JICA TR

REPUBLIC OF INDONESIA

FEASIBILITY STUDY

FOR

JAKARTA HARBOUR ROAD PROJECT

INTERIM REPORT

MARCH, 1981

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

This report shows the interim results of the work in Indonesia for the feasibility study on Jakarta Harbour Road Project. The Study Team have now completed our works in Indonesia of about seven months since our arrival in Indonesia on August 20, 1980 to carry out this Interim Report.

This report consists of two parts, the main Interim Report and the Appendix.

The results shown in this report will be further studied in Japan to carry out the Summary Draft Report in June, 1981 and the Draft Final Report in September, 1981.

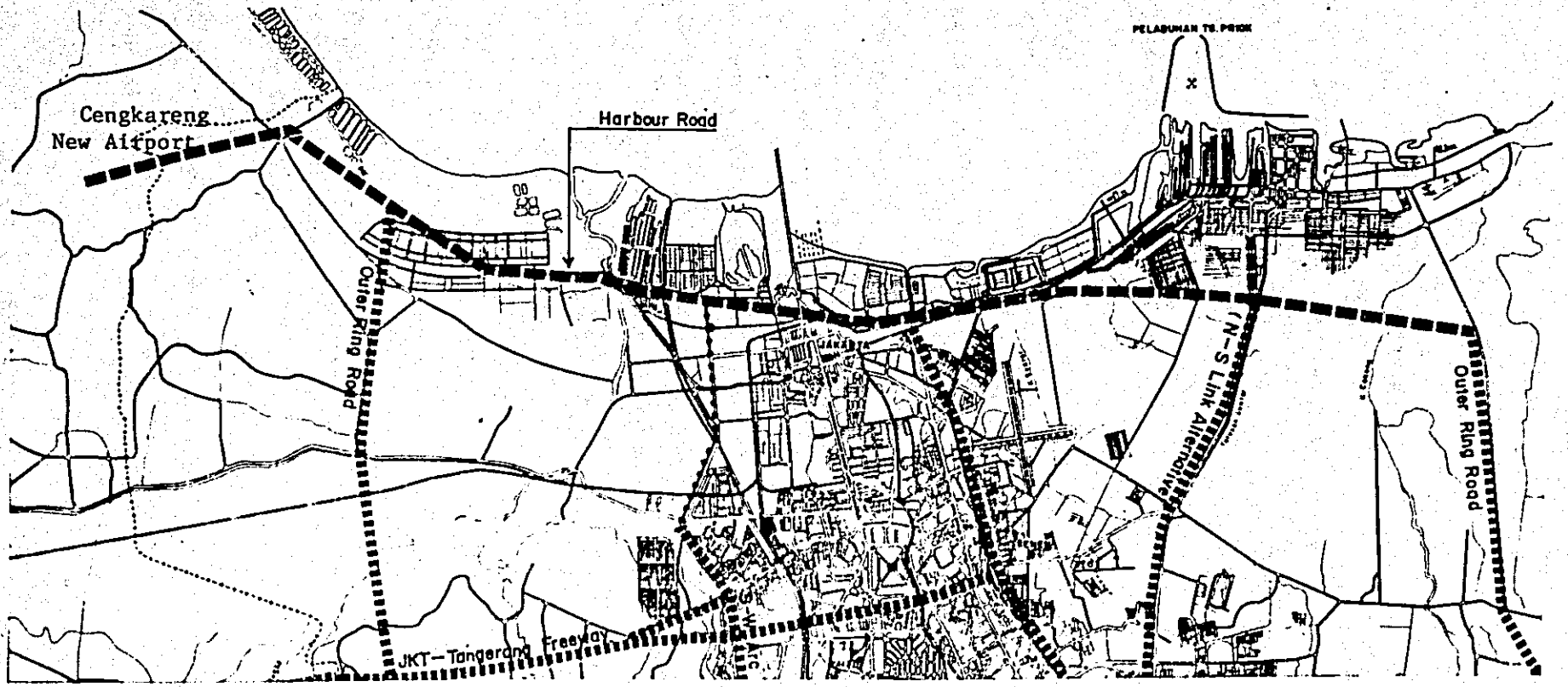
The Study Team hereby cordially express their hearty appreciation for the cooperation provided by various Government Agencies concerned in providing the necessary data and information and for their assistance during field surveys. The Team also appreciate the earnest cooperation by the counterpart staff at the office in carrying out the study.

Yours faithfully,

N. Yamakawa
Team Leader of JICA
Study Team for the Feasibility
Study on Jakarta Harbour Road Project

March 9, 1981.

PROJECT LOCATION MAP



: Project Road

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OF

THE INTERIM REPORT

FOR

JAKARTA HARBOUR ROAD FEASIBILITY STUDY

I. INTRODUCTION

1.1 Background of the Study

1.1.1 Introduction

The Government of Japan, in compliance with the request of the Government of the Republic of Indonesia (hereinafter called the "Government"), has agreed to undertake the Feasibility Study (hereinafter referred to as the "Study") on Jakarta Harbour Road Project (hereinafter called the "Project").

Based on this decision, the Japan International Cooperation Agency (hereinafter called "JICA"), an official agency responsible for the execution of the technical cooperation programs of the Japanese Government, was assigned to carry out the Study.

In February 1980, the JICA despatched a mission headed by Mr. Ichiro TANAHASHI to Jakarta for the preliminary survey as well as discussion on the scope of work of the forthcoming feasibility study.

Following this process, the JICA Study Team, headed by Mr. Nobuwaka YAMAKAWA mobilized to Jakarta on August 20, 1980 together with the Japanese Supervisory Committee for the Study. The team commenced their activities after the submission of the Inception Report and meetings to discuss it followed in accordance with the scope of works agreed upon by both the Government of Indonesia and the Government of Japan (Refer the attached Record of Discussions on meetings from 21 August to 30 August 1980).

The team has carried out their activities with Indonesian counterparts and prepared the Progress Report on November 1980.

The joint Meetings of both steering committees and the Study Team were held early December 1980 and gave some comments and suggestions to the Team. (Refer the attached Record of Discussions on meetings on December 8 and 9, 1980)

Respecting the meetings results and comments, the Team carried out the activities and prepared this Interim Report.
Following the submission of this Interim Report, it is scheduled that the joint meetings of both Steering Committees and the study Team will be held.
After there meetings, the JICA Study Team will leave for Japan and continue the activities in Japan as shown in the schedule chart in the Inception Report, while, in due course, Indonesian Counterparts will join the Team to carry out the activities in Japan for some period.

1.1.2 Background of the study

Jakarta City is the capital of Indonesia with the area of 650 square kilometers in 1980, which is about 0.03 percent of the total land area of the Republic of Indonesia.

The population of Jakarta City was six million in 1980 and its population growth is at a very high rate of 5.0 percent per annum compared with the national average of 2.3 percent per annum.

The rapid population growth in Jakarta from migration is considered to be due to greater opportunity for employment and to higher cultural and educational facilities.

The rapid urbanization in Jakarta inevitably entailed various urban problems, such as inadequacy of basic infrastructures, sprawling suburbs and sub-standard housing conditions, etc.

Due to the recent increase in vehicle traffic demand accompanying the regional development of Metropolitan Jakarta and West Java, traffic flows have greatly increased and the necessity for

strengthening the road network in the area has been anticipated for years.

In parallel with the improvement of street networks in Jakarta, the road in the southern corridor connecting Jakarta-Bogor-Ciawi, otherwise known as the Jagorawi Freeway, was open to traffic over the entire stretch in 1979.

Two other regional freeways from Jakarta to Tangerang (the first stage improvement of Jakarta-Merak Highway in the western corridor) and from Jakarta to Cikampek (a priority section of the future Trans Java Highway in the eastern corridor) are also scheduled to start construction in 1981.
In connection with the two circumferential roads, the feasibility study of the Outer Ring Road and Intra Urban Tollway were completed in 1978 and 1979 respectively. The South-West Arc of the Intra Urban Tollway components is presently under detailed design stage and some of its flyovers are to be constructed soon with Japanese OECF loan.
In addition to such development of the tollway network, the improvement of the existing harbour road has been expected from the viewpoint of urban and regional development progress in the project area as well as to solve the traffic management problems mainly caused by the port related traffic.

Tanjung Priok Port, located in the eastern end of the planned Harbour Road, is the largest sea port in Indonesia and handles the majority of the international trading goods (imported goods in particular). In the hinterland of the Tanjung Priok Port, an industrial complex of warehouses and cargo terminals are located to support not only daily needs in Jakarta, but also commercial and manufacturing industries in the West Java Area. Ancol recreation area and Kota district, a center of commercial and business activities in Jakarta, exist around the middle of the planned Harbour Road.
In the western end, Cengkareng New Airport is to be constructed and opened to traffic in 1984.

Under these conditions, the need has arisen to substantially improve the Project Road and to complete the missing link constituting a part of the Outer Ring Road and Intra Urban Tollway as well.
The solution of traffic management problems in the Project corridor is urgently awaited.

1.1.3 Objectives

The objectives of this study are to evaluate the technical, economic and financial feasibility of the project for approximately 35 kilometers of the planned Harbour Road as a tollway.
In due course of the study, the team will point out the traffic problems in the projected corridor and propose some alternative solutions to be taken by time staging to make the project more feasible or more realistic.

The Project Road to be covered by the study will include the following sections :

1)	Cilincing - Pluit	: about 18 km
2)	Pulit - Cengkareng New Airport	: about 15 km
3)	Tanjung Priok Access	: about 2 km
	Total	about 35 km

1.2 Basic Approach of the Study

1.2.1 General

In consideration of the characteristics of the Project, the following basic policy of the study will be adopted with an aim to fulfilling the objectives of the study without delay.

- From the characteristic of the Project, the study will be carried out in two phases. Phase I study will be conducted in Indonesia covering covering field investigation, data collection, socio-economic study, traffic survey and analysis, soils and materials testing, highway planning and engineering surveys.
  Alternative routes will be compared on the best route will be selected in the light of the cost estimation and other criteria.
  Future O-D tables will be forecasted based on the traffic survey.

  Phase II study will be conducted in Japan including traffic assignment, preliminary design of the bestroute and an implementation program. Total evaluation, including economic and financial evaluations, will be made in order to judge the feasibility of the Project.

- Execution of traffic survey:

  Jakarta Harbour Road will serve the traffic generated from its direct influence zones as well as the traffic from the feeder street and tollways. For more accurate future forecasting of traffic volume on the Project Road, four kinds of traffic counts and (home-interview survey, roadside O-D survey, traffic counts and vehicle running speed survey) have been conducted to supplement the existing traffic data and survey.

- Tollway consideration in the System:

  Jakarta Harbour Road will be planned as a tollway and the study will be conducted assuming that it is a part of Jakarta-West Java tollway system with emphasis on the time staging program.

- Close contact with the Government Agencies:

  Close contact with Bina Marga, DKI Jakarta and other relevant agencies will be kept for each crusial step of planning, especially for selecting routes.

  Recommended solutions will be given for traffic problems occurring in the corridor area, with a view to giving effective support to the project.
  Those urgent or intermediate solutions will harmonise with the longer - term plan for the toll road.

