

CHAPTER

15

STRUCTURE PLANNING

15.1 DEVELOPMENT FRAMEWORK

15.1.1 PLANNING AREA

GENERAL

The division of SMA into a series of planning areas was performed as a part of the preparatory work on structure planning. A planning area has the following functions;

- Basic area for the allotment and distribution planning for population, major facilities, land use and action areas.
- Basic area for more detailed planning such as local plan, action area plan and subject plan (therefore the future framework, general direction for development and the situation in the total structure of SMA are suggested by a planning area).

The following factors were considered in the decision.

- One planning area should be of sufficient extent that the developments required, even if they are various, can be implemented simultaneously.
- By major transportation means such as arterial street and/or railway system, a planning area should be connected with the other planning areas.

This division of planning areas is also a basis of transportation analyses.

DIVISION OF PLANNING AREA IN SMA

According to the considerations mentioned above, the division of planning areas is as shown in Fig. 15.1.1. Inside Surabaya City most planning areas are divided into a few sub-areas in consideration of the distribution planning for urban function and action areas. Fig. 15.1.2 and Table 15.1.1 show the existing conditions such as distribution of population, landuse and urbanization by planning area.

15.1.2 CRITICAL FACTORS

GENERAL

In order to check the possibility of the realization of the socio-economic framework, it is important to identify the critical factors involved. The critical factors will be identified by taking into account the estimated available development resources.

According to this aim, the relationship between the socio-economic framework proposed in this study and the likely availability of critical factors such as land capacity, water and electricity supply, and port capacity are considered. The check of physical and spatial conditions is executed here, but the financial review is carried out in Part IV.

LAND CAPACITY

It is necessary to check whether the estimated future population and the required economic activities can be accommodated in the planning area, especially in the city of Surabaya. If an imbalance between the demand and the capacity is recognized, the framework should be adjusted in accordance with the available capacity.

(1) Land Capacity of the City of Surabaya

The present situation and characteristics of landuse in the city of Surabaya was discussed in section 2.4 of Part I. Based on the characteristics, the total capacity to accommodate the increase of population consists of the following:

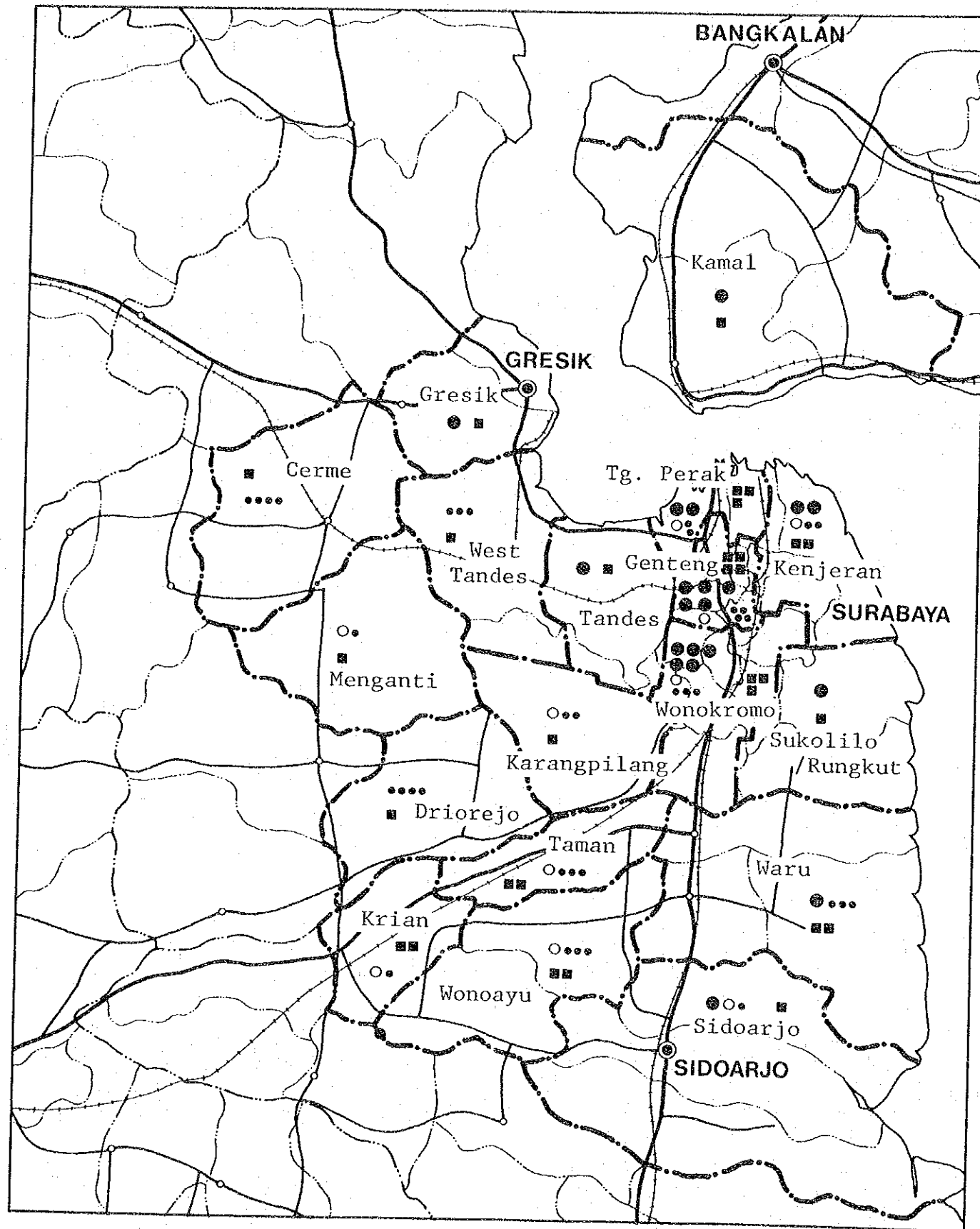
- The capacity due to the utilization of the unused uncultivated land.
- The capacity due to the change from agricultural land to urban landuse.
- The capacity resulting from the land intensification in the existing built-up area.
- The capacity resulting from reclamation of the existing fishponds.



Fig. 15.1.1 PLANNING AREA DIVISION IN SMA

Prior to the estimation of land capacity, some assumptions on the rate of urbanization were made as follows:

- The increased density in the existing built-up area was considered in only the residential area, and it was assumed that the increase in density in the commercial and industrial areas would be intentionally limited in order to avoid environmental aggrava-



Population ● 100 ○ 50 • 10 Thousand Persons
 Urbanized Ratio ■■ 100 - 75 ■■ 75 - 50 ■■ 50 - 25 ■ 25 - 0 %

Fig. 15.1.2 CHARACTERISTICS OF PLANNING AREA

Table 15.1.1 CHARACTERISTICS OF PLANNING AREA

PLANNING AREA	AREA (ha)	(1) Residential (ha)	(2) Industrial (ha)	(3) Agricultural (ha)	(4) Fishponds Swamps (ha)	(5) Forest (ha)	(6) Unused & Waste (ha)	(7) Others (ha)	Population (ISSD)	PLANNING AREA	1) GROSS-DENSITY	2) SEMI-GROSS DENSITY	3) URBANIZED RATIO (%)	4) RATE OF AGRICULTURAL LAND (%)
1. TG. PERAK	1,817	730	264	25	121	-	262	435	273,644	1. TG. PERAK	149	275	54	1
2. GENTENG	1,974	1,755	122	-	45	-	25	27	591,852	2. GENTENG	300	315	95	-
2.1. CANTIAN	544	457	59	-	16	-	-	12	179,247	2.1. CANTIAN	329	348	95	-
2.2. TEGALSARI	1,430	1,298	63	-	29	-	25	15	412,605	2.2. TEGALSARI	289	303	95	-
3. WONOKROMO	4,228	2,561	165	718	57	24	575	126	526,998	3. WONOKROMO	131	211	65	17
3.1. WONOKROMO	688	565	19	-	18	-	15	71	142,514	3.1. WONOKROMO	207	243	85	-
3.2. GUBUNG	904	732	61	70	15	-	26	-	199,131	3.2. GUBUNG	220	251	88	8
3.3. SAWAHAN	796	512	-	-	6	20	223	35	131,867	3.3. SAWAHAN	166	258	64	-
3.4. WONOCOLO	1,840	754	85	648	18	4	311	20	103,486	3.4. WONOCOLO	56	123	46	35
4. KENJERAN	3,119	972	73	1,251	325	35	461	2	267,352	4. KENJERAN	86	256	34	4
4.1. KEDUNG COWEK	857	108	7	439	106	10	187	-	31,825	4.1. KEDUNG COWEK	37	274	13	5
4.2. TAMBAKSARI	1,059	683	56	246	12	-	62	-	210,011	4.2. TAMBAKSARI	198	285	73	23
4.3. NORTH SUKOLILO	1,203	181	10	566	207	25	212	2	25,516	4.3. NORTH SUKOLILO	21	134	16	47
5. SUKOLILO/RUNGKUT	5,702	934	162	1,816	1,919	399	472	-	99,076	5. SUKOLILO/RUNGKUT	17	90	19	32
5.1. SOUTH SUKOLILO	2,398	337	2	758	930	97	274	-	62,805	5.1. SOUTH SUKOLILO	18	126	14	32
5.2. RUNGKUT	3,304	597	160	1,058	989	302	198	-	56,271	5.2. RUNGKUT	17	74	23	32
6. TANDES	4,085	662	129	1,128	1,464	25	677	-	103,405	6. TANDES	25	131	19	28
6.1. GENTING	1,075	39	26	-	973	-	37	-	16,489	6.1. GENTING	15	254	6	-
6.2. SIMOMLYO	3,010	623	103	1,128	491	25	640	-	86,916	6.2. SIMOMLYO	29	120	24	37
7. WEST TANDES	4,486	193	-	1,777	2,260	220	36	-	33,641	7. WEST TANDES	4	174	4	40
7.1. ROMO KALISARI	1,223	12	-	-	1,207	-	4	-	3,105	7.1. ROMO KALISARI	3	259	1	-
7.2. SEMEMI	3,263	181	-	1,777	1,053	220	32	-	30,536	7.2. SEMEMI	9	169	6	54
8. KARANGPILANG	3,747	680	104	2,526	32	95	261	139	71,559	8. KARANGPILANG	19	91	21	67
SURABAYA TOTAL	29,178	8,489	1,019	9,241	6,223	798	2,709	699	2,017,527	SURABAYA TOTAL	69	212	33	32
9. GRESIK	3,356	454	325	515	566	588	908	-	104,353	9. GRESIK	31	134	23	15
10. CERME	7,167	422	-	5,707	650	-	388	-	44,096	10. CERME	6	104	6	80
11. MENGANTI	6,872	625	-	4,025	-	-	2,222	-	59,414	11. MENGANTI	9	95	9	59
12. DRIOREJO	5,129	549	91	2,352	23	-	1,474	-	39,283	12. DRIOREJO	8	61	12	46
GRESIK TOTAL	22,524	2,050	416	12,599	1,239	588	4,992	-	247,146	GRESIK TOTAL	11	100	11	56
17. WARU	11,376	2,792	165	3,855	4,263	-	231	70	129,528	17. WARU	11	44	26	34
18. TAMAN	2,854	1,054	80	1,549	5	-	111	55	76,376	18. TAMAN	27	67	40	54
19. KRAN	3,016	960	17	1,945	-	-	104	-	58,899	19. KRAN	20	60	32	64
20. SIDOARJO	12,804	2,429	42	4,199	5,966	-	151	17	158,783	20. SIDOARJO	12	64	20	33
21. WONDAYU	6,340	1,810	-	4,451	-	-	79	-	79,531	21. WONDAYU	13	44	29	70
SIDOARJO TOTAL	36,390	9,045	304	14,999	10,234	-	676	142	503,117	SIDOARJO TOTAL	14	54	26	41
37. KAMAL	13,514	2,392	2	5,879	1,043	1,167	3,031	-	99,687	37. KAMAL	7	42	18	44
BANGKALAN TOTAL	13,514	2,392	2	5,879	1,043	1,167	3,031	-	99,687	BANGKALAN TOTAL	7	42	18	44
SURABAYA METROPOLITAN AREA TOTAL	101,606	21,976	1,741	42,718	18,739	2,553	11,408	841	2,867,477	SURABAYA METROPOLITAN AREA TOTAL	28	121	23	42

NOTES : 1) INCLUDING COMMERCIAL PUBLIC SERVICE AREA
2) ONLY MAJOR INDUSTRIAL AREA
3) INCLUDING AREA OF SPECIAL USE SUCH AS MILITARY

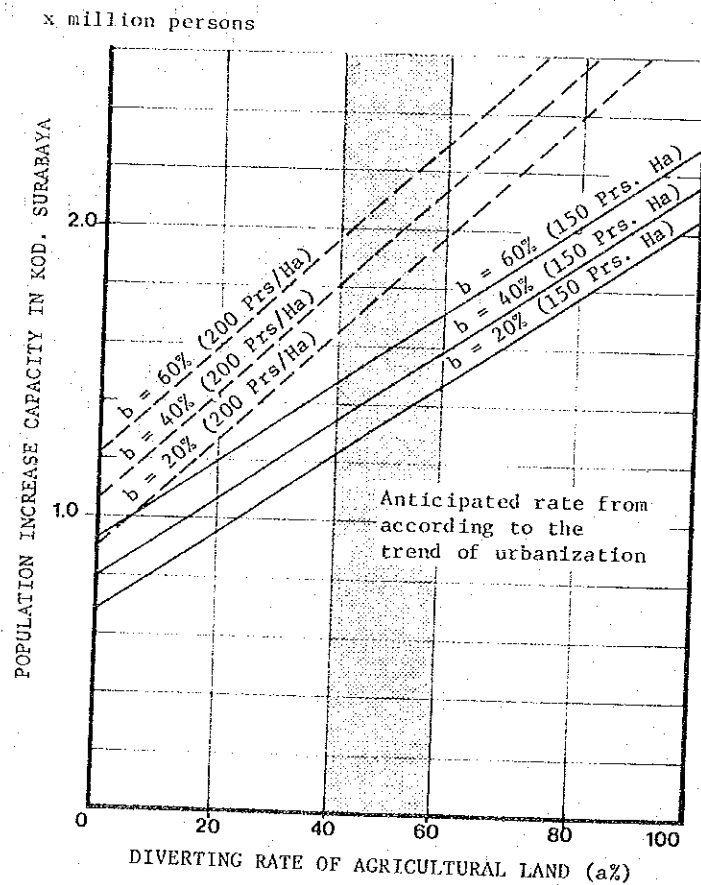
NOTES : 1) POPULATION/TOTAL AREA (Persons/ha)
2) POPULATION/URBANIZED AREA (Persons/ha)
3) URBANIZED AREA/TOTAL AREA
4) AGRICULTURAL AREA/TOTAL AREA

tion. The increase in residential density is assumed to be 20%.

Furthermore, the loss of residential area caused by the industrial development in the port supporting area, was assumed to be balanced by the gain in residential area due to the relocation of the existing factories to areas outside the city of Surabaya.

