitability and need for giving priority to the construction of the estate in question should be reviewed with reference to the following conditions:

Land conditions, water supply, roads, railways, labour force, climate, geology, ground conditions, presence or absence of related subcontracting industries, and electric power supply.

- 3) The recent trend of industrial locations in the vicinity of the estate must likewise be studied with reference to the conditions given in Item 2) above.

(2) Preparation of Location Map

a. Location Map

A location map of the estate showing the existing distribution of enterprises and smaller industries as well as the availability of urban facilities should be prepared. The map should indicate the location of the estate, outline of the land use plan (covering the agricultural and urban development in the vicinity of the estate), area and ownership of the estate land by land category, and lands already acquired for industrial estate development.

b. Map of Related Facilities

A map of a scale of approximately 1/3,000 showing the existing state of facilities required for the estate development such as railways, roads, water supply and sewerage system, industrial water supply facilities, housing facilities, etc. should be prepared. This map should also indicate the difficulties involved in improving these facilities and give an outline of their future development plan.

(3) Selection and Scale of Suitable Industries

The types and scale of industries to be located in the estate are to be determined on the basis of the following factors:

Type and location of the estate, trend of industrial location in the region where the estate is located, relationship between the estate and the existing enterprises, relationship between the estate and the industries established in the nearby cities, distance to the existing large city and to the central city of the

district embracing the estate site, availability of water, and conditions for locating different types of industries.

In addition, studies should be made on the industries already located in the area surrounding the estate.

(4) Estate Construction Plan

1) Division of Estate Area

a. Planning of Estate Construction Work

Division of the estate area into plots, arrangement of the central estate lot and green zones, alignment of roads with reference to the arrangement of lots, etc. should be determined during the stage of planning the construction work.

b. Land Use Plan

A land use map of the estate and its vicinities (scale: approx. 1/30,000) should be prepared with regard given to the topography, roads and residential zones.

c. Division of Estate Area

The estate area should be divided into plots of suitable sizes for locating large and small enterprises.

The anticipated volume of freight traffic (raw materials and finished commodities inclusive) and the interrelationship between larger and smaller enterprises must be taken into consideration so that the estate area will be divided into plot groups of varying sizes. For this purpose, either a composition map showing various plot sizes including the standard plot size and a land division map should be prepared, or about three tentative plans for land division should be drafted for the selection of one of them. (A land division map of a scale of 1/2,000 should be prepared)

d. Construction Plan of Public and Common Facilities

Outline of the construction plan of public and common facilities to be established within the estate should be studied. The public facilities should include parks, green zones and substation, and common facilities such as a mess-hall, an assembly hall and parking lots.

(A map of a scale of about 1/1,000 should be prepared)

2) Road Construction

a. Construction Policy

A policy for road construction should be established with consideration given to the existing state and problems of the roads in the vicinity of the estate.

b. Construction of intra-estate roads should be studied from the forecast of the intra-estate traffic generation so that the optimum road width will be determined and the smooth traffic flow within the estate will be ensured.

c. Typical Cross Section of Road

A detailed road alignment, road width, facilities on the road and sideditches are to be designed for the preparation of a road traffic map and typical cross sections of roads. (Maps of a scale of 1/1,000 should be prepared)

3) Industrial Water

a. Demand for Industrial Water

The relationship between the estate scale and the obtainable volume of water must be clarified from the estimated unit industrial water requirement per enterprise assumed to be located in the estate.

Further, to facilitate the planning of industrial water supply, the volume of water supply to industries located in the vicinity of the estate, pumping-up level of rivers and wells used for such water supply, water quality, etc. should be studied.

b. Possibility of Using Rivers, Lakes and Wells for Water Supply

The possibility of obtaining industrial water from rivers, lakes and wells should be studied from their distribution and existing state.

c. Facilities for Industrial Water Supply

Types of facilities for industrial water supply including the distributing main and branches should be studied. (A map showing the industrial water supply plan should be prepared)

4) City Water

Studies should be made on the city water requirement, outline of city water supply facilities and design supply volume. (A map showing the city water supply plan of a scale of approximately 1/2,000 should be prepared)

5) Drainage

a. Drainage of Industrial Water

The type or types of industries to be located in the estate and the expected quality and volume of industrial waste water should be reviewed in relation to the condition of the rivers available for drainage.

b. Drainage of Rain Water

The rainfall intensity and wet-weather flow should be calculated to estimate the volume of rain water to be drained.

c. Drainage Facilities

The drainage network, arrangement of the main drain pipe, drainage method and facilities should be studied with account taken of the topography of the area surrounding the estate and the existing urban and agricultural drainage system. (A drainage network plan of a scale of about 1/2,000 should be prepared)

6) Electrical Facilities

The capacity of the existing main power cable and of the substation should be studied for the installation of a service cable which will be required for power supply to the factories in the estate. The installation of the service cable, whose economical implementation calls for considering the division of the estate area and the road width, should be planned after making prior arrangements with the pertinent organizations. (A map showing the electrical facilities construction plan should be prepared)

(5) Construction Design

The amount of soil excavation and transport work should be calculated on the basis of the studies mentioned in the preceding items, and the outline of the construction design including that of the levelling work and drainage ditches of roads should be indicated in a map of a scale of 1/1,000-1/3,000. The calculation should also be made for

estimating the estate area, number of roads and the area of drainage ditches as well as the cost of the construction work. In estimating the cost of levelling work, consideration should be given to the need for removing the existing structures and trees as well as the soil condition since the levelling cost varies with these conditions.