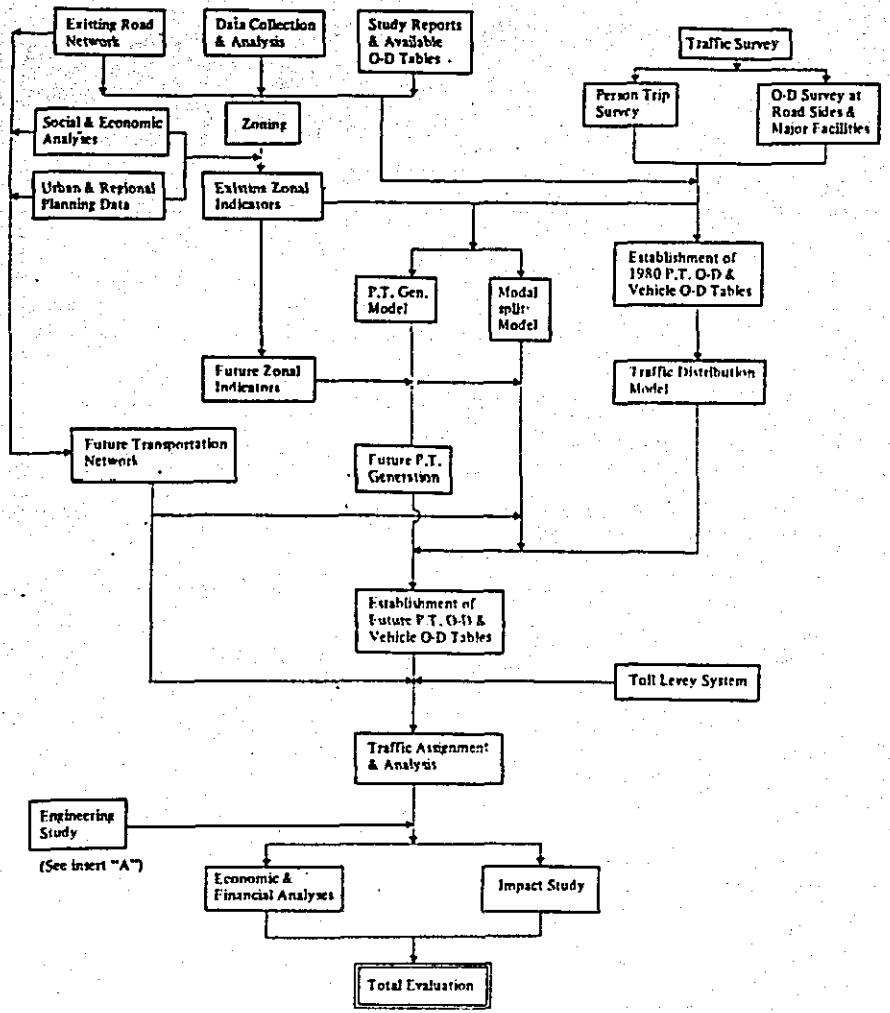
- The implementation program of the Project Road on the best route will be proposed so as to meet the future level of traffic demand and to maximize the effectiveness of investment. Construction stages will be determined considering the progress of implementation of the Jakarta-West Java Tollway System and Cengkareng Airport.

The conceptual work flow is shown in Fig 1-1

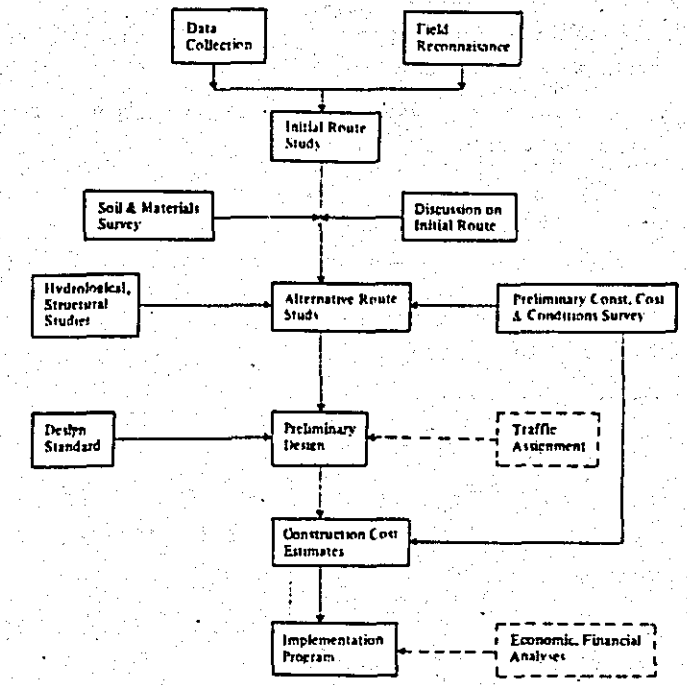
1.2.2 Organization for Implementation of the Study

The study organization is shown in Fig 2-2. As mentioned in previous section, JICA is responsible for the implementation of the study and JICA organized the Supervisory Committee and the Study Team as shown in Table 2-1.
Based upen the agreement between both Governments for this study, Indonesian Government also organized the Steering Committee and supplied the counterpart staff to the Study Team as shown in Table 1-1.

Fig. 1-1 CONCEPTUAL WORK FLOW



Insert "A" : Engineering Study



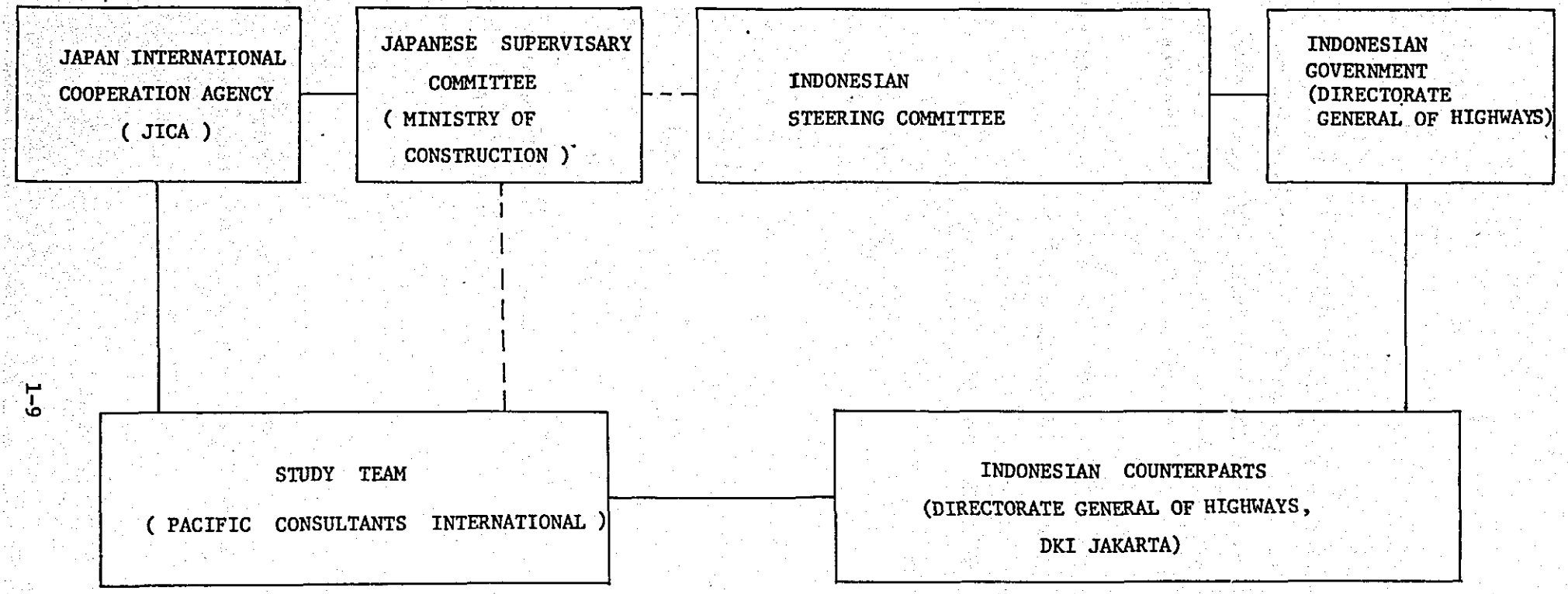
Members of Supervisory Committee (JAPAN)

Chairman	:	Mr. Ichiro TANAHASHI Director of Urban Planning Dept., Building Research Institute, Ministry of Construction
Committee Member	:	
(Urban Trasportation Planning)		Mr. Masamoto FUKAMI Deputy Director of City Planning Division, City Bureau, Ministry of Construction
(Transportation Planning)		Mr. Takashi YAJIMA Deputy Director of Street Division, City Bureau, Ministry of Construction
(Road Planning)		Mr. Yoshirato MASUDA Deputy Director of Local Road Division, Road Bureau, Ministry of Construction
(Toll Road Planning)		Mr. Hisakazu OISHI Deputy Director of Toll Road Division, Road Bureau, Ministry of Construction
(Coordinator)		Mr. Ichiro KUBOTA Social Development Cooperation Department, Japan International Cooperation Agency

Members of Study Team

Mr. Nobuwaka YAMAKAWA	:	Team Leader Transportation Planning/Economic & Financial Analyses PACIFIC CONSULTANTS INTERNATIONAL,
Mr. Fumimasa SUGIYAMA	:	Team Member City Planning/Environment PACIFIC CONSULTANTS INTERNATIONAL
Mr. Isamu GUNJI	:	Team Member Transportation Planning/Economic & Financial Analyses PACIFIC CONSULTANTS INTERNATIONAL
Mr. Hideo ARIKAWA	:	Team Member System Engineering PACIFIC CONSULTANTS INTERNATIONAL
Mr. Nobuhiro KOYAMA	:	Team Member Transportation Planning PACIFIC CONSULTANTS INTERNATIONAL
Mr. Tsuneyoshi JITSUHARA	:	Team Member Traffic Engineering PACIFIC CONSULTANTS INTERNATIONAL
Mr. Hidemoto NOJIMA	:	Team Member Road Planning PACIFIC CONSULTANTS INTERNATIONAL
Mr. Kunio SHIBATA	:	Team Member Structural Engineering PACIFIC CONSULTANTS INTERNATIONAL
Mr. Shosuke ITOH	:	Team Member Soil and Materials Investigation PACIFIC CONSULTANTS INTERNATIONAL
Mr. Shigeyoshi KURIHARA	:	Team Member Hydrological Engineering PACIFIC CONSULTANTS INTERNATIONAL
Mr. PARLINDUNGAN	:	Project Officer/Counterpart Highway Engineer Directorate General of Highways
Mr. ARIEF BUDIHARTONO	:	Counterpart Traffic Engineer Directorate General of Highways
Miss. SRI APRIATINI	:	"
Mr. SAHAT SIMORANGKIR	:	Counterpart, Highway Engineer Directorate General of Highways
Mr. JANUAR MARDI	:	Counterpart, Structural Engineer Directorate General of Highways.
Mr. IKA EFFENDI	:	Counterpart Urban Planner DKI Jakarta.