- In considering the utilization of the existing unused uncultivated lands, around 70% of them were assumed to be available for residential areas.
- The rate of changing the landuse from agricultural to urban, was assumed to be around 2.5 – 3.0% per annum, based on the trend of the past 12 years. Approximately 2,800 ha of agricultural land was unbanized between 1969 and 1981. This means that 2.7% per annum of the agricultural land is subject to change into other landuse. Accordingly, up to the year 2000, about 40% – 60% of the existing agricultural land would change to another landuse.
- Only the fish pond located in the corridor of Surabaya – Gresik was assumed to be reclaimed. The fish ponds in the eastern part of the city should be preserved.
- The residential density in the area developed was assumed to be between 150 and 200 persons per hectare. For reference, the present average residential density (Net Density) is around 238 persons/ha.
- Utilization of military land, the existing infrastructure and rivers were not taken into account for use as residential area.

The problems on agricultural landuse and on the reclamation of the fish pond are intentional considerations. Therefore if the amount of agricultural land to be converted is $a\%$ and the amount of the reclamation development of the fishponds area in the corridor of Surabaya-Gresik is $b\%$, the relational equations between the capacity of the population increase, $a\%$ and $b\%$, can be obtained and are shown in Fig. 15.1.3.



Notes; "b" indicates the rate of reclamation development of the fishpond area along the corridor of Surabaya-Gresik

Fig. 15.1.3 CAPACITY OF INCREASE POPULATION IN KOD. SURABAYA

As a result, the capacity of population in the city of Surabaya is evaluated as follows:

- The amount of reclamation of fishponds for residential use, is assumed to be 20% up to the year 2000. The amount of agricultural land should be limited intentionally to around 50% of the existing and the residential density in the newly developed area is reasonably assumed to be a maximum of 200 persons per hectare.
- Based on these planning considerations, the maximum capacity for population increase is estimated to be about 1,807,000 persons. Adding the present population, 2,017,527 persons to this number, the total land capacity has the capability of supporting 3,825,000 persons. The total population estimated in the socio-economic framework study is about 4,164,000 persons and consequently 339,000 persons will be surplus to the available land in Surabaya in the year 2000.

(2) Land Capacity of Sidoarjo Area

The surplus population from the city of Surabaya are to be accommodated in the Sidoarjo and Gresik areas. From a study of the landuse, the areas of unproductive land such as unused, uncultivated and waste land, are around 5,000 ha. in Gresik and 700 ha. in Sidoarjo within SMA. If the surplus population of 339,000 persons is shared by the ratio of the area of unproductive land, Sidoarjo area is to accommodate 42,000 persons overspilling from Surabaya.

Adding this population to the estimated population, the total in the year 2000 is assumed to be about 1,312,000 persons. Therefore, the land capacity in Sidoarjo area was checked for the increase of 788,000 persons gained by subtracting the existing population from the anticipated population.

The capacity of the existing town and village area is assumed to be an additional persons, by increasing the density from 59 persons/ha at present, up to 100 persons/ha. Accordingly, the remaining increase of 491,000 persons should be accommodated in the newly developed areas.

Regarding the residential development in this area, three housing types were assumed as follows:

- Type A : Typical Suburban Type (120 persons/ha),
- Type B : Public Housing Type for the middle and low income group (250 persons/ha),
- Type C : Sprawled Type (150 persons/ha).

Next, three patterns according to the composition rate were assumed as below:

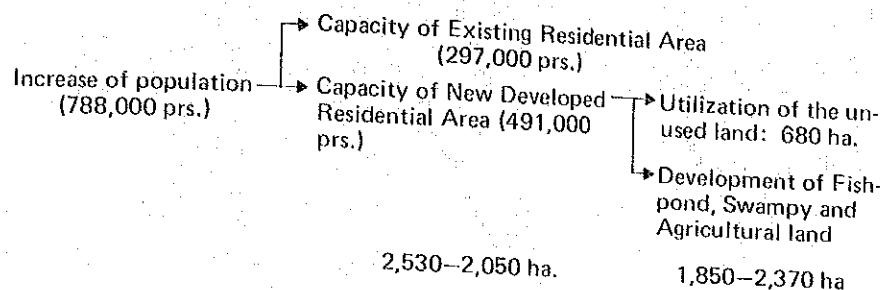
	Pattern 1	Pattern 2	Pattern 3
Type A	50%	20%	30%
Type B	30%	50%	20%
Type C	20%	30%	50%
	100%	100%	100%

According to these assumptions, the increase of land demand can be computed as follows:

- Pattern 1 : 2,980 ha.
- Pattern 2 : 2,530 ha.
- Pattern 3 : 3,050 ha.

From consideration of available land supply, the existing unused area of around 680 ha can be utilized for the residential area, therefore an additional area of 1,850–2,370 ha should be developed. The fishpond or swamp land of about 10,230 ha and the agricultural land of about 15,000 ha, can be considered as a source of supply. If the area corresponding with 7.3 – 9.4% of the fishpond, swampy and agricultural area of 25,230 ha, is developed by the year 2000, the increase in population can be accommodated.

The following diagram can be considered to show the intention regarding the accommodation of increased population:



Judging from the tendency of urbanization in this area, the development of fishpond, swampy and agricultural area of about 7.3–9.4% of those total areas is assumed to be reasonable. As a result, the land capacity of Sidoarjo area could be enough to accommodate the increase in its population and the surplus population from the city of Surabaya.

However, good care should be taken that the urban development of the area within kec. Wonoayu and kec. Sukodono is controlled in order to preserve the advanced agricultural development.

(3) Land Capacity of Gresik Area

As mentioned above (2), the Gresik area is to accept a population of 297,000 persons inflowing from the city of Surabaya. Adding this population to the estimated increase in population, 548,000 additional persons should be accommodated in the Gresik area.

In the same way as the study of Sidoarjo area, the demand of new development for the residential use is assumed to be 2,820 ha – 3,400 ha, as follows:

Pattern A	: 3,320 ha.
Pattern B	: 2,280 ha.
Pattern C	: 3,400 ha.

From study of the existing landuse, the unused and uncultivated land is estimated at about 4,990 ha, and therefore exceeds the demand. Consequently, the land capacity in this area could cope with the future land demand, if the existing unused land is utilized effectively.

(4) Land Capacity of Kamal Area

It is assumed that there will not be a land capacity problem in this area. The estimated population of around 170,000 persons could be accommodated, if an area of about 400 ha is developed from the available unused land of 3,030 ha.

(5) Evaluation of Land Capacity in SMA

The population in the year 2000 adjusted from the land capacity is summarized in Table 15.1.2.

Table 15.1.2 ADJUSTED POPULATION OF SMA IN 2000 FROM LAND CAPACITY

(Unit: Person)

Kot./Kab	Adjusted Population from Land Capacity	
	2000	Increase 2000/1980
Kab. Surabaya	3,825,000	1,807,000
Kab. Sidoarjo	1,312,000	788,000
Kab. Gresik	813,000	548,000
Kab. Bangkalan	170,000	70,000
Sub Total	6,120,000	3,213,000

Consequently, there is no problem in land capacity for SMA as a total, however, it is a fact that the city of Surabaya is not endowed with the capacity for more than around 4.0 million persons. Therefore, before the year 2000, the rate of population migration into the city of Surabaya must decrease and the migration rates into the surrounding area increase. Developments to accommodate this migrating population will be required in the surrounding area. This emphasises the need for an integrated approach to the development of the SMA region. Although SMA consists of four (4) Kotamadya and Kabupaten, the actual urban structure should be developed in a unified system as a metropolitan area.

Concerning the allotment to Gresik and Sidoarjo of the surplus population of Surabaya, further administrative considerations will be necessary. Judging from the natural and agricultural conditions, the Gresik area should perform a larger role in this allotment.

WATER CAPACITY

(1) Water Demand Forecast

The SMA water demand consists of the following:

- A. Domestic water
- B. Industrial water (Manufacture and Commerce)
- C. Public Facilities water

– Domestic Water Demand

This is assumed to increase in accordance with the general elevation of life style. The domestic water demand is however considered to be rather conservative under the present severe water supply situation.

The estimate aims at an equity in the special service to SMA rather than an up-grading of service level in the existing service areas. The future water supply for the residential sector is shown in Table 15.1.3.

Table 15.1.3 DOMESTIC WATER SUPPLY IN SMA

Year	Service	Service Level (%)		Service Volume (ℓ/capita/day)	
		Piped	Vendor	Piped	Vendor
1980		10.9	23.4	219	20
1990		40	20	220	20
2000		70	10	220	20

– Industrial Water Demand

Industrial water estimate is based on the consumption per capita per day. In 1975 the consumption was high at around 300 ℓ/employee/day. This has decreased to 72 ℓ/employee/day in 1980. The future unit consumption is assumed to be 200 ℓ/employee/day in 1990 and 500 ℓ/employee/day in 2000. The port water demand is based on the future cargo handling volume.

Commercial water forecast is based on the tertiary sector of GRDP.

– Public Facilities Water Demand

Public facilities water is estimated in relation to the population growth in SMA. In 1990 a total of 9.6 m³/sec. and 23.8 m³/sec. in 2000 is needed for SMA as estimated in Section 14.6.1 in Part III.

(2) Development of Water Sources

– Available water sources by 1990

The water development plan made by each PDAM is reviewed and investigated. Available water sources up to 1990 are estimated in the Section 14.6.1 of Part III and a total of 7.7 m³/sec. will be available for SMA. PDAM Surabaya plans the water development of 8.06 m³/sec. total including Umblan spring and 6.5 m³/sec. is defined as

future available water sources. The Surabaya river water source is not expanded due to the limited water flow in the river.

-- New Water Sources Development

The additional water demand of $1.9 \text{ m}^3/\text{sec.}$ in 1990 and $16.1 \text{ m}^3/\text{sec.}$ in 2000 is therefore required. To meet this demand the available water potential is reviewed.

Brantas river (Surabaya river) has low development potential due to the previous development of the river. Sala River has been developed only in its upper reaches, and therefore the Sala has big development potential. Lamong river is not expected to be a water supply source for SMA due to the small water potential and the several shortage of irrigation water in the basin.

The drainage water from the irrigation system in the Brantas Delta Sidoarjo is also considered as a possible urban water source, however it is possible that adverse effects may occur. Water which flows to the sea, whether as groundwater or in the surface channels, maintains a balance with the saline water in the coastal area. Any reduction of the freshwater flow through the system would alter this balance causing a further intrusion of saline water and possibly converting productive sawah to salt marsh.

The result of urbanization in the agriculture area of Surabaya and Sidoarjo is also considered to be a water supply potential. The surplus water from this source is estimated to be $6 \text{ m}^3/\text{sec.}$ in 2000.

These are summarized in Table 15.1.4.

Table 15.1.4 WATER SOURCE DEVELOPMENT

Unit: $\text{m}^3/\text{sec.}$

Water Source	Expected Development ($\text{m}^3/\text{sec.}$)
Sala River	10
Surplus irrigation water in Surabaya and Sidoarjo	6
4 Spring water in Bangkalan	0.15
Total	16.1

Urban water needs have only been considered in a minor role in the past water development projects. For future water development programmes, water usage between agriculture use and urban use should be considered in more equal terms. Therefore, urban water needs must be incorporated into water development plans. Water sources (surface, spring, ground water) are to be further developed and the planned water reservoirs must be re-examined to raise additional water for urban water usage.

The discussion on the water capacity above is summarized in Fig. 15.1.4.

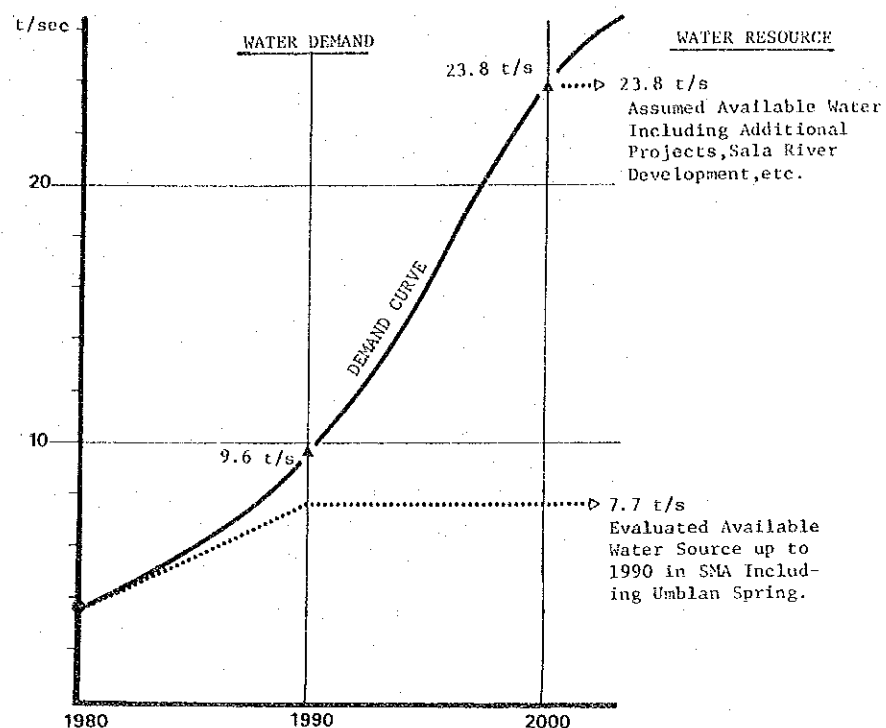


Fig. 15.1.4 WATER DEMAND AND CAPACITY OF SUPPLY IN SMA

ELECTRICITY CAPACITY

(1) Future Demand Forecast

-- Peak Demand

For the forecast of future electricity demand, "SURABAYA LONG RANGE PLAN OF ELECTRIC POWER SYSTEM UP TO YEAR 2000, EAST JAVA ELECTRIC POWER TRANSMISSION AND DISTRIBUTION NETWORK PROJECT SECOND STAGE" conducted by Persahan Umum Listrik Negara (PLN), the Ministry of Public Works and Power in Dec. 1976. This is the source data for the forecasts in this study. The future electricity demand in SMA is estimated in Table 15.1.5.

Table 15.1.5 FUTURE ELECTRICITY DEMAND FORECAST (PEAK DEMAND)

Unit: MW

Category \ Year	1990	2000
Residential	154	559
Commercial	352	1,205
Industrial	772	1,440
Public	105	345
Total	1,383	3,549

-- Average Annual Demand

The annual demand is estimated from the relation between GRDP and electricity consumption. Table 15.1.6 gives the future demand in SMA.

Table 15.1.6 FORECAST OF ANNUAL ELECTRICITY DEMAND

Year	GRDP (Million Rp.)	ANNUAL DEMAND (MWH)
1980	441,843	432,424
1990	883,413	864,581
2000	1,821,422	1,782,594

(2) Prospect of Electricity Supply

The PLN estimated the future electric demand as 7,948.1 GWH in all of East Java in 1988/1989. Based on this estimation, about 11% of the total in East Java will be consumed in SMA in the year 1990. The PLN has some new projects as well as on-going projects to cope with the future demand. For instance, the Gresik project, the extension project of which is under construction, is to produce about 380-400 MW in the future.

Including the others, the total capacity of supply is estimated to be about 774 MW in East Java up to the year 1984. This capacity corresponds with the consumption of about 6,780 GWH. the macro-scopic point of view is necessary for the discussion on the electric balance but judging from the present trend and conditions for electricity development, it is assumed that there is not a large problem for the future capacity of electric supply.