The following statistics and materials are required in order to prepare a construction plan which reflects the aforementioned studies.

V. CONCLUSION

In the preceding chapters, the existing state of industrial estate development in Indonesia has been discussed together with the suitability of respective development sites. The conclusion that can be drawn from the theoretical approach presented in the preceding pages is that the development of industrial estates is an imperative for the creation of civilized and populous communities in any country of the world irrespective of the level of its development or the philosophy of its administration. It is a need to be fulfilled by a plan which is formulated in accordance with the policies and specific conditions of the respective countries.

Indonesia is no exception to this general rule. The present situation in the country calls for early formulation and implementation of an industrial estate development plan.

In conclusion of this report, the survey group wishes to draw the attention of the Indonesian authorities concerned to the following points.

1. A region-wise distribution plan of different industries and a region-wise industrial estate development plan should be formulated on the basis of a long-range industrial development scheme (5 - 10 years). All individual plans to be implemented in future should be based on these two fundamental plans. It is hoped that Japanese Government will offer technical assistance in the formulation of these two plans.
2. The following data and materials are required for the formulation of the said two plans.
 - 1) Maps of a scale of 1/50,000.
Drawings
 - 2) Region-wise industrial statistics.
 - 3) Recent trend of industrial location (location, types and scale of industries).
 - 4) Maps showing the distribution of natural resources.
 - 5) Maps of planned traffic network.
 - 6) Population distribution by cities.
 - 7) Maps showing the network of electric power supply.
 - 8) Data on the potential availability of industrial water.

- 9) Maps showing scenic and historic spots and areas designated for preservation of nature.
 - 10) Maps showing top priority agricultural development areas.
 - 11) Others materials and data.
3. An industrial estate development plan most suited to the present situation in Indonesia should be mapped out on the basis of theories advanced in many countries of the world.
4. Land use master plans carefully delineating the industrialization areas, preservation areas, tourist industry development areas and agricultural development areas should be prepared for respective regions of the country so that the sites for industrial estates and their development priority will be determined within the framework of such master plans.
5. Spontaneous location of industries is observed along the bypaths and arterial roads running through and connecting the Djakarta district, the Surabaya district and the metropolitan region embracing the Djakarta district. Industrial concentration in these areas was apparently caused by easy access to the city, favourable traffic condition and availability of electric power. Industrial estate development programmes in these areas should be established at an early date in relation to the expected urban development.
6. Development of proposed sites of industrial estates located in the suburbs of large cities and the foreign proposals for industrial estate development should be considered in relation to the future development of cities. The plan for using airport areas for industrial development must be reconsidered from the theoretical standpoint elucidated in this report since these airport areas are considered more suited for the development of distribution centres and the construction of residential zones or office buildings.
7. At the present stage, the formation of industrial estates should be planned and carried out by the Central Government or local public bodies as in the case of the neighbouring South-east Asian countries. It may, however, be left to private developers including foreign developers if their development plan conforms to the urban or regional development plan of the Government or the local public bodies concerned and is carried out so as to be compatible with

the environmental conditions of the surrounding areas under the administrative control of the Government or the local public bodies. (This type of development can be applied to Tjilatjap district)

8. Though the implementation of industrial estate development will impose a substantially heavy financial burden on the Government, it is to be pointed out that the Government will not find it so difficult to obtain foreign financial aid insofar as its economic stabilization policy is pursued steadfastly. What is now required of the Government above all other things is therefore to prepare a good master plan which can be presented for financing.

9. With its 100 million population and the steady progress of its economic stabilization policy, Indonesia's development potential is becoming larger than ever, drawing the growing investment interest of foreign countries.

It is therefore recommended that the Government prepare the future vision of nationwide industrial estate development and construct a model estate either in Pulogadung district of Djakarta or in Rungkut district of Surabaya.

VI. REFERENCE DATA

The arguments advanced in the foregoing pages are intended to establish the means and ways which can be employed to materilize the overall development and formation of a region.

The spatial arrangement to which great importance is attached in this report has been treated and discussed as being equally essential economic and ecological activities, and the determination of location has been argued as a strategic method which not only ensures passive merits such as the functional rationality of a region and the provident prevention of public nuisance in urban areas but also enables the overall development to be conducted successfully.

With the recent development of design techniques, the said theory has come to be increasingly reduced to comprehensive practice in many countries of the world.

The attached reference sheets illustrate the relationship between the formation of large urban areas and the location of industrial estates. In all the three sheets representing the case of Tokyo, Boston and Montreal respectively, the prime objective is invariably the development of a region into its universal form.