Fig 1-2 STUDY ORGANIZATION CHART



1.3 Scope of the Study

The study is consisted of two phases.
Phase I study covered the preparatory work in Japan by the Team and the studies in Indonesia together with Indonesian counterparts.
Phase II study covers the studies finalizing the Phase I studies in Japan including the training program of Indonesian counterparts in Japan.

In the conduct of the study, thefollowing work items has been and shall be undertaken both in Indonesia and in Japan.

1. Data Collection and Analysis

   a) traffic data

   b) social condition data

   c) economic data

   d) financial data

   e) engineering data (ex. geological, hydrological etc.)

   f) other data necessary for the following study

2. Traffic Studies

   a) review of population distribution and land use plan

   b) analysis and future forecast of traffic demand

   c) traffic assignment

   d) a package of traffic surveys

3. Selection of the Route

   An investigation will be undertaken for the purpose of selecting the best route among some alternative routes.

4. Design Standards and Preliminary Engineering Design

a) design standards

b) construction methods

c) preliminary design

d) field survey necessary for the preliminary design

5. Cost Estimation

a) right-of-way acquisition cost

b) construction cost

c) maintenance cost

6. Economic Evaluation

a) estimation of benefits

b) N.P.V., IRR. B/C

c) sensitivity analysis

7. Financial Study

a) investment cost

b) annual financial expenditure and total financial cost

c) revenue calculation

d) financial revenue cost ratio

e) repayment program

f) sensitivity analysis

8. Economic and Social Inpact Studies

9. Implementation Program

a) An implementation program will be prepared based on the construction program and the study of financial aspect

b) consistency with construction programs of some other roads

c) possibility of stage construction

d) selection of priority segment

The reporting on above work items has been and will be prepared in English and submitted to the Government of the Republic of Indonesia as follows :

1. Inception Report
   Twenty (20) copies on August, 1980

2. Progress Report
   Twenty (20) copies on December, 1980.

3. Interim Report
   - Twenty (20) copies at the end of the Study in Indonesia, on March, 1981.
   - The Government of the Republic of Indonesia will provide JICA with its comments within one (1) month after the receipt of the Interim Report.

4. Summary Draft Final Report
   Twenty (20) copies within eleven (11) months after the commencement of the Study, on July, 1981.

5. Draft Final Report
   - Twenty (20) copies within thirteen (13) months after the commencement of the Study, on September, 1981.

- The Government of the Republic of Indonesia will provide JICA with its comments within one (1) month after the receipt of the Draft Final Report.

6. Final Report
   Thirty (30) copies within one month after the receipt of the comments on the Draft Final Report from the Government of the Republic of Indonesia.

In order to carry out the study smoothly, the Joint Meeting between Indonesian side and Japanese side are held periodically to discuss the major results or points relating the study items.

II. BACKGROUND

As for the study, the situation and conditions of the project road, in broad sence, are very important to understand the role of the project road. In this chapter, the situations of DKI Jakarta and its suronding area, so-called Jabotabek area are explained.

2.1 DKI Jakarta

DKI Jakarta is the capital of Republic of Indonesia and the center of social and economic activities of the country.
She is divided into 5 wilayah (cities) and these cities are further divided into 30 Kecamatan which are in turn subdivedéd into 237 Kelurahan. (refer to Fig. 3.1 Administrative Zones)

2.1.1 Population

DKI Jakarta has 6239 thousand population which are 4,5% of the nation. The grouwth rate of DKI Jakarta is rather high because of the in-migration population, which shows 3,2% per annum, where the rate of growth for the nation is 1,9% per annum for this five years.
The population density shows high rate of 103 capita per heeters, which is about 145 times to that of the nation.

2.1.2 Economic Development

DKI Jakarta shows Rp.148,000.- per capita GRDP which is almost two times of per capita GDP of the nation in 1978.
Average rate of growth for this five years per capita Regional income of DKI Jakarta shows 7.20% per annum at year 1975 constant prices and 23.4% per annum at current prices, while the average rate of growth in per capita national income shows 4.8% per annum at year 1973 constant prices and 17,8% per annum at current prices.

The Characteristic of components of the gross regional domestic in DKI Jakarta are as follows;

1) Sector of whole sale and retail trade is reeping 47 to 48% of share for years.

2) Sector of manufacturing and Sector of public administration keep 10% of share respectively.

3) Agricaltural sector occupies only 2% of share and these lead that DKI Jakarta furnetions a centre of social and economic of the nation.

2.1.3 Motor Vehicles

Motor vehicles in DKI Jakarta are registered about 700 thousand in year 1980. About 60% of the vehicles are motorcycles and 30%, sedans, while 70% of the vehicles in Indonesia are motorcycles and about 20%, sedans. The annual growth rates of registered number of vehicles show 8,4% and 14,8% respectively in DKI Jakarta and in Indonesia.

The rates of car ownership show 104 and 21 vehicles per one thousand capita, while in Japan it shows about 300 including motorcycles.

The rates of sedan ownership show 31.3 and 3.9 for one thousand capita respectively while in Japan it shows 185.

Table 2-1 DEVELOPMENT OF ECONOMY IN DKI JAKARTA

	1973	1974	1975	1976	1977	1978
Population *1 (in Thousand)	5,142 (92,6)	5,336 (96,1)	5,554 (100)	5,856 (105,4)	5,959 (107,3)	6,094 (109,7)
GRDP (in Bil. Rupiah at 1975 lon stant prices)	829 (79,9)	922 (88,9)	1,037 (100)	1,152 (111,1)	1,260 (121,5)	1,344 (129,6)
Regional Income (In - Billion Rupiah at 1975 Constant Prices)	704	783	880	978	1,070	1,141
Per Capita Regional Income (Rupiah at 1975 Constant Prices)	137,000 (86,4)	146,500 (92,4)	158,500 (100)	167,000 (105,4)	179,500 (113,2)	187,500 (118,3)
No. of Registered Motor Vehicle	345,390 (70,7)	414,663 (84,8)	488,719 (100)	543,229 (111,2)	583,716 (119,4)	635,575
- Sedan	115,705 (75,9)	131,587 (86,3)	152,536 (100)	170,265 (111,6)	177,847 (116,6)	190,566
- Bus	7,696	8,554	9,819	10,976	13,444	17,132
- Truck	29,701	37,391	44,699	48,408	52,791	58,449
- Motorcycle	192,292 (68,3)	237,131 (84,2)	281,665 (100)	313,580 (111,3)	339,634 (120,6)	369,428 (131,2)
Car-Ownership Per 1.000 Capita *2	67,2 (29,8)	77,7 (33,3)	88,0 (37,3)	92,8 (39,2)	98,0 (41,0)	104,3 (43,7)
Sedan Ownership per 1.000 Capita	22,5	24,7	27,5	29,1	29,8	31,3

Note : Data Sources : DKI Jakarta Statistic Office, DKI Jakarta Metropolitan Police Office.

*1 : Population are adjusted to the area of DKI Jakarta at Present.

*2 : These figures in parenthesis are for car ownership rate excluding Motorcycles.

Table 2-2 DEVELOPMENT OF INDONESIAN ECONOMY

	1973	1974	1975	1976	1977	1978
Population (in mil.)	124.6 (95.4)	127.6 (97.7)	130.6 (100)	131.9 (101)	133.9 (102.5)	136.6 (104.6)
GDP 1) (in Billion Rp.)	6,753 (88,5)	7,269 (95,3)	7,631 (100)	8,156 (106,9)	8,761 (114,8)	939,2 (123,1)
National Income 2) (in Rp.)	5,74 (89,6)	6,076 (94,9)	6,404 (100)	6,860 (107,1)	7,343 (114,7)	783.9 (122,4)
Per Capita Income 3) (in Rp.)	46,073 (94.0)	47,616 (97.1)	49,035 (100)	52,009 (106.1)	54,835 (144.9)	57,375 (165.9)
Per Capita Income at current prices	46,073 (56,0)	70,987 (86,3)	82,280 (100)	101,120 (122,9)	119,223 (144,9)	136,509 (165,9)
Export (x 1000 tons) P.C.B. value in million US $)	77,763 (106,2) 3211	80,892 (110,5) 7421	73,215 (100) 7103	83,722 (114,4) 8547	95,302 (130,2) 10,853	101,267 (138,3) 11,643
Export (x 1000 tons) value in million US $)	9,954 (95,7) 2729	10,458 (100,6) 2842	10,397 (100) 4770	12,056 (116,0) 5673	13,925 (133,9) 6230	13,349 (128,4) 6690

Note : Figures in parentheses show index over year 1975.
1), 2), 3) at year 1973 constant prices

Course: STATISTICAL YEARBOOK OF INDONESIA, - Biro Pusat Statistik, Jakarta.

Table 2-3 . SOCIAL AND ECONOMIC SITUATION IN 1978

	Indonesia	DKI Jakarta	West Java
Population (x 10^3)	136,631 (100)	6,094 (4.5)	24,671 (18.1)
Area (KM2)	1,919,443 (100)	590 (0,03)	46,300 (2.4)
Population Density (Capital/KM2)	71 (100)	10,329 (14,548)	533 (751)
Average of Household	4.9	5.3	4.5
GDP/GRDP 1) (in Bil.Rp)	9,392 (100)	901 (9.6)	1,344 (14.3)
Per Capita GRDP 2) (in Rp)	69,000 (100)	148,000 (214)	55,000 (80)
Number of Registered Vehicles	2,822,559 (100)	635,575 (22.5)	403,461 (14.3)
Car Ownership per 1,000 capita	21.1 (100)	104.3 (494)	16.3 (77.3)
Car Ownership per 1000 capita Excluding Motor-Cycle	6.8 (100)	43.7 (643)	6.5 (95.6)

Source : Statistical Year book of Indonesia
Statistical Yearbook of DKI Jakarta

Note : 1), 2): at Year 1973 Constant prices

Table 2-4 REGISTERED NUMBER OF MOTOR VEHICLES

	INDONESIA	DKI JAKARTA	WEST JAVA
1976			
Total	2,103,383	543,229	215,906
Sedan	420,945	170,265	54,680
Bus	40,001	10,976	3,424
Truck	223,062	48,408	30,895
Motorcycle	1,419,375	313,580	126,907
Car-ownership Rate per 1000 Capita.	16,1	92,8	9,0
1977			
Total	2,511,367	583,716	355,332
Sedan	479,335	177,847	85,941
Bus	48,089	13,444	4,701
Truck	278,979	52,791	50,559
Motorcycle	1,704,964	339,634	214,131
Car-ownership Rate per 1000 Capita.	18,7	98,0	14,6
1978			
Total	2,882,559	635,575	403,461
Sedan	532,299	190,566	96,774
Bus	58,365	17,132	6,100
Truck	331,658	58,449	59,226
Motorcycle	1,960,237	369,428	241,361
Car-ownership Rate per 1000 Capita.	21,1	104,3	16,3
1979			
Total	3,181,874	692,817	
Sedan		202,781	
Bus		21,655	
Truck		64,713	
Motorcycle		403,668	
Car-onership Rate per 1000 Capita.		111,0	

2.2. Jabotabek Metropolitan Development Plan

2.2.1 General

Jabotabek Metropolitan Development plan (JMDP) was drafted by Cipta Karya, Ministry of Public Works after reviewing the plans prepared by the Governments of DKI Jakarta and West Java Province. The Project area is shown in Fig.2-1.
This study has tried to indentify the critical tools to implement the expansion strategy of the area and to prepare a preliminary investment programme and sectoral policies for review by the Government.