PORT CAPACITY

(1) Trend of Poart Traffic

The hinterlands of the Port of Surabaya (Tg. Perak) are not only Surabaya City or East Java but also Java, Bali, Kalimantan, Sulawesi and so on. The port has fulfilled an important role in foreign and domestic trades, since the old days and its position as the second biggest port in Indonesia after Jakarta, is well established. Table 15.1.7 shows the trend of port traffic from 1965 to 1980.

The total volume of cargo has been increasing since 1965 with the exception of 1976 and 1977, and in 1980 it was 5,762 thousand tons, some four times that of 1965. For foreign trade, exports exceeded imports before 1975, but since 1975 imports have exceeded exports. The volume of imports was approximately 2.5 times that of exports in 1980.

For domestic trades, inward volume and outward volumes have been nearly balanced with outward slightly exceeding inward in 1979 or before. Foreign and domestic trade has been almost equal with foreign slightly exceeding domestic in 1979 and 1980.

Table 15.1.7 PORT TRAFFIC (TG. PERAK)

	(thousand tons)							
	1965(a)	1970	1975	1976	1977	1978	1979	1980
<u>Foreign</u>								
Imports	289	605	1,764	1,463	1,345	1,552	1,768	2,131
Exports	357	667	608	586	552	636	888	849
Total	646	1,272	2,372	2,049	1,897	2,188	2,656	2,980
<u>Domestic</u>								
Inwards	309	244	610	653	797	1,127	1,172	1,423
Outwards	416	556	941	946	1,032	1,237	1,214	1,359
Total	725	800	1,551	1,599	1,829	2,364	2,386	2,782
<u>Foreign and Domestic</u>								
Imports/Inwards	598	849	2,374	2,116	2,142	2,679	2,940	3,554
Exports/Outwards	773	1,223	1,549	1,532	1,584	1,873	2,102	2,208
Total	1,371	2,072	3,923	3,648	3,726	4,552	5,042	5,762

Note: (a) For 1965, short distance foreign traffic is included with domestic traffic.

(2) Existing Port Expansion Plan

The Port Administration of Surabaya have made a port expansion plan up to the year 2000 and is now executing part of it. The plan includes the expansion of PT Bogasari grain berths, PT Dok and Pertamina LPG Depot, and construction of Pantai Nilam Barat KPLP berths.

Apart from these, the Port Administration instructed a British consultant, to carry out a feasibility study on the expansion plan, and intend to implement the plan based on the results of the study. The consultant proposed the betterment and extension of a part of the existing quays, provision of a container yard, and new construction of quays to the west of the present port as a programme towards the year 2000. The port traffic upon which the plan was based was predicted by the consultant and the result is shown in Table 15.1.8.

Table 15.1.8 TRAFFIC FORECASTS

		(thousand tons)							
		Actual		Forecast					
		1979	1980	1981	1983	1985	1990	1995	2000
Foreign									
Imports		1,768	2,131	2,140	2,421	2,849	4,143	6,128	9,285
Exports		888	849	945	1,011	1,086	1,360	1,852	2,681
Total		2,656	2,981	3,085	3,432	3,935	5,503	7,980	11,966
Domestic									
Inwards		1,172	1,423	1,515	1,602	1,761	2,316	3,235	4,778
Outwards		1,214	1,359	1,410	1,561	1,752	2,510	3,700	5,564
Total		2,386	2,782	2,925	3,163	3,513	4,826	6,935	10,342
Foreign and Domestic									
Imports/Inwards		2,940	3,554	3,655	4,023	4,610	6,459	9,363	14,063
Exports/Outwards		2,102	2,208	2,355	2,572	2,838	3,870	5,552	8,245
Total		5,042	5,762	6,010	6,595	7,448	10,329	14,915	22,308

These show that the total volume will be 10,329 million tons in 1990 and 22,308 million tons in 2000. These figures are 1.8 and 3.9 times respectively, of the 1980 figures.

(3) Comparison with Structure Plan

The forecasting methodology of the port traffic used by the consultant is, as stated in the report, based on Pelita III, Master Plan Surabaya 2000, and the prospect for world economies. The consultant estimated the future volume of cargo by item and obtained the total volume by summing them up. Although it was aware of the development plan of GKS, the consultant did not take the effect of the plan on the port into account. Consequently it can be anticipated that the scale of the port required by the structure plan will exceed that of the consultant. In order to know the difference between the two and to check the port capacity, the Study Team adjusted the cargo volume by using the anticipated framework.

The difference of premise for future forecast between the Feasibility Study and this study is that:

— Average Annual Growth Rate of GRDP,

The Feasibility Study: 6.5% (same as Pelita III) 1980 – 1985

This Study: 6.89% (1980 – 1990)
7.12% (1980 – 2000)

Fig. 15.1.5 is a comparison of the results and the forecast of the Feasibility Study. The cargo volume forecast of the Team is 10.71 million tons in 1990 and 25.05 million tons in 2000, and these results are 4% to 12% bigger than those of the Feasibility Study. This means that the present port expansion plan should be magnified so that the scale of the port fits the industrial development in GKS Region recommended by the structure plan. Especially, the coastal area between Surabaya and Gresik should be developed as an industrial port and be equipped with exclusive quays.

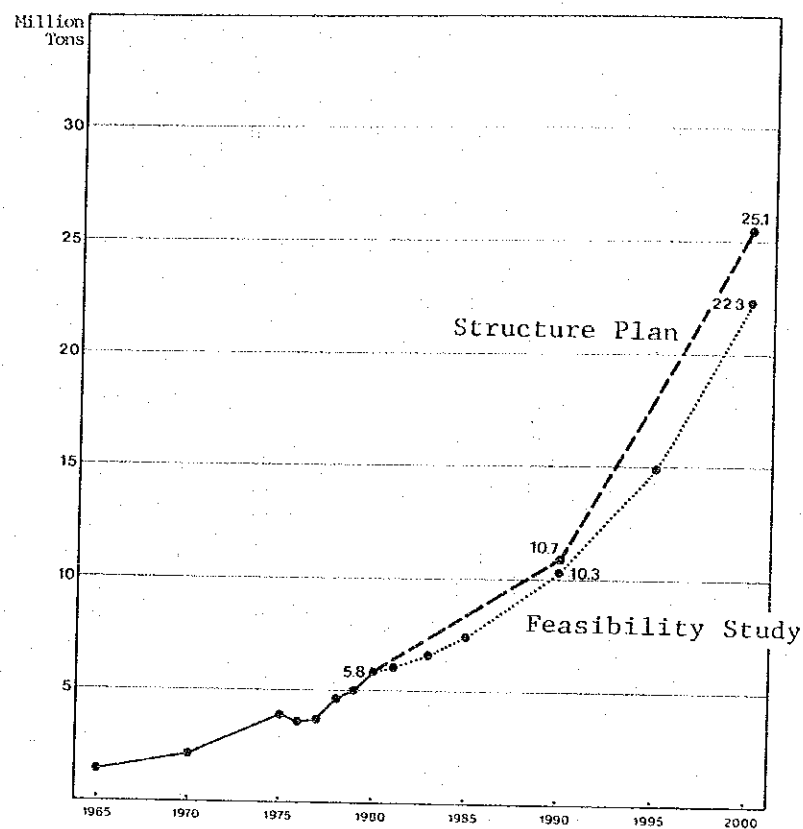


Fig. 15.1.5 COMPARISON OF PORT TRAFFIC FORECASTS

(4) Evaluation of Port Capacity

The existing port capacity of Tg. Perak is assumed to be able to handle about 5.0 million tons as evaluated in the Feasibility Study. The expansion and development of the capacity of the port is indispensable for the industrialization of East Java as well as SMA.

Using the data estimated, a further 5 times the existing port capacity is required to be developed, and this project should be given high priority. However, comprehensive development concerning the port expansion including the relevant facility development such as the industrial supporting zone and infrastructure should be performed simultaneously.

15.1.3 DEVELOPMENT FRAMEWORK

LANDUSE DEVELOPMENT FRAMEWORK AND LAND PREPARATION

Based on the results of sectoral study, the land demand to be developed up to the year 2000 is summarized as shown in Table 15.1.9. From this table, the landuse development framework has the following characteristics:

— The expansion of urban landuse is assumed to be about 21 thousand hectare up to the year 2000. Amongst this, about 1.5 thousand hectare is the commercial area, 3 thousand hectare for the industrial area, and about 12 thousand hectare for the residential use are to be newly developed by the year 2000. Simultaneously, the urbanized ratio (the rate of urban uses to the total area) is assumed to be 27.4%, 35.0% and 48.4% in 1980, 1990 and 2000 respectively.

Table 15.1.9 LANDUSE FRAMEWORK IN SMA

Items	Existing	Future		New Development (2000-1980)
	1980	1990	2000	
Urban Landuse (ha)				
1. <u>Total of Urban Landuse</u>	<u>27,796</u>	<u>35,540</u>	<u>49,131</u>	<u>21,335</u>
1) <u>Commercial</u>	<u>1,215</u>	<u>1,711</u>	<u>2,736</u>	<u>1,521</u>
Central Business and Commercial	650	830	1,407	757
Neighbourhood Commercial	565	881	1,329	764
2) <u>Industrial</u>	<u>1,741</u>	<u>2,573</u>	<u>4,801</u>	<u>3,060</u>
For Existing Industry	1,741	1,626	1,511	Δ 230
For Newly Located	-	827	2,920	2,920
For Relocated and Small Scale Factories	-	120	370	370
3) <u>Residential</u>	<u>20,761</u>	<u>25,683</u>	<u>32,938</u>	<u>12,177</u>
Housing	16,609	20,546	26,350	9,741
Relevant Public Service	4,152	5,137	6,588	2,436
4) <u>Major Public Services</u>	<u>508</u>	<u>630</u>	<u>806</u>	<u>298</u>
5) <u>Recreational/Park</u>	<u>125</u>	<u>663</u>	<u>1,835</u>	<u>1,710</u>
6) <u>Major Infrastructure</u>	<u>2,605</u>	<u>3,439</u>	<u>5,174</u>	<u>2,569</u>
7) <u>Military</u>	<u>841</u>	<u>841</u>	<u>841</u>	<u>0</u>
2. <u>OPEN SPACE</u> (Agricultural, Natural Conservation, etc.)	<u>73,810</u>	<u>66,066</u>	<u>52,475</u>	<u>Δ 21,335</u>
* Urbanized Ratio (%)	27.4	35.0	48.4	-

PUBLIC FACILITIES DEMAND IN SMA

The estimates of the demand for public facilities is summarized in Table 15.1.10.

Taking note of educational facilities, the number of primary schools to be developed up to the year 2000 amounts to 576 units, which means about 1.7 units per 10 thousand people increase. A key factor for development planning is the budget capability for the financing of the proposed new public facilities.

15.1.4 AREA DISTRIBUTION BY PLANNING AREA

DISTRIBUTION OF POPULATION

In planning the distribution of population in the year 2000, the following items were taken into account:

- (1) To control the urban development in the areas where the engineering study shows that areas should be prepared as flood control reservoirs.
- (2) Development in the swampy and fish-pond areas located in the eastern part of Surabaya should be discouraged, however, the area along the Surabaya-Gresik corridor which is also swampy, should be considered for utilization as an industrial area as long as its use is possible from a civil engineering point of view.

Table 15.1.10 LIVING FACILITIES DEMAND IN SMA UP TO 2000

Categories	Items	Number of Facilities to be developed up to 2000
Public Service Facilities to be Developed	<u>EDUCATION</u>	<u>1,856</u>
	- Kindergarten	960
	- Primary School (SD)	576
	- Jr. Secondary School (SLP)	192
	- Sr. Secondary School (SLA)	128
	<u>HEALTH</u>	<u>1,244</u>
	- Polyclinic	768
	- Dispensary	192
	- BKIA 1)	196
	- PUSKESMAS 2)	64
	(-) Distric Public Health Center	16
	(-) Regional	8
	<u>COMMERCIAL/BUSINESS</u>	<u>8,532</u>
	- Stall	7,680
	- Shop	768
	- Shopping Center (Sub-district)	64
	(-) District Shopping Center + Trade	16
	(-) Trade and Industry	4
	<u>PARK/PLAY AND SPORTS GROUND</u>	<u>8,532</u>
	- Play lot	7,680
	- Mosque/Park/Play ground or Langgar	768
	- Park/play and Sports Ground (sub-district)	64
- " (district)	16	
- " (regional)	4	
<u>ADMINISTRATIVE/PUBLIC SERVICE</u>	<u>788</u>	
- For RUKUN WARGA	768	
(-) For KECAMATAN	16	
(-) For WILAYAH	4	
Total Water Demand		- 23.8 t/sec.
Total Electricity Demand		around 1,782 CKH/year

Notes: 1) : Mother + Child care center and maternity hospital

2) : Health Center for Sub-district

- (3) Housing landuse will be planned on the concepts of the community scale under the following classifications:

- urban housing areas with high density;
- suburban housing areas located in the corridors of the major roads;
- housing estates developed as one unit; and
- housing areas formed by sprawl.

The areas which can be anticipated to possess a large capacity in the future are:

- Western part of Surabaya and the neighbouring area in Kab. Gresik;
- Southern area of Surabaya and the neighbouring area in Kab. Sidoarjo; and
- Eastern area of Sidoarjo.

- (4) Some kind of open space and green area should be prepared not only in residential areas but also in industrial areas. Especially, sufficient green areas which can also function as flood control areas should be provided.
- (5) The irrigated area already developed by public projects should be basically preserved for agricultural use. By this concept the area between the Mangetan irrigation canal and the Porong River is a high grade agricultural area and should be preserved. The Mangetan irrigation canal should therefore be the border of the urbanized area in the south.
- (6) The agricultural land located inside Surabaya City should be developed except for those lands evaluated to be a significant green area or open space from an urban planning point of view.
- (7) The gross population density is assumed to be less than 250 person per hectare even in the high dense area, and the accommodation capacity in the existing peripheral housing area is assumed to be 200 persons per hectare and the existing village areas 150 persons per hectare.
- (8) Generally, the political control of population increase in the Central Business District and the port area, Tg. Perak was taken into account. Especially it is assumed from an urban planning point of view that the population in the port area will decrease as development of the supporting area takes place.
- (9) In the area developed by the nodal system such as housing complex, the planning considerations were taken prior to estimation.

Based on these considerations, the distribution of population by unit of planning area was assumed as indicated in Table 15.1.11 and illustrated in Fig. 15.1.6.

Table 15.1.11 DISTRIBUTION OF POPULATION

No.	NAME OF ZONE	1980	1990	2000	1990/1980	2000/1980
1.	TG. PERAK	273,644	279,000	249,000	1.020	0.910
2.	KEDUNG COWEK	31,825	41,000	66,000	1.288	1.068
3.	CANTIAN	179,247	198,000	215,000	1.105	1.199
4.	TEGARSARI	412,605	456,000	495,000	1.105	1.120
5.	WONOKROMO	142,515	164,000	194,000	1.151	1.361
6.	SAWAHAN	131,867	161,000	180,000	1.221	1.365
7.	GENTING	16,489	28,000	57,000	1.698	3.456
8.	ROMO KALISARI	3,105	5,000	23,000	1.610	7.407
9.	SIMOMULYO	86,916	191,000	307,000	2.198	1.607
10.	SEMENTI	30,536	50,000	244,000	1.637	7.991
11.	KARANGPILANG	71,559	223,000	389,000	3.116	5.436
12.	WONOCOLO	103,486	240,000	308,000	2.319	2.976
13.	GUBUNG	199,131	242,000	271,000	1.215	1.361
14.	TAMBAKSARI	210,011	271,000	308,000	1.290	1.467
15.	NORTH SUKOLILO	25,516	73,000	124,000	2.861	4.860
16.	SOUTH SUKOLILO	42,805	111,000	186,000	2.593	4.345
17.	RUNGKUT	56,271	129,000	209,000	2.292	3.714
(1)	Sub. Total (SURABAYA)	2,017,527	2,862,000	3,825,000	1.419	1.896
18.	GRESIK	104,353	154,000	205,000	1.476	1.964
19.	CERME	44,096	53,000	208,000	1.202	4.717
20.	MENGANTI	59,414	63,000	180,000	1.060	3.030
21.	DRIOREJO	39,283	83,000	220,000	2.113	2.651
(2)	Sub. Total (Kab. GRESIK)	247,146	353,000	813,000	1.428	3.290
22.	WARU	129,528	198,000	314,000	1.529	2.424
23.	TAHAN	76,376	95,000	137,000	1.244	1.794
24.	KRIAN	58,899	138,000	253,000	2.343	4.295
25.	SIDOARJO	158,783	349,000	494,000	2.198	3.111
26.	WONOAYU	79,531	85,000	113,000	1.069	1.421
(3)	Sub. Total (Kab. SIDOARJO)	503,117	865,000	1,311,000	1.720	2.606
27.	KAMAL	99,687	107,000	170,000	1.073	1.705
(4)	Sub. Total (Kab. BANGKALAN)	99,687	107,000	170,000	1.073	1.705
(5)	Total (2)+(3)+(4)	849,950	1,325,000	2,294,000	1.559	2.699
	GRAND TOTAL	2,867,477	4,187,000	6,119,000	1.460	2.134
	OTHER AREA IN KAB. GRESIK	415,238	561,000	684,000	1.351	1.647
	OTHER AREA IN KAB. SIDOARJO	350,568	368,000	456,000	1.050	1.301
	KOD. MOJOKERTO	68,507	82,000	99,000	1.197	1.445
	KAB. MOJOKERTO	705,358	889,000	1,135,000	1.260	1.609
	KAB. LAMONGAN	1,049,808	1,277,000	1,569,000	1.216	1.495
	OTHER AREA IN KAB. BANGKALAN	588,604	645,000	697,000	1.096	1.184
	G.K.S. WITHOUT SMA	3,244,458	3,822,000	4,640,000	1.178	1.430
	G. K. S. TOTAL	6,111,935	8,009,000	10,759,000	1.310	1.343

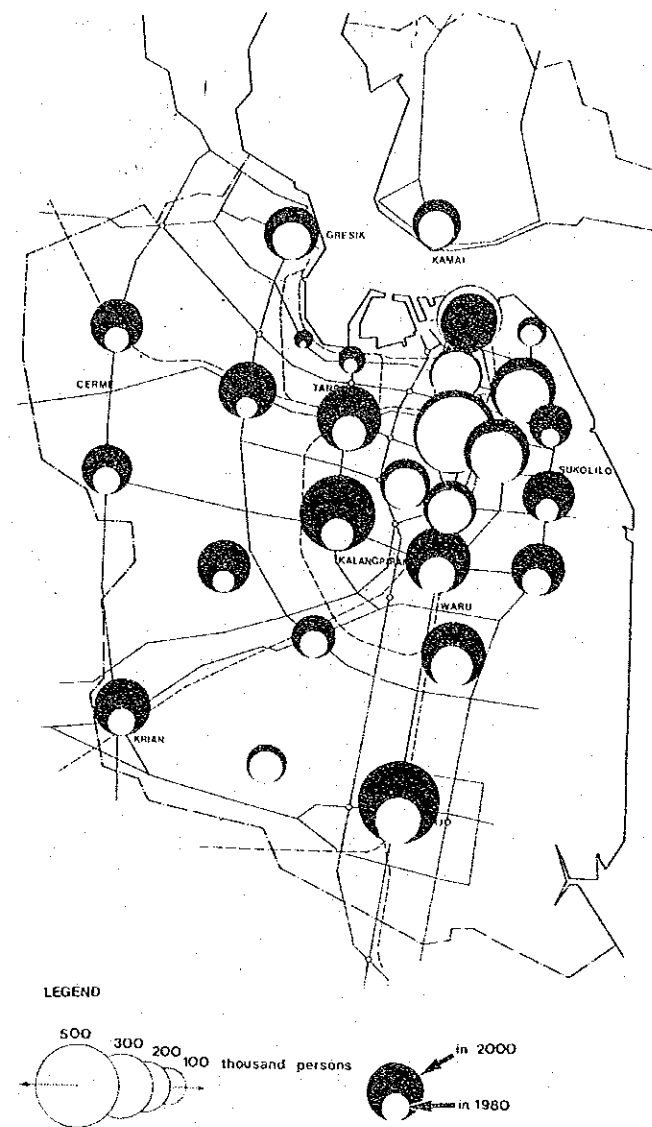


Fig. 15.1.6 DISTRIBUTION OF POPULATION IN SMA

DISTRIBUTION OF WORK PLACES

The distribution pattern of work places should correspond to the landuse planning and the transportation network system planning.

The distribution plan of work places was carried out based on the following assumptions:

- Basically the number of jobs in the primary sector is assumed to be equivalent to the number of employments in the resident base.
- The distribution of jobs in the secondary sector was estimated corresponding to the planned industrial areas. However, the productivity per labour in the central area is assumed to be comparatively low because of the many small scale factories in these areas.
- Accordingly, the number of jobs in the central area was calculated based on the assumption that labour productivity ratio of small scale factories to the modern factories is about 0.4.
- The distribution of jobs in the tertiary sector was estimated corresponding to the distribution of commercial landuse. However, the number of jobs per hectare in the central commercial area is evidently different from the other commercial areas because of the difference of land productivity. Basically, the ratio of difference is conceived to be nearly equivalent to that of land prices.

Accordingly, the number of jobs per hectare in the central commercial area was assumed to be about 8 times that of the other commercial areas.

Based on the assumption above, the tentative distribution of jobs by sector was calculated and after the evaluation of those results from a planning point of view, the final framework was adjusted as shown in Table 15.1.12.

Table 15.1.12 DISTRIBUTION OF WORK PLACES (NO. OF JOBS)

No. NAME OF AREA	Primary Sector					Secondary Sector				
	1980	1990	2000	1990/1980	2000/1980	1980	1990	2000	1990/1980	2000/1980
1. TG. PERAK	140	111	81	0.793	0.579	19,715	21,512	43,539	1.091	2.208
2. KEDUNG COWEK	1,017	1,193	1,356	1.173	1.333	523	5,117	16,519	9.783	31.585
3. CANTIAN	11	5	-	0.455	-	11,052	9,821	7,681	0.889	0.695
4. TEGARSARI	21	11	-	0.524	-	11,799	9,830	6,102	0.833	0.517
5. WONOKROMO	13	7	-	0.538	-	3,584	4,004	5,260	1.117	1.468
6. SAWAHAN	4	2	-	0.500	-	-	-	-	-	-
7. GENTING	695	690	678	0.933	0.976	1,942	3,985	23,779	2.052	12.245
8. ROMO KALISARI	862	1,095	1,317	1.270	1.528	-	1,023	10,552	-	-
9. SIMOMLYO	2,769	2,365	1,935	0.854	0.705	7,692	24,006	31,881	3.121	4.145
10. SEMENI	4,562	4,716	4,819	1.034	1.056	-	4,618	15,782	-	-
11. KARANGPILANG	5,438	4,911	4,332	0.903	0.797	7,763	14,273	21,464	1.839	2.765
12. WONOCOLO	1,402	1,176	938	0.839	0.669	6,348	7,366	10,522	1.160	1.658
13. GUBUNG	161	219	274	1.360	1.702	11,426	8,281	5,627	0.725	0.492
14. TAMBARSARI	536	269	-	0.502	-	10,455	13,844	15,782	1.324	1.510
15. NORTH SUKOLILO	1,361	1,664	1,950	1.223	1.433	747	955	1,052	1.278	1.408
16. SOUTH SUKOLILO	2,290	2,349	2,383	1.026	1.041	149	2,752	5,471	18.470	36.718
17. RUNCKUT	2,975	3,660	4,305	1.230	1.447	11,950	37,949	50,474	3.176	4.224
(1) Sub. Total (SURABAYA)	24,257	24,443	24,368	1.008	0.997	105,145	169,396	271,457	1.611	2.582
18. GRESIK	3,392	3,066	2,710	0.904	0.799	6,109	51,671	101,366	3.208	6.293
19. CERME	28,553	29,581	30,325	1.036	1.062	-	624	7,089	-	-
20. MENGANTI	19,401	19,773	19,955	1.019	1.029	-	624	7,089	-	-
21. DRIOREJO	11,374	11,573	11,660	1.017	1.025	4,510	9,155	24,243	2.030	5.375
(2) Sub. Total (Kab. GRESIK)	62,720	63,993	64,650	1.020	1.031	20,619	62,074	139,787	3.011	6.780
22. WARU	24,348	24,356	24,129	1.000	0.991	19,656	32,673	54,580	1.662	2.777
23. TAMAN	7,156	6,876	6,530	0.961	0.913	9,530	14,775	24,101	1.550	2.529
24. KRAN	8,976	7,458	5,869	0.831	0.654	2,025	5,611	16,587	2.771	8.191
25. SIDOARJO	28,556	29,244	29,650	1.024	1.038	5,003	16,983	52,739	3.395	10.541
26. WONOAYU	20,541	22,110	23,466	1.076	1.142	-	-	-	-	-
(3) Sub. Total (Kab. SIDOARJO)	89,577	90,044	89,644	1.005	1.001	36,214	70,042	148,007	1.934	4.087
27. KAMAL	10,039	9,129	3,132	0.909	0.810	981	11,644	25,519	11.870	26.013
(4) Sub. Total (Kab. BANGKALAN)	10,039	9,129	3,132	0.909	0.810	981	11,644	25,519	11.870	26.013
(5) Total (2)+(3)+(4)	162,336	163,166	162,426	1.005	1.001	57,814	143,760	313,313	2.487	5.419
GRAND TOTAL	186,593	187,609	186,794	1.005	1.001	162,959	313,156	584,770	1.922	3.588

	Tertiary					Grand TOTAL				
	1980	1990	2000	1990/1980	2000/1980	1980	1990	2000	1990/1980	2000/1980
1. TG. PERAK	28,978	29,490	52,166	1.018	1.800	48,833	51,113	95,786	1.047	1.962
2. KEDUNG COWEK	354	370	1,276	1.045	3.605	1,894	6,740	19,151	3.559	10.111
3. CANTIAN	171,655	244,611	309,428	1.425	1.803	182,718	254,437	317,109	1.393	1.736
4. TEGARSARI	257,354	366,484	463,376	1.424	1.801	269,174	376,326	469,478	1.398	1.744
5. WONOKROMO	21,003	38,031	53,825	1.810	2.563	24,600	42,042	59,085	1.709	2.402
6. SAWAHAN	30,396	35,082	38,646	1.154	1.271	30,400	35,084	38,646	1.154	1.271
7. GENTING	87	327	1,403	3.759	16.126	2,724	5,002	25,860	1.836	9.493
8. ROMO KALISARI	35	73	637	2.086	18.200	897	2,191	12,476	2.443	13.909
9. SIMOMLYO	5,229	7,263	14,795	1.389	2.829	15,690	33,634	48,611	2.144	3.098
10. SEMENI	620	523	6,632	0.844	10.697	5,182	9,857	27,233	1.902	5.255
11. KARANGPILANG	26,674	29,526	54,589	1.107	2.047	39,875	48,710	80,385	1.222	2.016
12. WONOCOLO	22,686	33,659	43,493	1.484	1.917	30,436	42,201	54,953	1.387	1.806
13. GUBUNG	17,281	24,253	30,357	1.403	1.757	28,868	32,753	36,258	1.135	1.256
14. TAMBARSARI	46,879	67,165	85,201	1.433	1.817	57,870	81,278	100,983	1.404	1.745
15. NORTH SUKOLILO	620	1,017	2,168	1.640	3.497	2,728	3,636	5,170	1.333	1.895
16. SOUTH SUKOLILO	1,063	2,106	4,719	1.981	4.439	3,502	7,207	11,573	2.058	3.305
17. RUNCKUT	1,950	2,796	5,740	1.434	2.953	16,875	44,405	65,519	2.631	3.883
(1) Sub. Total (SURABAYA)	632,864	882,777	1,168,451	1.395	1.846	762,266	1,076,616	1,464,276	1.412	1.921
18. GRESIK	45,893	106,670	157,994	2.324	3.443	65,394	161,407	262,070	2.468	4.008
19. CERME	1,778	2,485	31,384	1.398	17.651	30,331	32,690	68,798	1.078	2.268
20. MENGANTI	2,556	1,048	11,393	0.410	4.457	21,957	21,445	38,437	0.977	1.751
21. DRIOREJO	2,223	3,256	12,253	1.465	5.512	18,107	23,984	48,156	1.325	2.660
(2) Sub. Total (Kab. GRESIK)	52,450	113,459	213,024	2.163	4.061	135,789	239,526	417,461	1.764	3.074
22. WARU	11,446	23,165	50,515	2.024	4.413	55,450	80,194	129,224	1.446	2.330
23. TAMAN	4,334	5,613	10,748	1.295	2.480	21,020	27,264	41,379	1.297	1.969
24. KRAN	20,003	27,206	52,665	1.360	2.633	13,004	40,275	75,121	3.097	5.777
25. SIDOARJO	57,895	91,738	117,152	1.585	2.024	91,454	137,965	199,541	1.509	2.182
26. WONOAYU	3,667	7,260	15,692	1.980	4.279	24,208	29,370	39,158	1.213	1.618
(3) Sub. Total (Kab. SIDOARJO)	97,345	154,982	246,772	1.592	2.535	205,136	315,068	484,423	1.536	2.361
27. KAMAL	9,557	15,515	59,543	1.623	6.230	20,577	36,288	93,194	1.764	4.529
(4) Sub. Total (Kab. BANGKALAN)	9,557	15,515	59,543	1.623	6.230	20,577	36,288	93,194	1.764	4.529
(5) Total (2)+(3)+(4)	159,352	283,956	519,339	1.782	3.259	361,502	590,882	995,078	1.635	2.753
GRAND TOTAL	792,216	1,166,733	1,687,790	1.473	2.130	1,123,768	1,667,498	2,459,354	1.484	2.188

15.2 URBAN STRUCTURE PLAN IN SMA

15.2.1 ZONING SYSTEM

STRATEGIC DEVELOPMENT ZONES

The Study Team proposes a zoning system for urban development which is utilized to control as well as to encourage urban growth in an orderly system. Simultaneously an effective zoning system will contribute to the efficient execution of urban developments, and to the adjustment of sectoral developments.

Therefore, an appropriate zoning system should be authorized by some regulations or acts with an administrative control function. Based on the study results of the existing landuse, the process of urban growth, the urban development potential and so on, the Study Team proposes 5 categories of strategic development zones;

- Zone - I : to encourage the wide regional centre function,
- Zone - II : to improve the living environment by area development,
- Zone - III : to establish the new development areas,
- Zone - IV : to develop the sub-centres,
- Zone - V : to preserve open space and agricultural area and natural preservation areas.