2.2.2 The Metropolitan System Policy Proposed

The Metropolitan System comprises of Jabotabek area excluding Bogor city. (Kota Bogor). This Metropolitan System would have the following characteristics.

a) It would comprise the Main Centre and complementary Main and Secondary Sub-centres.

b) These centres would develop interdependent functions within the system and would accommodate the same functions relating to their immediate equivalent hinterland.

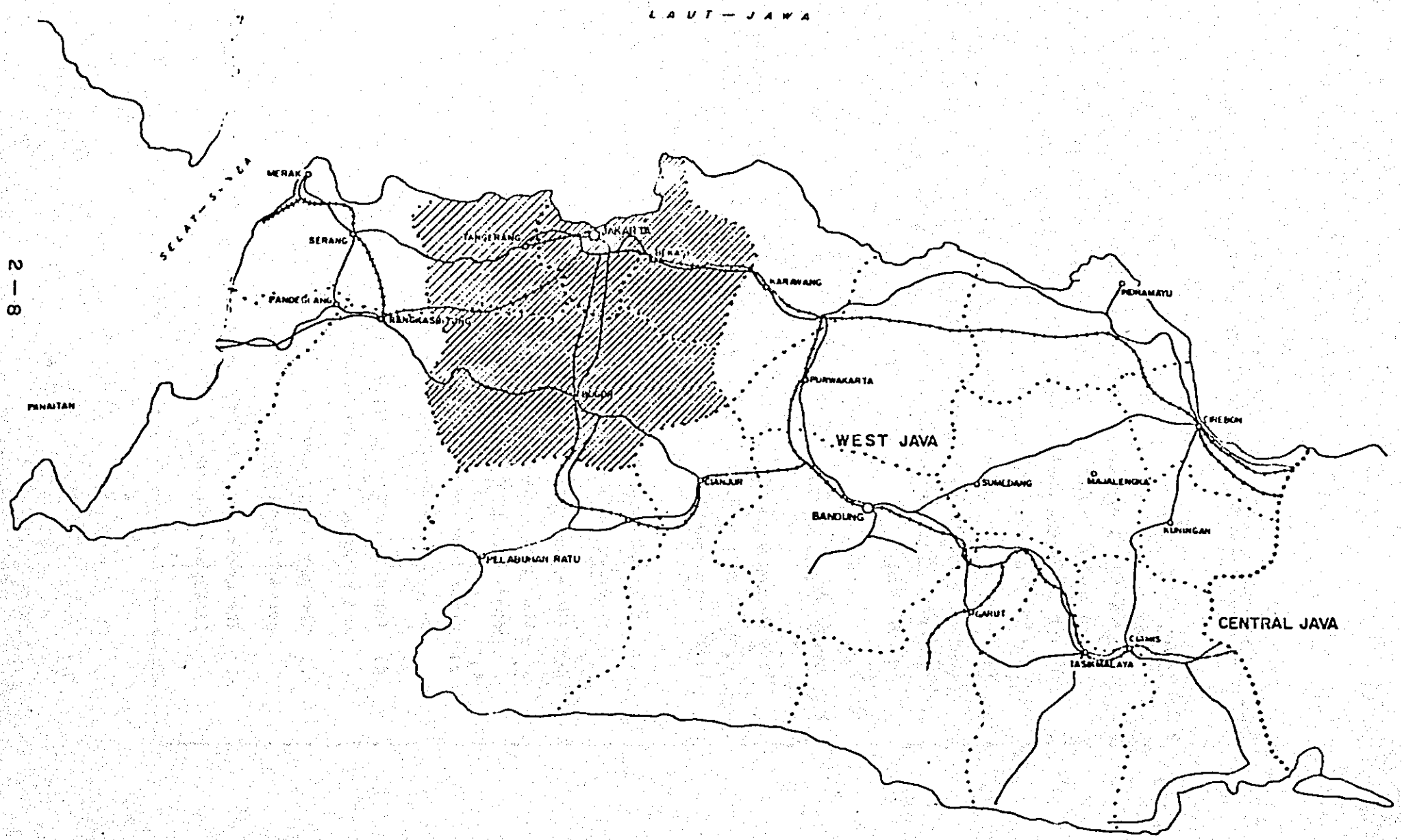
c) These centres would develop independently in space given that appropriate network linkages are undertaken.

d) The Main Centre will continue to attract the majority of regional and national service function.

e) The sub - Centre will attract the rest of regional and national service functions.

f) The centres within the system will require strong physical linkages in network.

Fig. 2-1 JABOTABEK AREA .



The objectives of the regional development of the area were listed as follows.

(1) accelerate the level of economic growth in the Botabek Kabupatens relative to that of DKI Jakarta, and as a consequence activate a greater degree of intra-regional equity.

(2) accelerate the level of economic growth in other regions of the nation, and as a consequence reduce the growth in Jabotabek and particularly DKI Jakarta, to achieve a greater degree of inter-regional equity.

(3) promote the economic and social betterment of the urban and rural poor of the regional.

(4) ensure the protection and development of key environmental resources, particularly the water cycle, and ensure equity of use for agricultural and urban purpose; and increase the availability to the urban poor.

(5) ensure equitable access to improved transportation within the region such that farmers and industrialsts alike can benefit from a widened market opportunity.

(6) accelerate the creation of non-farm employment opportunities in rural areas to augment farm incomes.

(7) accelerate the improvement of health and education services in Botabek and rural service centres so as to improve social conditions.

(8) increase efforts to achieve self-sufficiency in agricultural produce for the urban and rural population growth of the region.

(9) improve the financial and administrative capabilities of the kabupatens of Botabek in order to undertake and manage development growth.

(10) increase the recovery of development costs from the household and the firm while keeping public investment in such development expenditures to a minimum practical level.

Further, the study clasifies
And further, it clarity the key objectives for DKI Jakarta development as follows;

1. improve regional distribution services and induce its development to ensure the functioning of the regional development mechanisms of Metro Jakarta.
2. relieve further the population increase in DKI Jakarta by inducing higher than normal rates of population growth and employment creation in the main sub-centres of Metro Jakarta.
3. guide and induce development into preferred geographical zones away from environmentally sensitive zones, and make these development mechanisms complementary where possible.
4. relieve pressure on the environmental conditions, particularly those for low income urban households, so as to undertake the needed short term improvements, and ensure long term environmental protection of key resources (in particular the water cycle).
5. generate the creation of sub-regional service centres away from DKI Jakarta (in particular for kabupatens Tangerang and Bekasi) so as to provide more comprehensive services to the local kabupaten population.
6. accomplish the above at the least possible public cost with maximum utilization of private development capital and minimum practical levels of short term commuting into DKI Jakarta.

It also mentions objectives of restricted development for certain areas as follows;

(1) to relieve overcrowding and worsening environmental health conditions in the northern areas of the city.
(2) to indentify ways to minimize the use of ground water in the north of the city, and safeguard ground and surface water sources from the south.

(3) to minimize the rate of urban growth in the north-east and north-west of the city and in environmentally sensitive areas in the south of the city.

2.2.3 Jabotabek Development Framework

JMDP proposals for the framework of the area, are summarized in Table 2-5.

Table : 2-5. REGIONAL FRAME OF JABOTABEK METROPOLITAN DEVELOPMENT PLANNING

(Unit : 1000)

Job & Employment level by region	1978			1993			2003		
	Population	Jobs	Employed Population	Population	Jobs	Employed Population	Population	Jobs	Employed Population
JAKARTA Av.Ann.GR	6,005.1 (-)	1,911.8 (-)	1,868.1	9.720.0 (3.26%)	3,320.8 (3.75%)	3,251.3	11,315.0 (1.53%)	4,785.3 (3.72%)	4,647.3
BOTABEK : Av.Ann.GR	4,485.4 (-)	1,446.3 (-)	1,490.0	7,656.0 (3.63%)	2,491.4 (3.69%)	2,560.9	9,475.0 (2.15%)	3,753.4 (4.18%)	3,891.5
Tangerang Av.Ann.GR	1,257.2 (-)	383.6 (-)	397.2	2,041.0 (3.28%)	657.9 (3.66%)	682.7	2,819.0 (3.28%)	1,105.5 (5.33%)	1,157.8
Bekasi Av.Ann.GR	949.7 (-)	303.9 (-)	317.9	1,712.0 (4.00%)	552.5 (4.07%)	572.7	2,258.0 (2.81%)	870.7 (4.65%)	927.4
Bogor Av.Ann.GR	2,278.5 (-)	758.8 (-)	774.9	3,903.0 (3.65%)	1,281.0 (3.55%)	1,305.0	4,398.0 (1.20%)	1,775.2 (3.32%)	1,806.3
JABOTABEK	10,490.5 (-)	3,358.1 (-)	3,358.1	17,376.0 (3.42%)	5,812.2 (3.72%)	5,812.2	20,790.0 (1,819)	8,538.8 (3.92%)	8.538.8

Job & Employment ratio by region	1978			1993			2003		
	Job Ratio1/	Emp.Ratio2/	Emp.Balance Ratio3/	Job Ratio	Emp. Ratio	Emp.Balance Ratio	Job Ratio	Emp. Ratio	Emp.Balance Ratio
Jakarta	0.3184	0.3111	1.0235	0.3416	0.3345	1.0212	0.4229	0.4107	1.0297
BOTABEK :	0.3225	0.3322	0.9708	0.3254	"	0.9728	0.3961	"	0.0297
Tangerang	0.3052	0.3160	0.9658	0.3223	"	0.9635	0.3922	"	0.9550
Bekasi	0.3302	0.3347	0.9866	0.3225	"	0.9641	0.3865	"	0.9411
Bogor	0.3330	0.3400	0.9794	0.3282	"	0.9812	0.4036	"	0.9827
JABOTABEK	0.3201	0.3201	1.0000	0.3345	"	1.0000	0.4107	"	1.0000

Note : 1/ : Jobs/Pop. 2/ : Emp.pop/pop. 3/ : Jobs/Emp.Pop.

2.3 Land Use Plan of DKI Jakarta

An authorized landuse plan of DKI Jakarta is the "Jakarta Masterplan 1965-1985". In order to reflect the present landuse situation and its development trend are making the masterplan too small in some respects and the Government of DKI Jakarta has been modofying or streamlining respecting the actual proceedures and trends.

2.3.1 Present situation of land use in DKI Jakarta

The land use map, which is an intermediate product by DKI Jakarta Office, is used for the measurement by classification of land use as shown resultantly in the following table.

Table 2-6 DKI JAKARTA LANDUSE, 1977

Land use Measured on Maps of "DAERAH KHUSUS IBUKOTA JAKARTA by DINAS TATAKOTA"		LAND USE CLASSIFIED FOR ALLOCATION OF ZONAL PLANNING PARAMETERS	
LAND USE	AREA	LAND USE	AREA
Commercial Mixed Use Public Facilities	784 858 1,854	Commercial/ Administrative	3,494
Ware House Manufacturing	246 1,297	Industrial	1,543
Residential	19,899	Residential outside Kampungs Kampungs	12,061 7,838
Green Recreational Lake, Swamp	39,380 211 877	Agricultural Green	28,101 12,367
T o t a l	65,406	T o t a l	65,406

Commercial and administrative areas in 1977 amount to about 5.4% of the total DKI Jakarta area and they are concentrated in the CBD. Elsewhere, they are now beginning to appear along major arterials, Jl. Gatot Subroto, Jl. Sudirman, Jakarta By-Pass etc. along major regional highways, Jakarta-Tangerang, Jakarta-Bogor, Jakarta-Bekasi etc. and in the peripheral areas along the future Outer Ring Road.

Industrial areas, 2.4% in 1977, are concentrated mostly in Pulo Gadung, east of the city center. Areas for various light industries without obnoxious effect on the surroundings are planned around interchanges of the Outer Ring Road and radial highways such as Jakarta-Tangerang, Jakarta-Bogor and Jakarta-Bekasi. Residential areas, 30.4% in 1977, are penetrating mostly into the underdeveloped rural areas in the west and the south-west directions. They are also being developed massively in the east around the future industrial complexes. But still, for a moment green or agricultural areas are predominant outside of the 10 Km radius from the city center.

2.3.2 Future Land Use

According to the draft Masterplan of DKI Jakarta Landuse Development, the zoning of landuse is as shown in the following table.

Table 2-7 DKI JAKARTA LAND USE, 2000

LAND USE	AREA (HA)	%
Commercial/Administrative Area	5.495	8.4
Manufacturing Industry	8.522	13.0
Resintial excluding Kampungs	25.767	39.4
Kampungs	7.838	12.0
Agricultural	4.600	7.0
Green, etc.	13.184	20.2
T o t a l	65.406	100.0

III TRAFFIC SITUATION AT PRESENT

In this chapter, the following items are reported and discussed.

- Present transportation situation and problems in DKI Jakarta, by mode, are presented in the from of traffic survey data and transport statistics.
- Development plan of the transport sector as it relates to the Project road.
- Results of the traffic surveys carried out by the study team such as traffic count, OD survey, home interview PT survey, bus survey and running speed survey.
- Forcast population, both residential and economically active, relating to the landuse development.
- Future traffic demand such as person trips and vehicle trips by transport mode in the form of OD matrices.

3.1 Present Transport Situations and Problems in DKI Jakarta

3.1.1 Road Network

Roads in DKI Jakarta in 1978, extend for about 3,000 Kilometers with 80% asphalt paved and this is equivalent to approximately 5,000 meters per square kilometer. The existing main road network is shown in Fig. 3.1 and 3.2 indicating the number of lanes in each road.

In DKI Jakarta, the number of motor vehicles registered in 1979, was about 700,000 including motorcycles, with the latter amounting to about 400,000. It is calculated that the vehicle ownership rate per one thousand capita was 104 and the equivalent Sedan ownership rate was 31.

If these are compared with figures from Japan, the vehicle ownership rate was one-third and the Sedan ownership rate, one-sixth of the equivalent Japanese rates.

Traffic volumes on the road networks are shown in figure 3-3, 3-4.

These figures show that within the area bounded by a ten kilometer radius from the center of CBD, the roads carry rather large cross sectional traffic volumes.

The traffic volumes in the Jakarta Harbour Road corridor are shown in Fig. 3-5.

The figure shows clearly the problems in the project corridor and especially reflected are the traffic jams on Jl. Martadinata and Jl. Enggano caused by the unbalance between the actual volume and capacity.

Thus urgent improvement of the situation relating to the Port activities is required.

In general, within DKI Jakarta there is inadequate supply of road facilities to meet the demand. This applies both to the arterial road system and the feeder road system, and results in increased costs for transportation of both goods and passengers.

In general, because of the inadequency of roads density in Jakarta, the arterial roads are required to fulfill a number of functions such as arterial, collector and local road and this is likely to deter the traffic from flowing in to DKI Jakarta. From this point of view, it is important for the Government to maintain the arterial function of the major routes.

If this can be achieved, not only will this reduce the transportation costs for flowing into and out of DKI Jakarta, but also it will be possible to encourage the people to settle in the satellite areas.

Given success in the above, the following objectives for arterial highways planning will be achieved:

1) To prevent the in-migration to the special capital city of Jakarta, and encourage the development of the satellite towns in the peripheral area.

2) To promote the more efficient synchronization of JABOTABEK area as a Metropolitan area.

3) To assist and improve the port activity functions of Tg. Priok Port, which from consideration of land access, serves not only DKI Jakarta but also West Java and some parts of South Sumatera.

4) To reserve and maintain DKI Jakarta as the capital city and enable it to function as such.

5) To encourage an increase in the road density of the area as a whole as this density is felt to be too low as present.

Fig. 3.1

D.K.I ROAD NETWORK

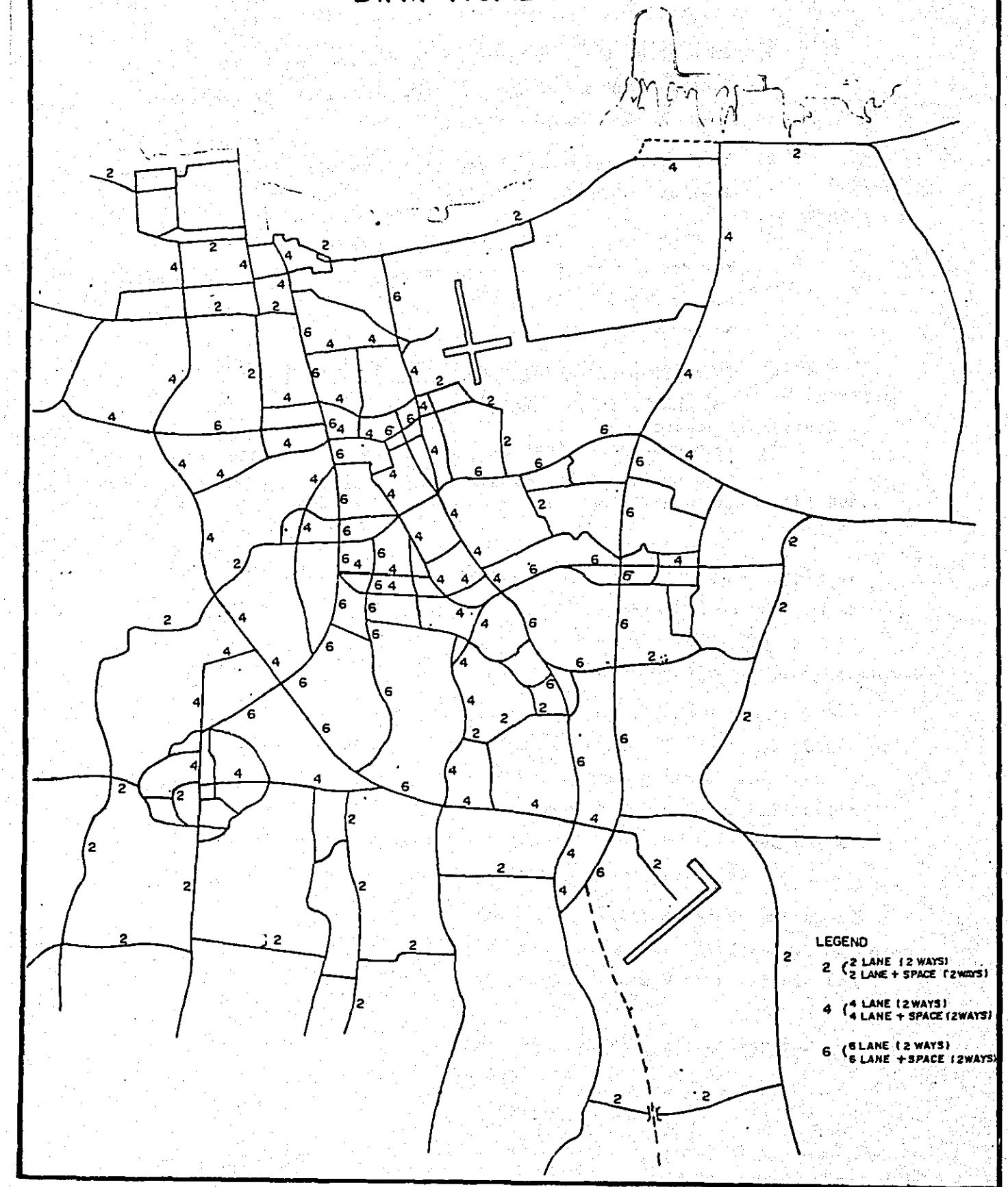


Fig. 3 .2

JABOTABEK ROAD NETWORK

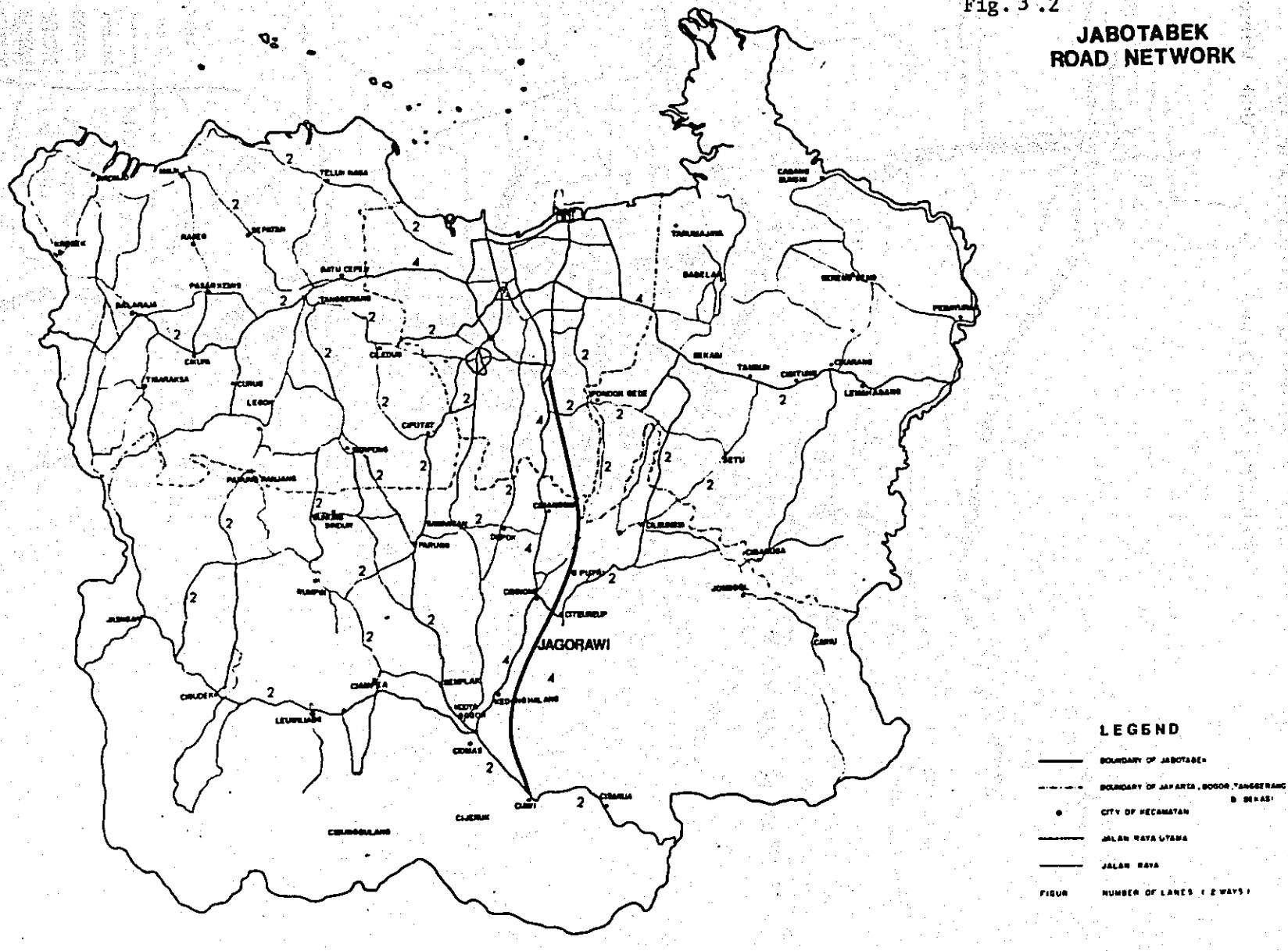


Fig.3.3

ROAD TRAFFIC VOLUME ON MAJOR STREETS IN 1980

(Including Motorcycle)