Zone - I consists of four major functional zones, from the North: the port and port supporting zone; the wholesale and distributional business zone; the central commercial and business zone (CBD); and the new sub-central commercial zone (Sub-heart of the city).

Zone - II, located around Zone - I, is the urban area formed in accordance with urban growth. Most of the area has already been built-up, and includes the high density dwelling areas such as Kampung. Some areas need intentional developments such as redevelopment and improvement based on district planning.

Zone - III is located around the outside of Zone - II, and is provided for the future urban development. Sufficient priority should be given to the development of this zone, and above all, the intentional inducement of development should be undertaken with the development of the infrastructure prior to everything else.

The proposed ring road and the railway loop line are expected to function as the axes for such a strategic development. Zone - III will contain various projects such as industrial estates, distribution terminals, housing complexes (like New Town), community centres, large-scale recreation facilities, educational and administrative complexes and so on. Therefore, this zone should ensure the realization of most of the projects required in the future.

Zone IV is located outside of Zone III. Centring on the existing accumulation of urban facilities, the encouragement of the sub-centre function is desired in this area.

Zone V will function not only as a green belt but also the reservation area for the development beyond the year 2000.

INDUSTRIAL DEVELOPMENT ZONE

The general concept on zoning for industrial location was already described in the section 14.1.3. In that section, three categories were prepared:

- Zone where industrial development is restricted;
- Zone where industrial development is controlled; and
- Zone where industrial development is encouraged.

The zone to be developed actively for industrial area can be further classified into four types from characteristics of location:

- Coastal industrial zone (including port area);

- Airport industrial zone;
- Inland industrial zone; and
- Urban location industrial zone.

Generally, each zone has different characteristic incentives for the location of industry.

ZONING SYSTEM FOR CENTRAL AREA DEVELOPMENT

For the intentional encouragement of the central area, strategic zoning system is of necessity regulated. Major important policies are as follows:

- (1) To regulate the parking control district;
- (2) To set up the housing improvement districts;
- (3) To regulate the district to be redeveloped for the encouragement of commercial areas;
- (4) To regulate the port development district including the relevant facilities such as warehouses, industrial complexes, distribution facilities and some transportation facilities, etc.;
- (5) To regulate the preservation area from an environmental aspect.

Among these policies, the countermeasure of (1) against the parking congestion is one of the most significant policies. To cope with the coming motorized society, some consideration should be given to the parking system in the central area. For instance, the development standard for parking space has to be regulated to reflect the kind and floor area of buildings within the regulated area. The policy of (2), the housing improvement, is actually underway in Kampung Improvement Program. The areas to be improved should be defined in consideration of the long term prospect.

Major points of the above are summarized in Fig. 15.2.1.

5.2.2 STRUCTURE PLAN FOR SMA

PROPOSED PHYSICAL STRUCTURE PLAN

Considering the desirable image beyond the year 2000, the Study Team proposes the physical structure plan for SMA in the year 2000, as shown in Fig. 15.2.2 and 15.2.3. This structure indicates an ultimate stage when the self-supporting system to encourage the local socio-economic urban activities is established. A decision on whether or not all of these projects can be implemented up to the target year 2000, is performed in the financial study in Chapter 17 of Part IV.

Specifications for the projects referred by the number shown in the figures are summarized in Table 15.2.1.

The anticipated future expansion of urban use area and the characteristics of area development and some policies are summarized in Fig. 15.2.4.

The sectoral development policies discussed in Chapter 14 are integrated into the physical structure plan shown in these figures.

General outlines for development are as follows:

(1) Commercial Development

Concerning the encouragement of commercial functions, five areas are considered.

The first is to encourage the central commercial function in the centre of Surabaya city around the railway stations of Pasar Turi and Surabaya Kota. For this purpose, a deliberate redevelopment programme should be executed.

The second is to form a sub-heart district in the Wonokromo area centring on Joyoboyo Bus Terminal and the railway station of Wonokromo. This area will function as an important traffic node as well as a commercial and business district serving the expanding urban area in the south of SMA.

The third is to encourage activity centres. Major activity centres which are also sub-centres in SMA are Sidoarjo, Krian, Gresik, and Kamal, while other activity centres in community levels are Waru, Karangpilang, Tandes and Cerme.

The activity centre has not only a commercial function but also an industrial and social facilities function.

The fourth is to establish in an appropriate location a system of shopping activities in consideration of residents' needs.

The last is to develop the commercial areas in front of the major railway stations. Some of these are involved in the encouragement of the centres described before, however, some must be new developments corresponding to the development of the railway transportation system. Especially, Station Gubeng possesses high potential for commercial development. It is recommended that this area is intentionally developed so as to produce new urban amenity in SMA.

(2) Industrial Development

Five categories for industrial development are listed:

The first is to develop the port supporting area where the material production and process manufacturing related to the port are located. This development is necessarily executed in accordance with the expansion project of the Tg. Perak Port.

The second is to develop large scale industrial complexes as a policy of industrialization. The Study Team recommends that these be located in the Tandes and Waru areas.

The third is to promote the relocation programme of the existing factories which have unsuitable conditions or locations for their activities. Mainly, the factories surrounded by housing in the built-up area, and the factories with potential for, or actual, industrial pollution should be deliberately relocated to suitable areas prepared by the public authorities.

The fourth is to encourage the existing manufacturing factories including small scale factories by the development and improvement of industrial infrastructure such as water, electricity, roads and so on.

The fifth is to induce some pollution-free manufacturing process to establish factories in the urbanized area. From an industrial planning point of view, there are generally two policies; One is to make use of the accumulation effects of industries, and the other is to promote the dispersion of their locations. Generally, material manufacturing and assembly are suitable for the first policy, whilst the processing type and light industries are not necessarily suited to the first policy. An appropriate distribution of manufacturers of the latter type should be planned in the housing areas.

(3) Development of Freight Distribution System

Modernization and rationalization in the field of the freight system is remarkably important and systemization of material flow is a basic policy for modern urban management. Solution of urban traffic problems is strongly related to the establishment of this system. For the sake of this purpose, a terminal system should be provided in parallel with administrative consultation on the improvement of the management system.

In this context, the Study Team proposes the establishment of a cargo terminal functioning as a converter for freight traffic, by transferring the goods transported by large trucks or containers to small lot loads for inner-urban freight movement.

This cargo terminal will possess the relevant freight facilities such as warehouses, truck parking lots, markets, some commercial facilities and so on.

The locations of these terminals should be in the fringe areas of the central area such as Tandes and Waru.

Concerning the improvement of the freight system it is also necessary to consider the

utilization of the existing terminal of Sidotopo and the land produced by the planned relocation of the Sidotopo railway depot. The Study Team suggests that the Sidotopo cargo terminal be operated as at present until the establishment of the new system. After that, this terminal should be changed to a centre of an inner urban distribution system. Thus, it is recommended that the land, after relocation of the depot, should be utilized as a distribution centre for inner urban freight.

These facilities will be considered as the secondary system in the total freight system.

(4) Housing Development

The programme on housing supply and development should be established. In this programme, the following points should be considered with the aim that all citizens must be accommodated in permanent houses.

Housing development is classified into five headings as below:

— Quality of Houses and Residential Density

PERUMNAS already have a standard for houses supplied for the low-income group and developments have been executed with great effect. The development policy on the housing supply for the low-income group must be one of the most important policies until at least the year of 2000. It is correct that the quantity of supply is more important than the quality, but the improvement in quality should be considered in relation to the elevation of income level and the advancement of life style of the nation.

It is conceivable that the high density dwelling style is traditional Indonesian style, rooted in the spirit of mutual aid. However, it is acknowledged from planning experience that some spatial problems are likely to occur with the achievement of an appropriate development of living standard, if the gross density is more than 300 persons per hectare in the case of at-grade development. It is necessary that the residential density corresponding with the Indonesian way of urban dwelling should be studied in conjunction with the quality of houses.

— Development of Public Service Facilities

The relevant public service facilities for the housing development must be ensured. Essentially, primary schools should be provided for all communities. Moreover, the social and medical facilities and the infrastructure such as streets, pedestrian paths, water and electricity supply system, drainage system and so on should be developed according to the community level.

In order to avoid disorderly development, firm control should be exercised by the relevant administrative agencies, after effective regulations for the control have been promulgated.

— Land Supply System

The policy for the land supply should be taken into account in order to realize the plan. In particular, effective control of land price should be executed by the relevant administrative agencies.

— Role of Public Authorities for House Supply

According to the actual amount of houses supplied by the public bodies, around ten thousand units were supplied by PERUMNAS and around three thousand units were done by YAMASAN KAS PEMBANGUNAN KOTAMADYA SURABA (Y.K.P) within Surabaya city up to 1981. The rate of supply by public bodies is assumed to be around 2% of the total of existing houses.

The Study Team recommends that the supply rate by the public bodies should be 20% until the anticipated demand is satisfied. According to this target, large scale housing complexes are proposed, and for the sake of the achievement of this project, it is recommended that the Nodal Development System is promoted under administrative guidance, utilizing the power of the private sector.

Housing developments should be implemented in the form of community units, the

size of which should be the most efficient to develop the relevant public service facilities.

– Clearance of the Illegal Occupants

The clearance of the illegal occupants should be undertaken from a social welfare point of view. The programme of housing supply for low-income group should be linked to the policies for migration and labour force. In the sense of this meaning, facilities to accommodate some of the illegal occupants should be provided under the social development policy.

(5) Transportation Network System

The comprehensive transportation network system and development policies are identified in Fig. 15.2.5.

This consists of the following modal developments:

- Road Network System;
- Public Transportation Network System;
- Development of Port (Tg. Perak); and
- Development of Airport (Juanda).

Road Network System

Road Network System is composed of the primary, the secondary, and the tertiary network; the primary system contributes to the wide regional transportation and the secondary system is situated as the system serving the intra-city traffic. The tertiary system functions at the community level. Some roads occasionally have two function levels, however, basically one function should be separated from the others.

Furthermore, each system has a ranking order based on the connecting function. Roads connecting facilities with high function level should be evaluated to be arterial, and similarly the collector roads and the local roads should be evaluated according to their for orders of roads is necessary in considering priority for development.

In planning of a road framework such an orderly system is indispensable and one of the reasons is that the road development should be in accordance with the characteristics of the traffic. Another is that the inefficiency of urban activities caused by traffic congestion should be eliminated. Generally, a traffic jam is due to the mixture of traffic with different characteristics such as industrial traffic with long trip length, concentrated commuter traffic, residents' daily traffic with short trip length, and so on. An evaluation for orders of roads is necessary in considering priority for development.

Public Transportation Network System

The public transportation network system is an important transportation mode ensuring the urban socio-economic activities, and should be aggressively developed, not only in the urban area but also in the peripheral areas.

The existing transportation modes such as becak, bemo, colt, bus, and railway should be given their own roles to be performed in the public transportation sector, and should be encouraged according to their allotments.

From the transportation planning point of view, it should be discussed as to whether there exists the possibility and need for a new rail system in order to supplement the comprehensive public transportation system.

Development of Port

As mentioned repeatedly, the development of the port, Tg. Perak is one of the most significant policies. Especially the inter-modal distribution of cargo between international and inter-island traffic should be encouraged aggressively.

Simultaneously the supporting area should be developed with high priority. This area should possess not only a nodal function between sea and land transportation but also a major industrial function utilizing the advantageous location near the port.

The establishment of an export processing zone (so-called "Free Zone") within the supporting area should be also studied for its benefits and effects.

The need to encourage the port function will stimulate the future expansion in the direction of Gresik Port which will also perform a significant role to supplement Tg. Perak in the future.

Air Transportation

The progress of industrialization will require as much high level information as possible and the airport can function as an information source through the passengers.

In any advanced country, it is recognized that the demand for air transportation has increased in accordance with the progress of communication service and the information society. Considering such a function, the development of the airport as an international airport is indispensable for the future socio-economic activities.

(6) Recreation Facilities Development

Enrichment of recreational activities is a main planning subject and it is also an urban amenity in itself.

As a planning target, the level of development should be raised as high as possible, and the characteristics of those facilities should be based on the natural conditions.

Moreover, the integrated service areas of these facilities, is recommended to enable an access time of less than 30 minutes and should cover the whole area from a location planning point of view.

The proposed plan on the recreational facilities takes these into account, and community parks and urban amenity facilities as green areas, are planned based on a standard of more than 5 m² per resident.

(7) Major Public Facilities Development

The plan for major public facilities development is based on the following planning policies:

- Educational facilities development such as vocational schools and middle level education should be given high priority in the context of industrialization;
- The existing high educational facilities should be improved within their environment;
- Major medical treatment facilities with high technology should be developed in each sub-centre of Sidoarjo and Gresik.

The new development of a hospital inside Surabaya city has not been especially planned, because of lack of an appropriate location and it may be preferable, to upgrade the existing facilities.

(8) Urban Utilities System Development

An integrated plan for the development of an urban utilities system was based on the analysis in Section 14.6 and results are shown in Fig. 15.2.6. Main considerations in this plan are as follows:

- The countermeasure against the anticipated shortage of water should be developed as soon as possible. In consideration of an additional source of usage from Bengawan Sala, the intake, treatment and supply system was generally discussed.
- Seven solid waste treatment facilities are planned to be located outside the central area and coastal areas in consideration of their service areas.
- Concerning industrial waste, regulations should be developed that require each factory owner to treat it within his own site and by his facilities.
- A sewer system was considered, but the full service will be provided later than the year 2000. The treatment facilities are to be located near the solid waste treatment facilities.