Unit : Vehicle / 12 Hours

(6:00_18:00)

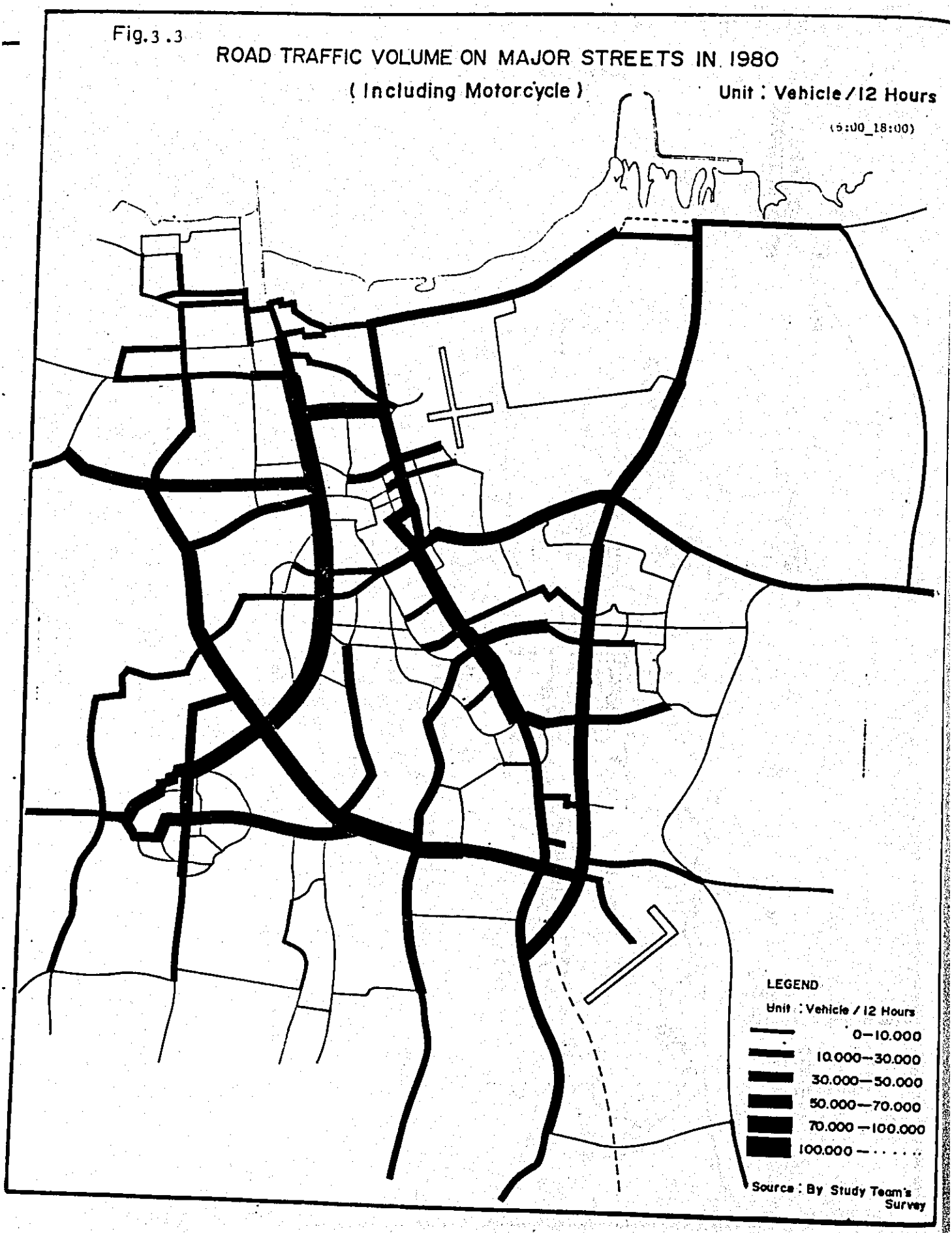
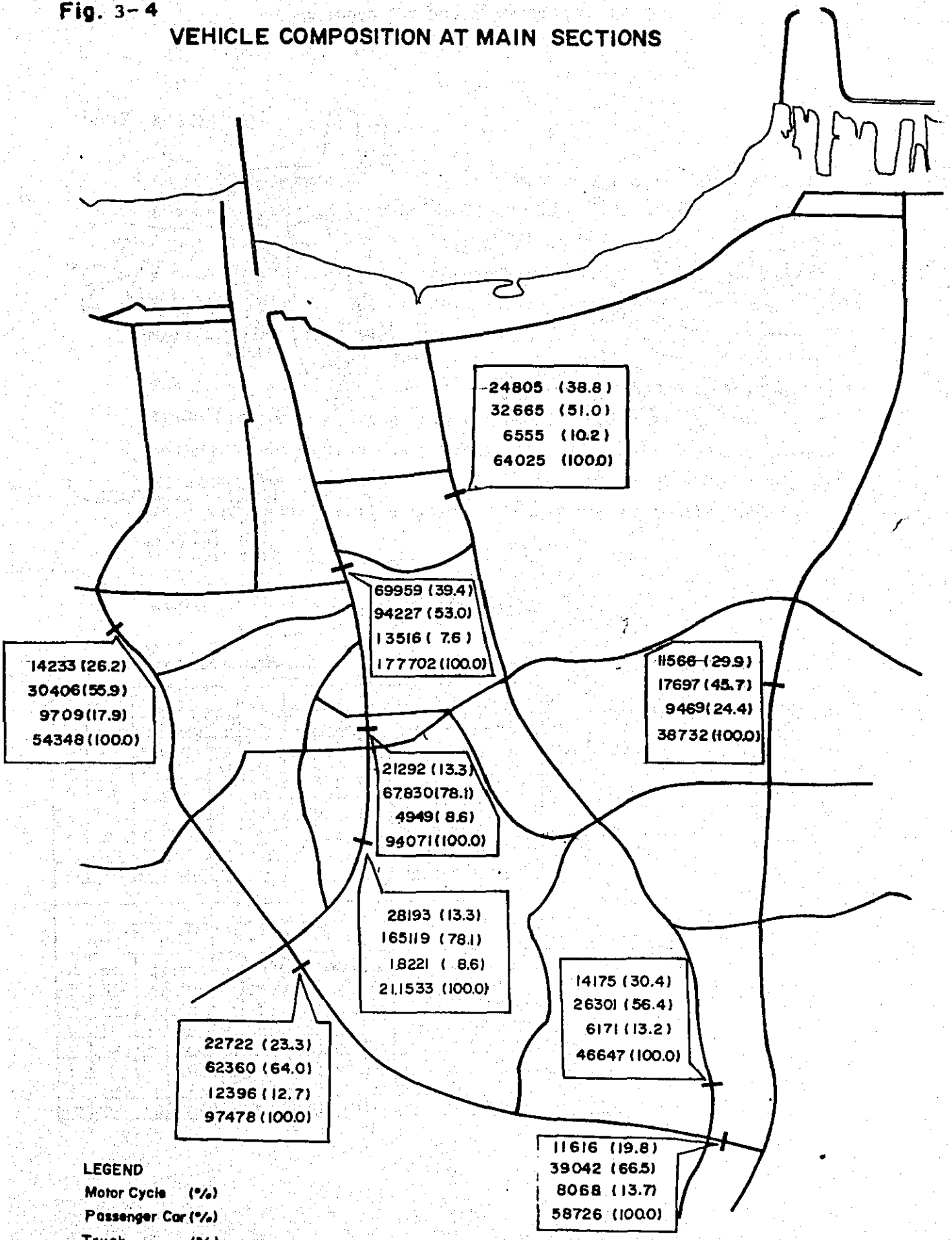


Fig. 3-4

VEHICLE COMPOSITION AT MAIN SECTIONS



LEGEND

Motor Cycle (%)

Passenger Car (%)

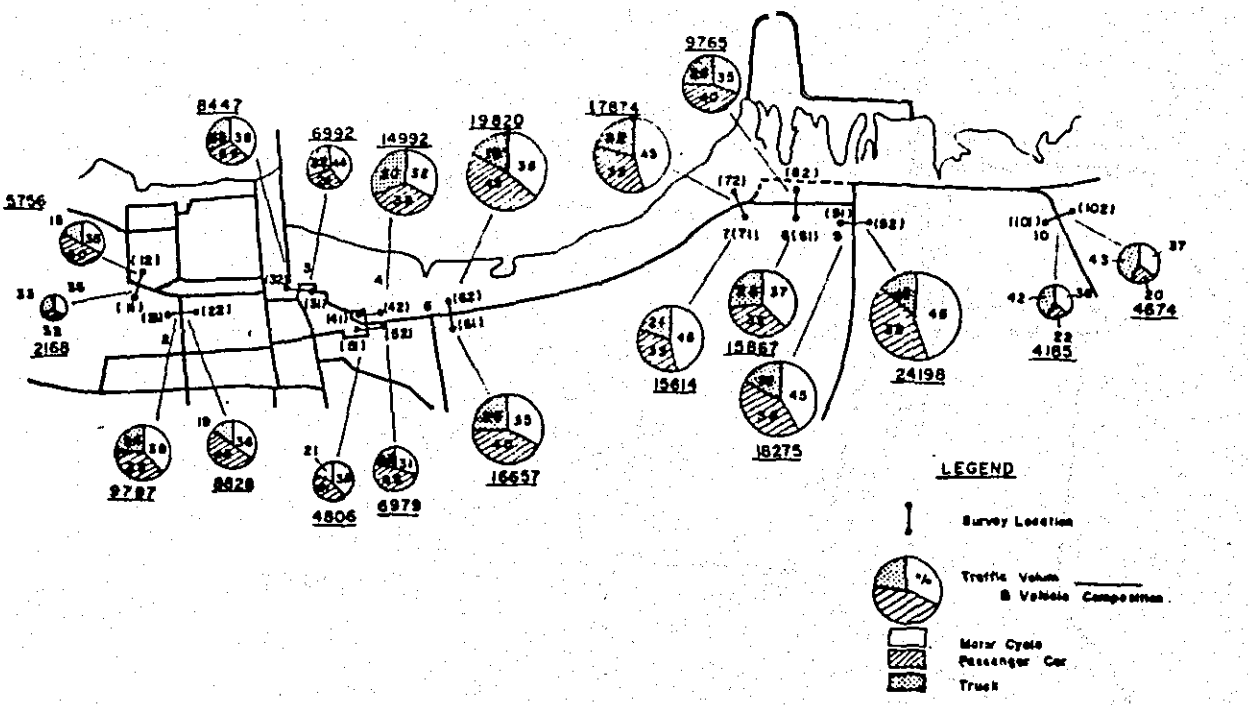
Truck (%)