Fig. 15.2.1






Surabaya Metropolitan Area

STRUCTURE PLAN


ZONING SYSTEM

LEGEND




ZONING FOR URBAN DEVELOPMENT

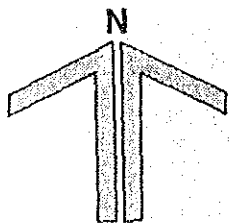
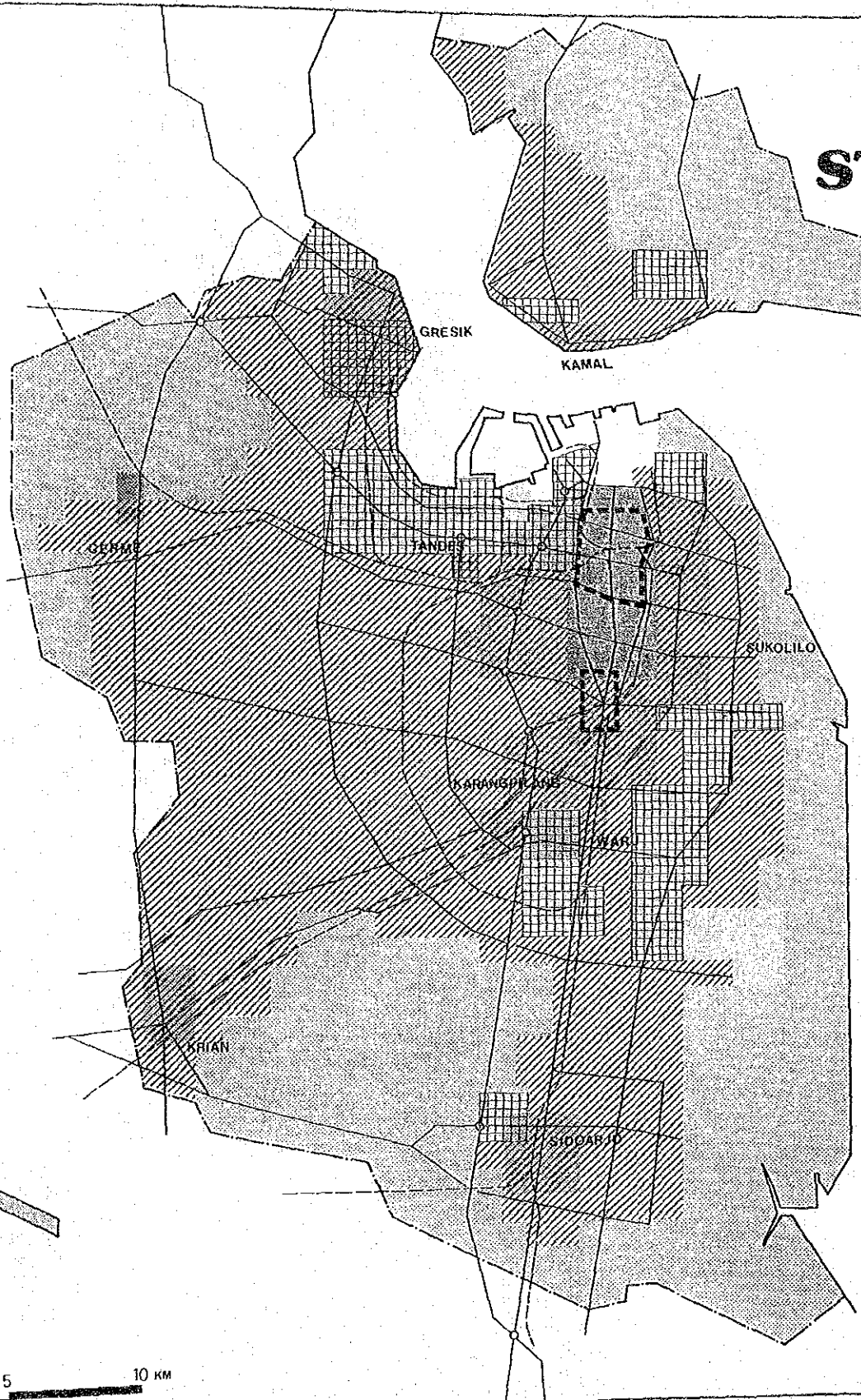
-  ZONE I TO ENCOURAGE THE WIDE REGIONAL CENTER FUNCTION
-  ZONE II TO IMPROVE THE LIVING ENVIRONMENT BY AREA DEVELOPMENT
-  ZONE III TO DEVELOP THE SUB-CENTER
-  ZONE IV TO ESTABLISH THE STRATEGIC AND INTENTIONAL DEVELOPMENT
-  ZONE V TO PRESERVE THE NATURAL AND AGRICULTURAL LAND FOR OPEN-SPACE

ZONING FOR TRAFFIC CONTROL

-  AREA PARKING CONTROL

ZONING FOR INDUSTRIAL DEVELOPMENT

-  ZONE A WHERE INDUSTRIAL DEVELOPMENT IS ENCOURAGED
-  ZONE B WHERE INDUSTRIAL DEVELOPMENT IS CONTROLLED
-  ZONE C WHERE INDUSTRIAL DEVELOPMENT IS RESTRICTED

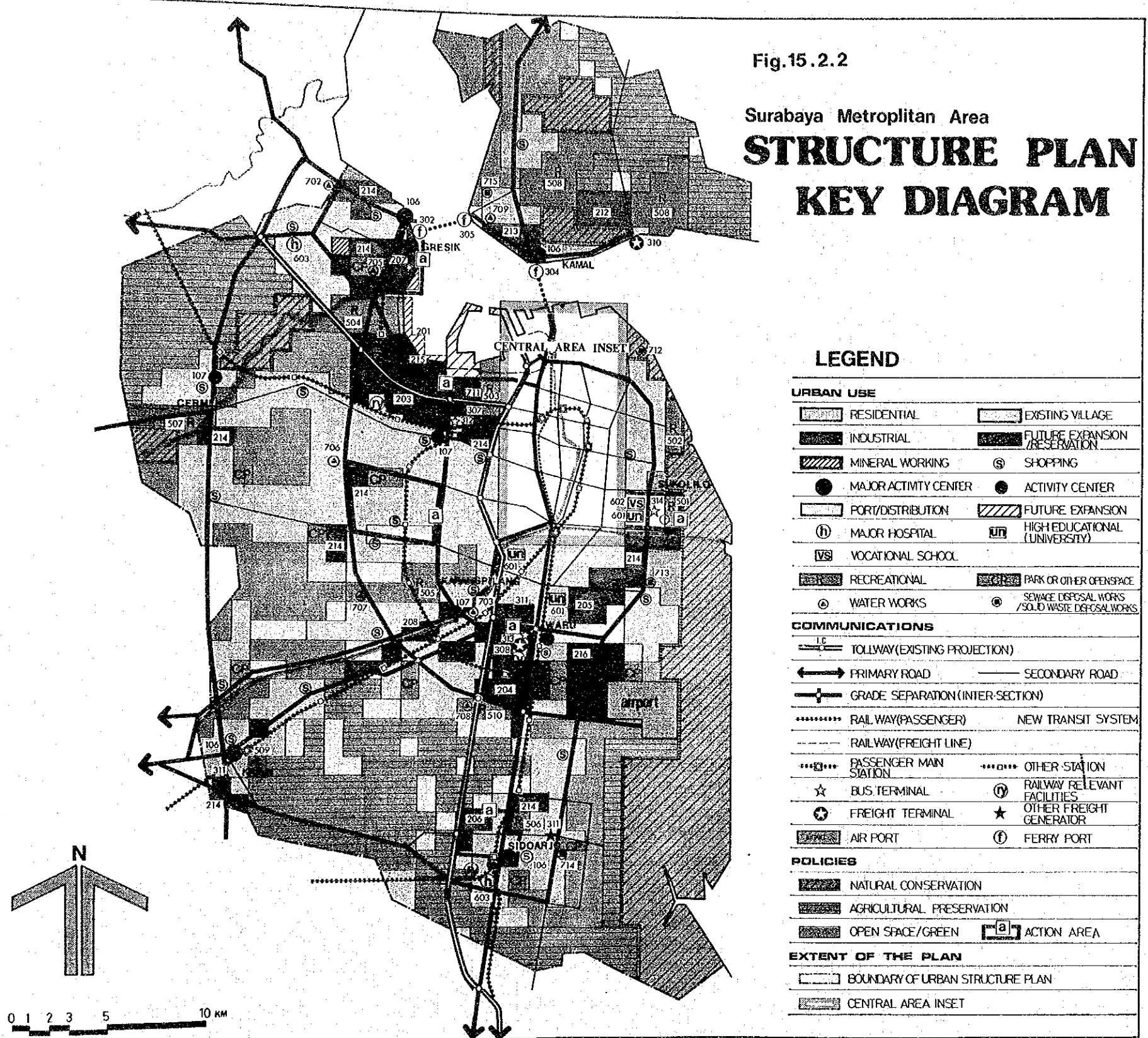


0 1 2 3 5 10 KM

URBAN DEVELOPMENT PLANNING STUDY ON GERBANGKERTOSUSILA
(SURABAYA METROPOLITAN AREA)

Fig.15.2.2

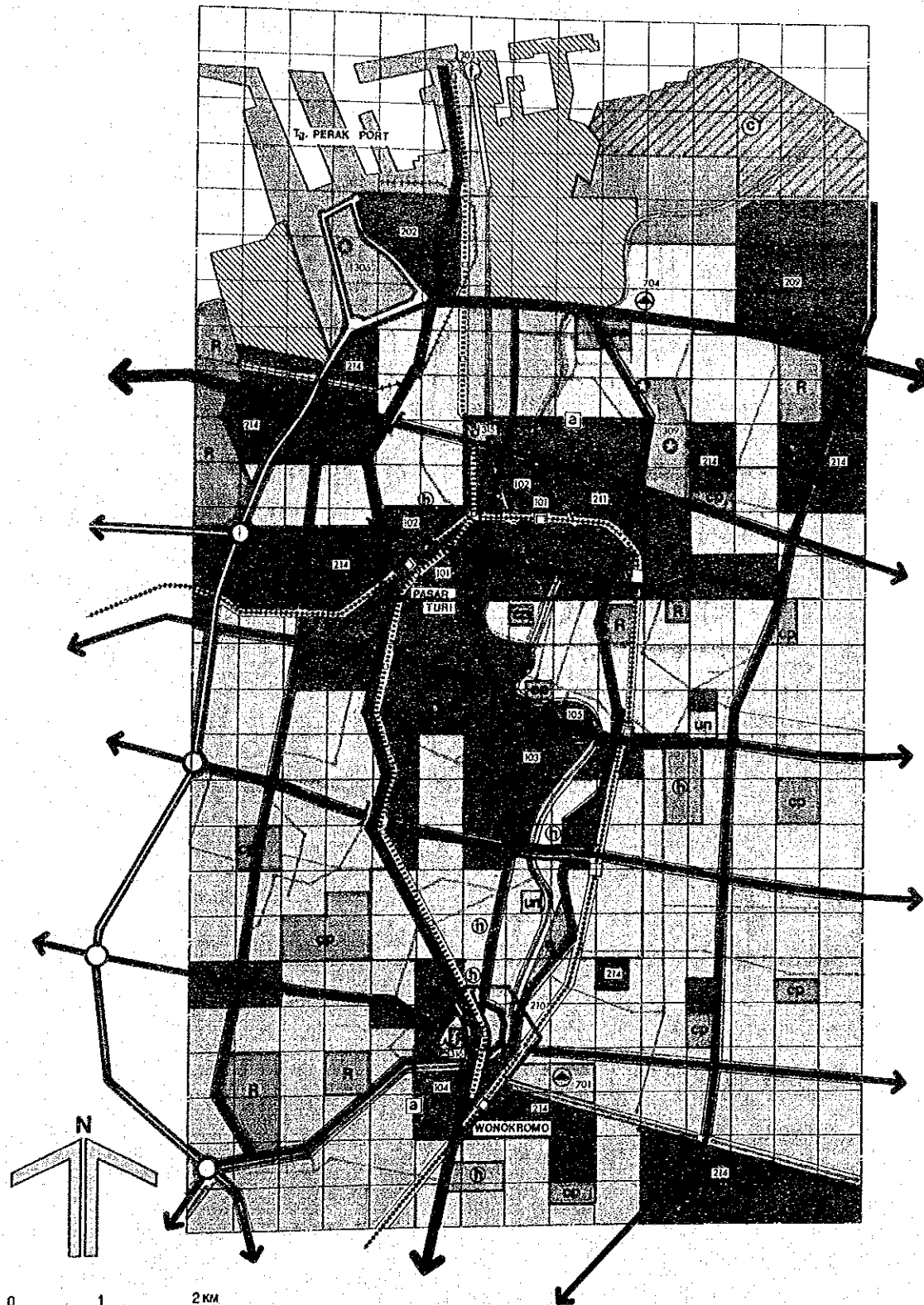
Surabaya Metropolitan Area
STRUCTURE PLAN
KEY DIAGRAM



URBAN DEVELOPMENT PLANNING STUDY ON GERBANGKERTOSUSILA
 (SURABAYA METROPOLITAN AREA)

Fig. 15.2.3

Surabaya Metropolitan Area
STRUCTURE PLAN
KEY DIAGRAM
(CENTRAL AREA)



LEGEND

URBAN USE

- COMMERCIAL
- BUSINESS & HOUSING
- HOUSING
- INDUSTRIAL
- WAREHOUSES
- PORT/DISTRIBUTION
- MAJOR HOSPITAL
- HIGH EDUCATIONAL
- RECREATIONAL
- PARK OR OTHER OPEN SPACE
- MILITARY
- WATER WORKS

COMMUNICATIONS

- TOLLWAY (EXISTING PROJECTION)
- PRIMARY ROADS
- SECONDARY ARTERIAL STREETS
- EXISTING STREETS
- GRADE SEPARATION INTER-SECTION
- RAILWAY (PASSENGER & FREIGHT LINE)
- RAILWAY (FREIGHT LINE)
- NEW TRANSIT SYSTEM
- PASSENGER MAIN STATION
- OTHER STATION
- BUS TERMINAL
- FREIGHT GENERATOR
- FERRY PORT

POLICIES

- NATURAL CONSERVATION
- OPEN SPACE/GREEN
- ACTION AREA

URBAN DEVELOPMENT PLANNING STUDY ON GERBANGKERTOSUSILA
(SURABAYA METROPOLITAN AREA)