Total (100.0)

Unit : Vehicle / 6:00 ~ 18:00

Fig. 3.5

VEHICLE COMPOSITION ALONG THE CORRIDOR



Unit: Vehicle / 12 hours

	1				2				3				4				5			
	(11)		(12)		(21)		(22)		(31)		(32)		(41)		(42)		(51)		(52)	
	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%
Motor Cycle	752	35	2027	35	3718	38	3200	36	3054	44	3239	38			4853	32	1849	38	2196	31
Sedan	519	24	2330	40	2950	30	3047	34	1439	21	1633	19			4170	28	1639	34	2153	31
Opel	124	6	484	9	471	5	672	8	224	3	384	5			1378	9	268	6	950	14
Bus	56	2	71	1	344	3	278	3	19	0	438	5			103	1	56	1	63	1
Light Truck	327	15	448	8	1156	12	944	11	717	10	849	10			1405	9	291	6	394	6
Truck	390	18	396	7	1140	12	687	8	1539	22	1904	23			3083	21	703	15	1223	17
TOTAL	2168	100	5756	100	9797	100	8828	100	6992	100	8447	100			14992	100	4806	100	6979	100

	6				7				8				9				10			
	(61)		(62)		(71)		(72)		(81)		(82)		(91)		(92)		(101)		(102)	
	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%
Motor Cycle	5864	35	7176	36	7095	46	8106	45	5818	37	3458	35	8271	45	11231	46	1496	36	1721	37
Sedan	4758	29	6310	32	3344	21	3674	21	3253	20	2276	23	5265	29	6938	29	648	16	673	14
Opel	1560	9	2100	11	1415	9	1609	9	1023	6	650	7	875	5	1319	5	178	4	164	4
Bus	377	2	401	2	479	3	484	3	1388	9	929	10	818	4	1034	4	93	2	107	2
Light Truck	1178	7	1381	7	739	5	906	5	1229	8	558	6	943	5	1359	6	223	5	194	4
Truck	2920	18	2446	12	2542	16	3095	17	3159	20	1894	19	2101	12	2317	10	1547	37	1815	39
TOTAL	16657	100	19820	100	15614	100	17874	100	15867	100	9765	100	18275	100	24198	100	4185	100	4674	100

3.1.2 Bus Network

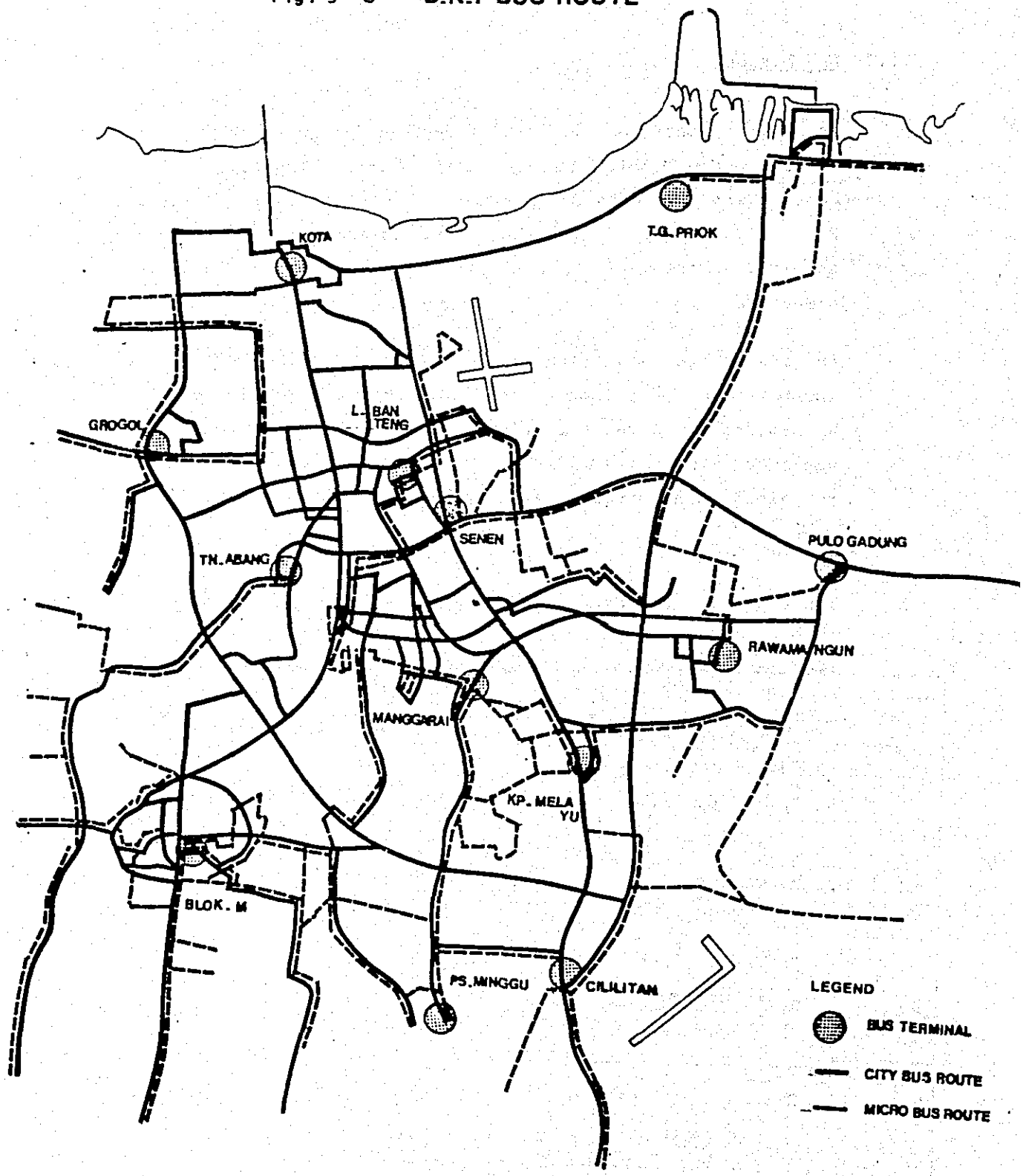
As of 1978, there are 1,385 City buses under everyday operation, and there are 1,551,000 passengers who are transported by City buses everyday. City bus network and bus terminals are shown on Fig. 4-6. In addition to the above, various kinds of vehicles are supplied as the means of public transportation, for example, private company bus, micro bus, oplet, bajaj and so on.

Bus transportation is the main public mass transport in DKI Jakarta. The number of operating companies in 1980 is given below. The Government has given the guideline to reduce the number of companies in bus operation by making then join the Government-owned bus company, to maintain the service level of bus transport to the public.

Table : 3-1 NUMBER OF COMPANIES

	1979	1980
City Bus		
- Government	1	1
- Private	12	4
Micro Bus		
- Private	2	2
Inter-City Bus		
- Government	1	1
- Private	60	60
Taxi		
- Private	8	9

Fig. 3-6 D.K.I BUS ROUTE



3.1.3 Railway Network

In the JABOTABEK area there is a railway network of 222 km in length, among which DKI Jakarta accounts for 91 km or 40% the JABOTABEK total.

The railways in Jakarta will be grouped into a circular route encompassing the central business district of Jakarta, and four radial routes extending to the rural areas: Tangerang, Rangkasbitung, Bogor and Purwakarta. Generally, the railway has had the characteristics of an inter-regional transport route, not contributing so greatly to the means of Intra Urban Transportation.

The railway lines in DKI Jakarta consist of these major lines as illustrated in: Fig. 4.7. Eastern Line, Central Line and Western Line.

(a) Eastern Line

The Eastern Line which starts from Jakarta Kota passes through Kemayoran and Pasar Senen, the center of shopping market and reaches Jatinegara (12.5 km) where the line further goes in the east direction to Bekasi, Karawang and Purwakarta.

From Kemayoran there is a connection with Tanjung Priok (8.6 km). There is another line connecting Jakarta Kota directly with Tanjung Priok (8.1 km). They are double track lines, which are completely electrified. Due to the absence of electric railcars, however, diesel railcars are operated.

(b) Central Line

The Central Line has a length of 9.7 km between Jakarta Kota and Manggarai. The line passes through the Central district of Jakarta City and reaches Manggarai beyond which the line proceeds to the south, passing through Depot Baru, housing areas, and terminates at Bogor, a satellite town of Jakarta. From Jakarta Kota to Manggarai the line is of double track and from Manggarai to Bogor it is of single track.
The whole line is completely electrified and electric railcars are operated.