Table 5.2.1 OUTLINE OF DEVELOPMENT PROJECTS PROPOSED
IN THE STRUCTURE PLAN

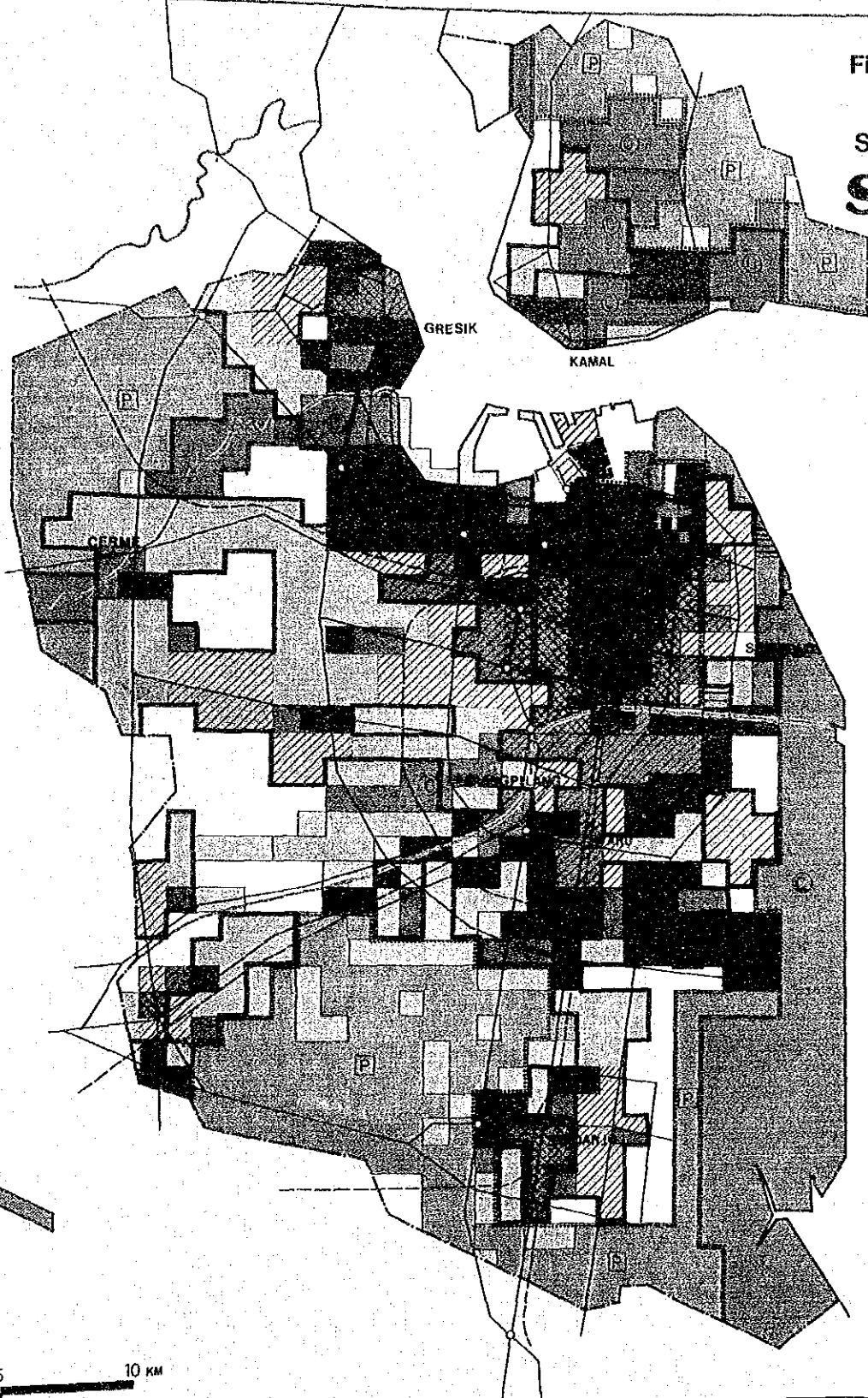
IDENTIFICATION OF LOCATION	PROJECT	LOCATION	OUTLINE OF PROJECT	NOTES	
COMMERCIAL DEVELOPMENT					
101	Redevelopment of Central Business District (Paser Turi and Kota Area)	Surabaya	- Encouragement of Central Commercial and Wholesale Function. Area Clearance and Rebuilding of Commercial and Business Facilities. (Around 25 ha)	It is assumed that the public body pays the development cost of relevant public facilities such as road expansion, parking space and utilities, and that the building cost is basically financed by the private sector.	
102	Improvement of Wholesale and Distribution Area	Surabaya	- Development of Warehousing and Wholesale area, including Road Expansion (about 3 km), Relocation of Warehouses, Land Adjustment, and Parking Areas.		
103	Improvement of Central Shopping Area	Surabaya	- Development of Shopping Environment by Street Improvement, Parking Lots Development and Tree Planting (along the major street, 4 km)		
104	Redevelopment of Central Business District (Sub-Urban Heart Development in Wonokromo)	Surabaya	- Area clearance and Rebuilding of Commercial and Business Facilities. (About 20 ha) - A drastic re-organization of inter-section is included in the context of this project.		Same as 101.
105	Development of Commercial Functions Around Railway Station, Cebung.	Surabaya	- Formation of Shopping and Business Core using the unoccupied land in front of Sta. Cebung.		
106	Encouragement of Major Activity Centers	Sidoarjo, Krian, Gresik, Kamal	- Renewal, Redevelopment and Improvement of the Built-up Industrial, Commercial and Residential Areas, including Parking Lot.		
107	Encouragement of Other Activity Centers	Waru, Karangpilang, Tandes, Cerme	ditto		
INDUSTRIAL DEVELOPMENT					
201	Port Area Expansion Project	Surabaya - Gresik	- Encouragement of Port Function in correspondence with future demand, including cargo distribution terminal, warehouses, industrial complex and so on	Beyond the year 2000	
202	Tg. Perak Port Supporting Area Development Project	Surabaya	- Development of Industrial Estate, Container yard, Distribution Facilities, Common Service Facilities and so on. (about: 250 ha)	Redevelopment and relocation of the existing houses is needed.	
203	Development of Tandes Industrial Complex	Tandes	- Industrial Estate for Middle and Large Scale Factories relating with the Port function (about 600 ha)		
204	Development of Waru Industrial Complex	Waru	- Industrial Estate for Middle and Large Scale Factories suitable for inland location (about 300 - 400 ha)		
205	Expansion of Rungkut Industrial Estate	Rungkut	- Industrial Estate for Middle and Small Scale Factories centering on the SIER. - Development of infrastructures for industrial activities.		
206	Development of Sidoarjo Industrial Estate	Sidoarjo	- Industrial Estate for Middle and Small Scale Factories relating with the Sidoarjo Inter-change. - Activation of industrial landuse development around the Inter-change.		
207	Development of Industrial Infrastructure in Gresik Coastal Area	Gresik	- Reclamation for new industrial location and Development of Infrastructures for industrial activities.		
208	Development of Industrial Foundation in Karangpilang area	Karangpilang	- Encouragement of the existing industrial activities - Development of Roads and Utilities and Land Adjustment - Environment Development by Tree Planting etc.		
209	Development of Cewek Industrial Estate	Surabaya	- Industrial Estate for Middle and Small Factories relating with the Port Function by land reclamation and adjustment.		

IDENTIFICATION OF LOCATION	PROJECT	LOCATION	OUTLINE OF PROJECT	NOTES
210	Industrial Relocation in Ngagel Area	Surabaya	- Promoting a relocation programme of the existing timeworn factories. - Utilization of the land produced by the relocation.	
211	Industrial Relocation in Kota Area	Surabaya	ditto	
212	Development of Large Scale Cement Factory	Kamal	- PT. CEMEN MADURA (around 400 ha)	On-going project
213	Development of Industrial Foundation in Kamal Coastal Area	Kamal	- Development of Industrial land for inducement of new location, and of infrastructures	
214	Improvement of Industrial Environment and Renewal, Redevelopment and Improvement of the built-up industrial area	SMA	- Development of infrastructure and land adjustment for inducement of new locations of the factories without industrial pollution.	
215	Future Expansion of Industrial Estate (Coastal Location)	Tandes	- Enlargement of the Tandes Industrial Complex developed, relating with the expansion project of the port, Tg. Perak.	Beyond the year 2000
216	Future Expansion of Industrial Estate (Airport-Side Location)	Sedati	- Reservation for the future development of Industrial Estate accepting the locations of Electron and Electric Manufacture.	
FREIGHT/DISTRIBUTION TERMINAL				
301	Relocation of Kali Mas Port and Redevelopment	Surabaya	- Relocation Programme of the Inter-Insular Port, Kali Mas Port to the Gresik Port. - Utilization of the land by Distribution Facilities such as Warehouses and Terminals	According to the existing programme
302	Development of the Gresik Port	Gresik	- Encouragement of the Gresik Port function by enlargement of the existing capacity and development of the relevant facilities as a major industrial port. - Enlargement of Ferry Transport Capacity.	
303	Development of the Surabaya Ferry Port	Surabaya	- Enlargement of the transport capacity as well as Improvement of the Wharf and the Relevant Facilities.	- To ensure this port as an important node of a major arterial road.
304	Development of the Kamal Ferry Port	Kamal	- Enlargement of the transport capacity as well as Improvement of the Wharf and the Relevant Facilities.	- Same as the Surabaya Ferry Port.
305	Development of the New Kamal Ferry Port	Kamal	- New Development of the Ferry Port linking with the Gresik Ferry Port	- To ensure this port as a major node of collector road.
306	Distribution Center Supporting Tg. Perak	Surabaya	- Development of Distribution Facilities Complex comprising Cargo Terminal, Container Yard, Warehouses, and Relevant Facilities.	- According to the existing programme.
307	Development of Tandes Cargo Terminal Complex	Tandes	- Distribution Facilities Complex comprising Truck Terminal, Warehouses, Market, Wholesalers Estate, Parking Lot of Trucks, Forwarding Companies Estate and Relevant Facilities. (around 60 ha)	- To function as a primary facilities in Cargo Distribution System.
308	Development of Waru Cargo Terminal Complex	Waru	- Same Function as Tandes. - A Distribution Center serving the southern areas	- ditto
309	Development and Enlargement of Sidotopo Cargo Terminal	Surabaya	- Encouragement of the existing terminal as one of secondary cargo terminals for intra-urban distribution and freight. - Utilization of the land produced by relocation of Railway Depot in the future as a major distribution center for an intra-urban freight.	- To adjust the development programme with the railway facilities development.
310	Development of Exclusive Industrial Port	Kamal	- Development by the Cement Factory located in Kamal.	- According to the existing programme.
311	Development of Local Markets and Distribution Centers for Agricultural Products	Waru, Sidoarjo, Krian	- The distributional connectors between the urban and the advanced agricultural hinterland.	
312	Tandes Inter-City Bus Terminal Development	Tandes	- The Major Bus Terminal for Inter-City Transport. The existing terminal, Jembatan Merah is to be relocated to this terminal.	- As a major connector between the city bus and the inter-city bus transportation.

IDENTIFICATION OF LOCATION	PROJECT	LOCATION	OUTLINE OF PROJECT	NOTES
313	Waru Inter-City Bus Terminal Development	Waru	- Same Function as Tandes Bus Terminal integrating the existing function of Joyoboyo Terminal.	- Joyoboyo Terminal is to function as a major city-bus terminal.
314	Sukolilo Inter-City Bus Terminal Development	Sukolilo	- Same Function as Waru and Tandes and the Major terminal in the eastern area of Surabaya.	
315	Development of Station Park of New Transit Node	Jumbatan Merah	- Development of a new transportation node of New Transit Node in the land produced by the relocation of the existing Bus Terminal. - Development of Community Park.	
316	Improvement of Joyoboyo Bus Terminal	Monokromo	- To transfer the function of inter-city terminal to Waru Terminal developed and improved as a major City-Bus Terminal.	
RECREATION FACILITIES				
501	Development in Sukolilo Area	Sukolilo	Agglomeration of Recreation Facilities comprising Sport Ground, Stadium and Large Scale Park.	
502	Development in Kenjerang Area	Kenjerang	Improvement and enlargement of the existing leisure facilities as a major Seaside Resort	
503	Development in the Port Side Area	Krebangan	A large scale Seaside Park utilizing the natural conditions such as pond and green.	
504	Development of the River Mouth of Kali Ramong Area	Gresik and Surabaya	Sport Facilities development in consideration of natural preservation.	
505	Development in Karangpilang Area	Karangpilang	Large Scale Natural Park consisting of Zoo, Botanical Garden, Leisure Facilities and so on.	
506	Development in Sidoarjo Area	Sidoarjo	Comprehensive Sport Park utilizing the existing facilities.	
507	Development in Cerme Area	Cerme	Natural Park in consideration of the preservation of River and Nature	
508	Development in Kamal Area	Kamal	Large Scale Resort Park as a core of tourism development.	
509	Development in Krian Area	Krian	Comprehensive Sport Park consisting of some sport facilities and green.	
510	Development in Waru Area	Waru	ditto	
MAJOR PUBLIC FACILITIES (REGIONAL FUNCTIONS)				
601	Encouragement of High Educational Facilities	Surabaya	- Enlargement of accommodation capacity and improvement of educational environment for the existing universities.	
602	Development of Vocational School	Sukolilo	- Industrial Skills Training Center, managed by the National Government.	
603	Development of Major Hospitals	Surabaya Sidoarjo Gresik	- Encouragement of the existing hospitals so as to enable a comprehensive medical treatment	
URBAN UTILITIES				
701	Ngagel			
702	Development of Water Purification Plant	Gresik	Capacity of 840,000 m ³ /day	
703	Development of Water Purification Plant	Waru	Capacity of 516,200 m ³ /day	
704	Development of Water Reservoir (Tank)	Surabaya	Effective capacity of 78,000 m ³	
705	Development of Waste Water Treatment Plant	Gresik	Max. Treatment Capacity : 305,000 m ³ /day	
706	Development of Water Reservoir (Tank)	Surabaya	Effective capacity of 139,300 m ³	
707	Development of Water Reservoir (Tank)	Gresik	Effective capacity of 39,000 m ³	
708	Development of Water Reservoir (Tank)	Sidoarjo	Effective capacity of 199,200 m ³	
709	Development of Waste Water Treatment Plant	Kamal	Max. Treatment Capacity : 77,000 m ³ /day	
711	Development of Waste Water Treatment Plant & Incineration Plant	Tandes	Water Treatment Plant Max. Capacity : 553,000 m ³ /day Incineration Plant Capacity : 900 ton/day	
712	Development of Wastewater Treatment Plant	Surabaya	Max. Treatment Capacity : 500,000 m ³ /day	
713	Development of Wastewater Treatment Plant & Incineration Plant	Surabaya	Max. Treatment Capacity : 340,000 m ³ /day Incineration Plant Capacity : 600 ton/day	
714	Development of Wastewater Treatment Plant & Incineration Plant	Sidoarjo	Water Treatment Plant Capacity : 524,000 m ³ /day Incineration Plant Capacity : 600 ton/day	

Fig.15 . 2. 4

Surabaya Metropolitan Area
STRUCTURE PLAN
DEVELOPMENT
SCHEME



LEGEND

URBAN USE

EXISTING	FUTURE EXPANSION	
		COMMERCIAL & BUSINESS
		HOUSING
		VILLAGE
		INDUSTRIAL
		EDUCATIONAL
		RECREATIONAL/COMMUNITY PARK
		AIR PORT
		HARBOUR & RELEVANT FACILITIES

HOUSING DENSITY

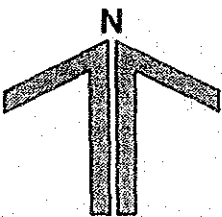
	HIGH DENSE RESIDENTIAL (MORE THAN 200 PPS/ha)
	MIDDLE (150-200 PPS/ha)
	LOW (LESS THAN 150 PPS/ha)

POLICIES

	NEW DEVELOPMENT
	IMPROVEMENT
	REDEVELOPMENT / RELOCATION
	CONSERVATION
	AGRICULTURAL PRESERVACION

EXTENT OF THE PLAN

	BOUNDARY OF URBAN STRUCTURE PLANNING
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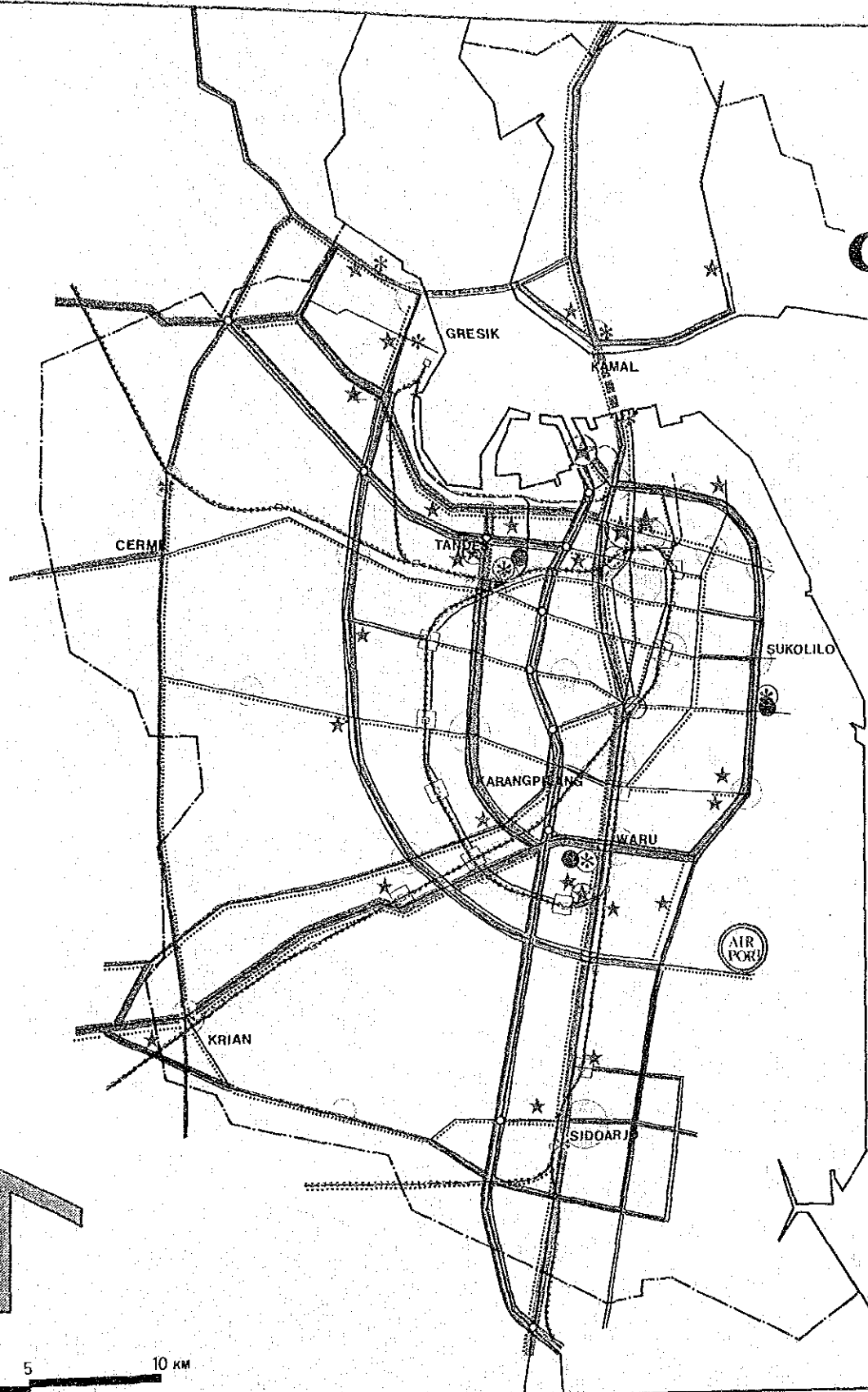
0 1 2 3 5 10 KM

**URBAN DEVELOPMENT PLANNING STUDY ON GERBANGKERTOSUSILA
 (SURABAYA METROPOLITAN AREA)**

Fig.15.2.5

Surabaya Metropolitan Area

STRUCTURE PLAN COMMUNICATIONS DIAGRAM



LEGEND

ROAD NETWORK SYSTEM

	TOLLWAY (EXISTING PROJECTION)
	PRIMARY ARTERIAL
	PRIM. COLLECTOR
	PRIM. LOCAL
	SECONDARY ARTERIAL STREET
	GRADE-SEPARATION INTER-SECTION

Policies

	NEW ROUTE
	IMPROVEMENT

RAILWAY SYSTEM

	PASSENGER/FREIGHT LINE
	FREIGHT LINE
	NEW TRANSIT SYSTEM
	PASSENGER STATION

Policies

	NEW ROUTE
	REHABILITATION
	TRACK ELEVATION
	NEW LOCATION
	RAILWAY / NEW TRANSIT MODE INTER-CHANGE

BUS SYSTEM

	INTER-CITY BUS TERMINAL
	MAJOR BUS STATION

Policies

	NEW LOCATION
--	--------------

OTHER INFORMATION

	PRIMARY FUNCTION (MAJOR FREIGHT GENERATOR)
	PRIMARY FUNCTION (MAJOR INDUSTRY)

POPULATION DISTRIBUTION

	400		200		100	thousand prs.
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EXTENT OF THE PLAN

BOUNDARY OF URBAN STRUCTURE PLANNING AREA

URBAN DEVELOPMENT PLANNING STUDY ON GERBANGKERTOSUSILA
(SURABAYA METROPOLITAN AREA)

Fig. 15.2.6

Surabaya Metropolitan Area

STRUCTURE PLAN

URBAN UTILITIES SYSTEM

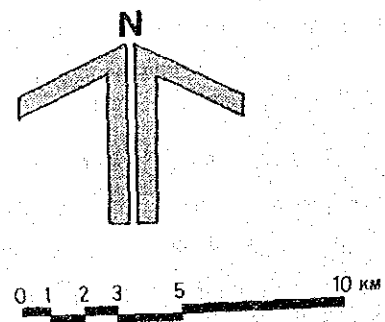
LEGEND

WATER SUPPLY SYSTEM

- ☒ WATER INTAKE
- ⊠ PURIFICATION PLANT
- ⊕ DISTRIBUTION POND
- TRANSMISSION PIPE
- ⋯ DISTRIBUTION PIPE

WASTE TREATMENT SYSTEM

- INCINERATION PLANT
- ⊙ COMPOST PLANT
- ▨ LAND FILL SITE
- △ WASTE WATER TREATMENT PLANT
- ▨ URBANIZED AREA



URBAN DEVELOPMENT PLANNING STUDY ON GERBANGKERTOSUSILA
(SURABAYA METROPOLITAN AREA)

MAJOR ACTION AREAS

The general conditions for the action areas proposed in the above plan are conceived as follows:

(1) Action for Industrial Development

– Tandes Industrial Complex

As a core of the industrialization policy, a large scale industrial complex is recommended for establishment in the Tandes area, utilizing the existing accumulation.

This complex should include the following facilities:

- Large Scale Industrial Estate (More than 300 ha)
- Cargo Terminal (around 5 ha. – 10 ha.)
- Warehousing (around 50 ha.)
- Container yard
- Commercial facilities
- Park
- Waste Treatment Plant
- Housing
- Passenger Terminal (Bus/Railway)

– Waru Industrial Complex

As a centre of an inland type industrial complex, a large-scale industrial complex is desirable in the Waru area so as to make use of the development effect of the Surabaya-Malang Tollway.

The complex is developed centring on the distributional function, and contains the following facilities:

- Cargo Terminal (around 9–15 ha.)
- Middle-Scale Industrial Estate (around 100 ha.)
- Perishable Foods Market/Distribution centre
- Merchandise Market
- Warehouse Estate
- Small-Scale Industrial Estate (For small factories)
- Park
- Housing
- Administrative Facilities
- Commercial Facilities
- Waste Treatment Plant
- Passenger Terminal (Bus/Railway for long distance transportation)

– Tg. Perak Industrial Complex

The expansion project of Tg. Perak is already under study financed by the World Bank. At present the feasibility study is nearing completion. Related with this project, the supporting area should be aggressively developed.

In this supporting area, the following facilities are required;

- Container yard
- Cargo Terminal related to the port function
- Industrial Estate (Export Processing Zone should be considered in this context.)
- Park and Public Social Facilities
- Passengers Terminal (Bus/New Transportation Mode)

– Gresik Coastal Industrial Zone Development

In order to make the best use of the existing industrial accumulation and to increase the potential for future development, the coastal area of Gresik should be improved including the port.

– Sidoarjo Sub-Regional Centre Development

The impact of the Sidoarjo I.C of Surabaya–Malang Tollway, should be utilized so as to enhance the industrial function of Sidoarjo. The area between the I.C and

the busy district, is recommended to be actively developed as an area to accommodate new factories. The scattered location of factories, which is at present observed, should be controlled.

– Rungkut Industrial Development

Centring on the existing industrial estate (SIER), this area is recommended to be further encouraged as an inland type of industrial zone.

In order to bring the capability of the existing accumulation into full, above all the infrastructure for access to the port and the I.C of Surabaya–Malang Tollway should be developed.

(2) Action for Enhancement of Commercial and Central Function

– Pasar Turi and Kota Area should be improved so as to bring a focus to the central function of the area in the context of the regional area to be administered.

Centring on the railway station, some redevelopment projects are recommended for consideration in the local plan.

– Wonokromo Area is also to be developed as a subheart of the city. The function as a significant transportation mode should be especially taken into account.

(3) Actions for Housing Development

– Park Town Project

The western hill area including Kod. Surabaya and Kab. Gresik is important in meeting the future demand for housing areas. The Study Team proposes that a park town project with around 300–500 thousand population be promoted under Government guidance, utilizing the private sector.

Park Town should be considered as a model of new housing development. Moreover, using this opportunity, some new housing development method or strategy to utilize the private sector should be considered. This would include regulation of land arrangement, rule of urbanization, firm standards of facility development, and so on.

The recommended park town consists of the following major facilities;

- Commercial Centre
- Housing with various type (For Low Income up to High Income; Single Storey Housing Types up to Multi-Storey)
- Recreation Facilities
- Abundant green and open space
- Bus and Railway Terminals
- Social/Educational Facilities
- Service Industry
- Small or Middle Scale Industrial Estate
- Waste Treatment Facilities
- Others

(4) Actions for Enhancement of Information Function

– Sukolilo Research Estate

The relocation for the Institute of Technology, Surabaya (I.T.S.) into this area is highly appreciated from an urban planning point of view.

Centring on this project, educational, institutional and administrative facilities should be collected into this area. Sukolilo Research Estate will support the urban activities on the side of technology and intelligence.

15.3 SUMMARY OF RECOMMENDATIONS FOR SECTORAL DEVELOPMENT

INDUSTRY

- Aggressive promotion of the development of the manufacturing sector.
- Encouragement of production of substitutes for import goods, especially processing and assembling type
- Aggressive inducement of kernel-type industries such as "ship building and repairing", "motor vehicles assembling and manufacturing" and "construction materials manufacturing"
- Strategy on encouragement of existing manufacture:
 - Preparation of suitable land for a factory relocation policy
 - Development of infrastructure serving the main industrial locations
- Strategy on encouragement of small-scale factories:
 - Development of a low interest loan system for modernization and rationalization
 - Development of industrial estates for mutual cooperation and consolidation with common facilities
 - Development of a training system for workers
- Development of productive skills so-called intermediate technology, in the traditional industries so as to provide a base for the modern industry
- Development of skilled man power through a vocational system,
- Establishment of a zoning and a guidance system for industrial location
- Aggressive promotion of industrial complex development for differing size and type of manufacture
- Land preparation and land development of about 3,270 ha up to the year 2000:
 - For new factory sites : 2,900 ha
 - For relocated factories : 350 ha
 - For small-scale factories consolidation : 20 ha

HOUSING

- Further execution programmes for KIP are expected.
- Establish a new improvement system, besides KIP or within KIP, such as a beneficial rates system, land consolidation system, urban redevelopment system, etc.
- Some landuse control system by the public sector should be prepared.
- The development programme for betterment, rehabilitation, or renewal should be made clear depending on an evaluation of existing conditions. Evaluation factors are safety, health, convenience and amenity.
- In the mixed areas, creation of open-space for living environment should be undertaken by arrangement of cubic use of land.
- New residential development areas should be undertaken based on a development rule and standard
- A planned way or system to sufficiently develop the necessary infrastructures using the limited government budget should be included in the development regulations and standards, utilizing private activities;
- For housing, the public sector should be the major supplier, especially for low income groups. Existing organizations such as PERUMNUS and Y.K.P. should be more encouraged.
- A recommended model housing development unit area is as follows:
 - Population : 30,000 persons
 - Land area : 150 ha

- Assumed development cost : about 18.5 billion Rp/unit (including roads and public facilities with secondary system but excluding housing cost.)
- Necessary portable water demand : 7.2 t/day/unit
- The development of 9,600 ha for new residential areas is assumed to be needed in SMA up to the year 2000.

SOCIAL SERVICE FACILITIES

- For commercial facilities development:
 - Comprehensive redevelopment in the area of Pasar Turi, Kembang Jepun and surroundings.
 - Development of business area in Wonokromo
 - Encouragement of the commercial areas of Gresik, Sidoarjo, Kamal and Krian as major activity centres and Waru, Tandes, Karangkilang, Cerme as activity centres
- In SMA, an educational and vocational function should be given high priority. The relevant public facilities to that function should be positively developed.
- The intentional allocation of recreational and leisure facilities should be developed using the existing natural resources and amenities.

TRANSPORTATION

- Re-organization of Road Network System
 - The proposal consists of two aspects. One is an appropriate composition for the primary road network to ensure the inter-regional road transportation. The other is that the secondary system in the city should secure effective urban transportation and achieve the development of various urban activities in the area.
- Development of Railway Network System
 - Railway transportation should be incorporated into a comprehensive urban transportation system.
- Improvement of Public Transportation System
 - The functions of the existing modes of public transportation should be incorporated into the total public transport system.
- Provision of Terminals
 - Terminal functions for passenger transport as well as freight should be placed in the transportation network.
 - The following terminals are recommended to be encouraged or developed:
 - Inter-city Bus Terminal (3 places)
 - Cargo Terminal (3 places, Tg. Perak, Tandes and Waru, for primary system, 1 place, Sidotopo, for secondary system in the urban area, and 3 places, Sidoarjo, Gresik and Krian, for sub-terminals of regional distribution)
 - Ferry Terminal (Surabaya and Kamal for expansion, and Gresik, Kamal for new development)

RIVER AND DRAINAGE

- Concerning river and rainage system improvements, the following are taken into account:
- Waterway planning for protection from salt water intrusion as well as reduction of the peak flood discharge in Surabaya and Sidoarjo
 - A new additional waterway and other relevant facilities should be developed in Kedurus River Basin.

- The Lamong river inundates at the lower reaches of Cerme, but this has little influence on the development of SMA.
- Existing secondary/tertiary system in Surabaya, Gresik, Sidoarjo and Kamal should be well maintained, and expanded for the future urbanization.
- Strengthening of canal maintenance work is indispensable.
- A "Coordination Board" for global water flow control should be established.
- Possibility of converting irrigation canals to drainage canals should be investigated.
- Implementation of a feasibility study on the above proposals is strongly recommended.

UTILITIES

(1) Water Supply

- New water source developments are indispensable to meet with the water demand up to 2000.

Necessary developments between 1990 and 2000 are:

- Sala river : 10 t/sec
- Surplus irrigation water in Surabaya and Sidoarjo : 6 t/sec
- 4 spring water supplies in Bangkalan : 0.15 t/sec

- The following should be undertaken in order to sufficiently develop water supply system:

- Coordination on water usage between irrigation and urban water
- Examination of the existing water usage
- Examination of the possibility of salt water use for industry

(2) Waste Water

- A night soil treatment system is to be established with a capacity of 27.4 t/day up to 1990, and with a capacity of 39.8 t/day up to 2000.
- A pilot project of waste water treatment should be executed in a linkage with housing development.
- Industrial waste water should be basically treated within the industrial site.
- Public toilet should be increased and construction of an additional 320 by 1990 and 550 by 2000, is assumed.

(3) Solid Waste

- An aggressive development programme should be established, based on the forecast of volume generation, 2,835 ton/day in 1990 and 5,067 ton/day in 2000.
- Development of a solid waste management system consisting of four sub-systems, collection, transportation, intermediate treatment and final disposal should be undertaken.
- Execution of master plan and feasibility study based on this Study is recommended.

(4) Electricity

- The anticipated peak demand in SMA is 1,383 MW in 1990 and 3,549 MW in 2000.
- A wide regional plan is necessary to ensure this supply in SMA by PLN.