(c) Western Line

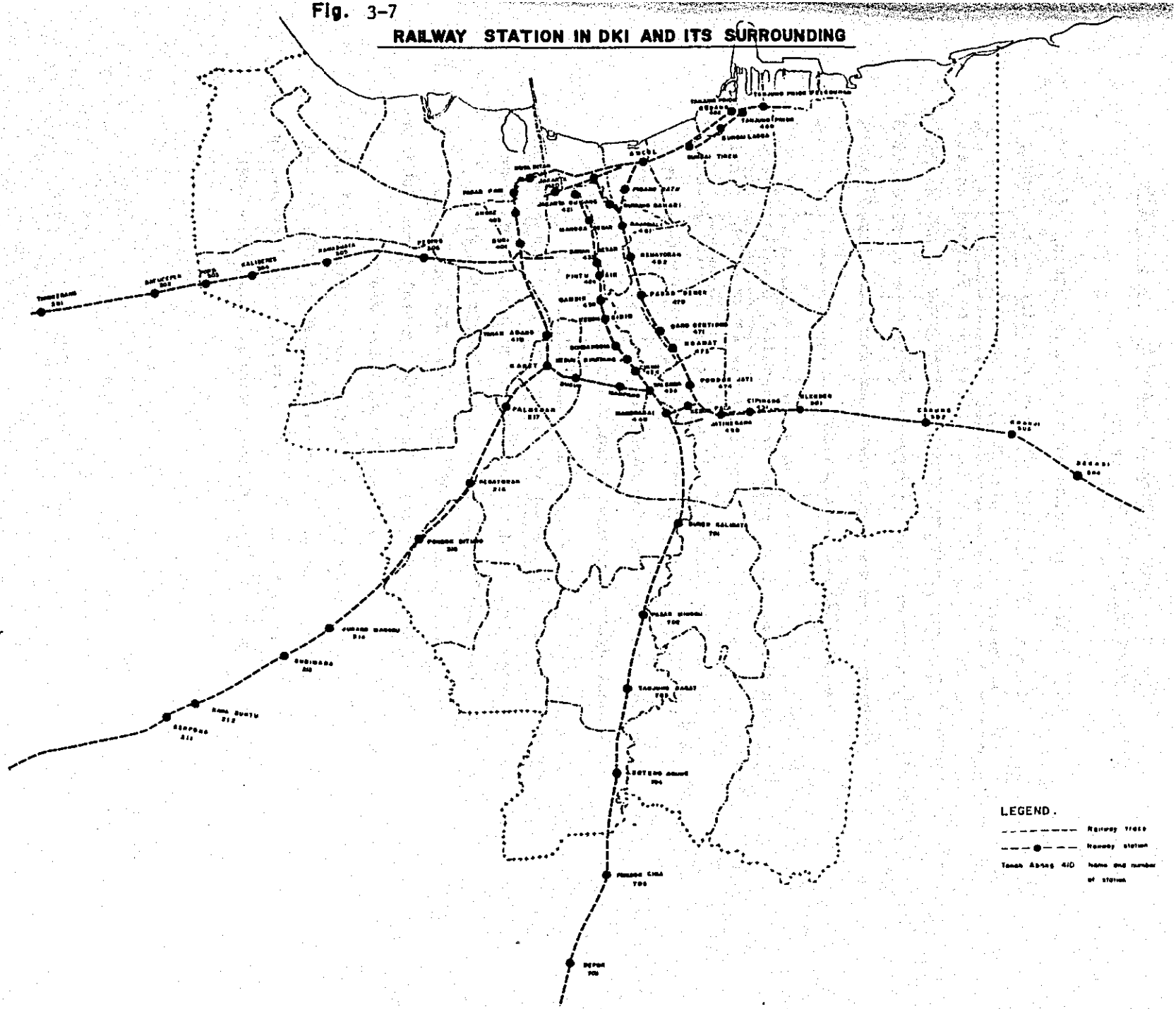
The Western Line has a length of 14.3 km between Manggarai and Kampung Bandan and the section between Kampung Bandan and Jakarta Kota is 2.7 km long. The line passes through Angke, local center of commercial activities, and at Duri it diverges to Tangerang (Tangerang Line), a satellite town of Jakarta. At Tanah Abang the line branches off to the western side of Jakarta proceeds to the cities such as Rangkasbitung via Kebayoran housing areas, terminating at Merak (Merak Line). The Western Line is of double track but nonelectrified. Diesel railcars are operated beyond Manggarai as far as Jatinegara to join the Eastern Line.

The transported passenger volume by rail in 1980 was about 50,000 passengers per day and this is equivalent of one percent of total passenger trip for DKI Jakarta.

However, in accordance with their policy, the Indonesian Government intends to improve and develop the railway sector to enable it to function as the back bone of urban transportation.

Fig. 3-7

RAILWAY STATION IN DKI AND ITS SURROUNDING



(1) Passenger Traffic

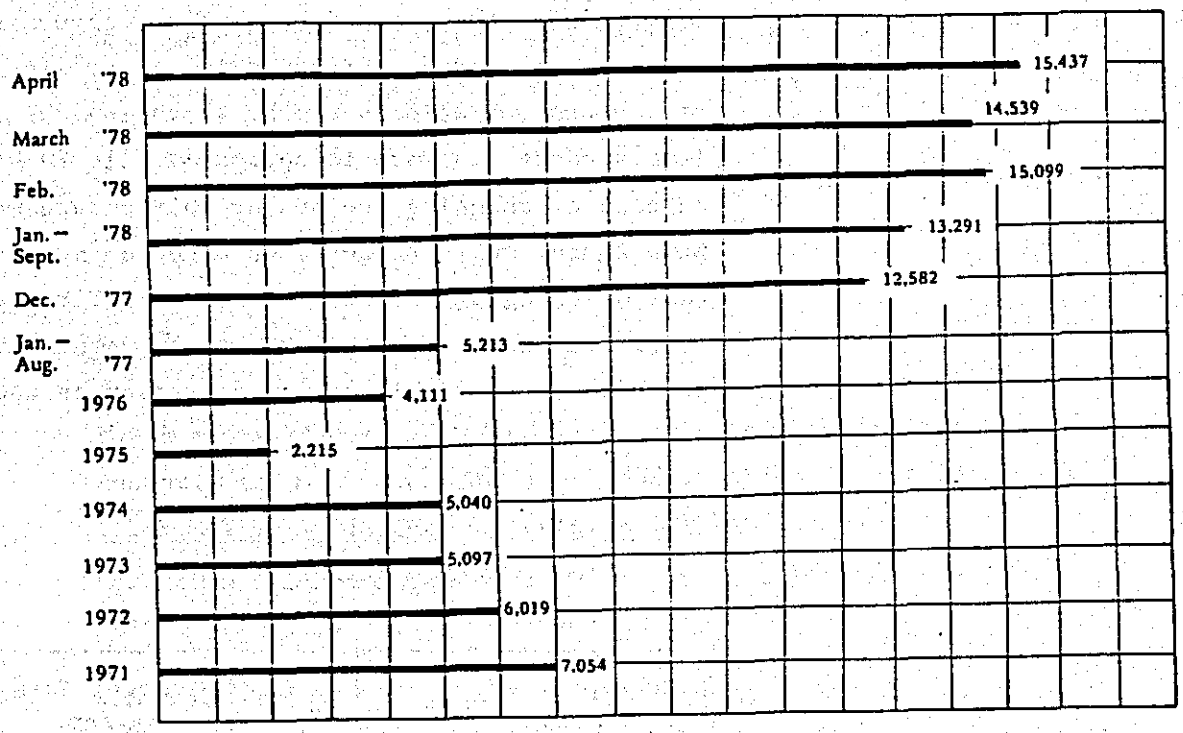
Rail traffic in terms of passengers getting off or on at all stations on the Central line up to Depok, the Eastern line up to Bekasi, the Western line up to Tangerang and the Merak line up to Serpong, totals about 8.8 million per year or 24 thousand per day, as shown in table A.2.15-17. In 1971, close to 12 million people used the railway; the number diminished later but in 1974 it began to rise.

In the volume of passengers handled, Jakarta station comes at the top, accounting for 40.3% of the total volume for Jakarta, followed by Gambir with 27.2% and Pasar-Senen with 16.7%. These three stations put together account for 84.2%, showing that the rail passengers concentrate in the urban zone.

This data relates to pre-1976; after 1977 a prominent change developed in the traffic volume as the result of the "JABOTABEK" train being instituted with introduction of new EC and DC by PJKA under the Intermediate Program. Thus the Central line, Jakarta-Bogor, can be taken as a remarkable example.
In 1975 the passengers carried were a mere 2,215, in 1976 they were 4,111 and as of December 1977 as many as 12,582 were carried. The trend of an increase in the traffic volume still continues as shown below:

Fig. 3-8 AVERAGE PASSENGER TRAFFIC PER DAY ON JAKARTA-BOGOR LINE

(Unit: person tips)



(2) Passengers Fares

The fare of the rail passenger transportation varies with the travelling distances as shown below, while the fare for bus passenger transportation is fixed at Rp.50/trip in any single route of the bus operation network, which length varies from a short distance to approximatelly 30 kilometers. In case of changing the bus or oplet, fare must be paid again, while there is no need to pay double in case of changing the rail lines. The fare by bus is lower than the one by railway although the fare rate per kilometer of the railway decreases as the travelling distance increases.

Table 3-2 COMPARISON OF FARES IN AND AROUND JAKARTA

Mode of Transport	km	Fare Rp.	Average Fare Rp./km.
Railway			
	0 - 10	50	10
	11 - 20	75	5
	21 - 30	100	4
	31 - 40	125	3.6
	41 - 50	150	3.3
	51 - 60	175	3.2
Bus	0 - 30	50	3

3.1.4 Air Transport

In DKI Jakarta there are two airports, namely, Kemayoran Airport used mainly for domestic flights and Halim Airport which is used mainly for international flights. Passengers by air are increasing year by year and amounted to 3,737.1 thousand passengers in 1977.

The number of passengers for both airports is shown on Table 4-3. The tonnage of cargos is also shown on Table 4-4.

3.1.5 Sea Transport (Cargo)

The tonnage of cargo handled at Tanjung Priok Port in 1977 amounted to 5,594 thousand tons, 80% of which is for international trade. The quantity of imports, which far exceeds that of exports, amounted to 4,028 thousand tons. Cargo loaded and unloaded at Tanjung Priok Port is shown on Table 4-5.

Sunda Kelapa Ports is another important port in DKI Jakarta, but in recent years the quantity handled here is negligbly small if compared with that of Tanjung Priok Port.

Cargo handled at Sunda Kelapa Port mainly consists of primary products, which are shown on Table 4-6.

Table 3-3-1 NUMBER OF PASSENGERS ARRIVING/DEPARTING THROUGH KEMAYORAN AIRPORT

(Unit: 1,000 passengers)

	INTERNATIONAL		DOMESTIC		TRANSIT	TOTAL
	DEPARTURE	ARRIVAL	DEPARTURE	ARRIVAL		
'1970	156.0	153.1	262.9	267.5	-	839.5
1971	190.4	189.0	361.5	362.2	-	1,103.1
1972	255.6	230.2	444.6	445.1	92.7	1,468.2
'1973	333.7	316.6	607.5	613.5	77.3	1,968.3
1974	50.7	51.3	713.1	721.2	-	1,536.3
1975	5.5	6.2	749.4	745.6	1.0	1.506.9
1976	1.7	1.3	900.1	892.2	-	1,795.3
1977	4.5	4.1	1,069.2	1,084.6	-	2,162.4

Source: "Statistical Year Book of Jakarta, 1978", Census and Statistical Office, Jakarta, 1979

Table 3-3-2 NUMBER OF PASSENGERS ARRIVING/DEPARTING THROUGH HALIM AIRPORT

(Unit: 1,000 passengers)

	INTERNATIONAL		DOMESTIC		TRANSIT	TOTAL
	DEPARTURE	ARRIVAL	DEPARTURE	ARRIVAL		
1974	343.0	328.6	42.7	46.4	-	760.7
1975	440.4	461.6	105.7	120.4	107.8	1,235.9
1976	474.2	487.4	132.8	141.9	126.9	1,363.2
1977	566.2	540.6	167.6	178.2	122.1	1,574.7

Source: "Statistical Year Book of Jakarta, 1978", Census and Statistical Office, Jakarta, 1979

Table 3-4-1 CARGO LOADED/UNLOADED THROUGH KEMAYORAN AIRPORT

(Unit: Ton/year)

	INTERNATIONAL		DOMESTIC		TOTAL
	LOADED	UNLOADED	LOADED	UNLOADED	
1970	1,203.1	8,404.1	2,736.2	963.5	13,306.9
1971	1,209.1	9,184.8	3,667.0	1,648.9	15,709.8
1972	1,502.2	7,967.1	5,353.2	2,211.8	17,034.3
1973	1,805.7	10,097.4	7,866.8	2,462.1	22,232.0
1974	263.7	1,646.6	10.621.3	2,948.7	15,480.3
1975	50.0	256.6	12,597.1	3,330.9	16,234.6
1976	54.8	645.1	15,351.3	4,379.8	20,731.0
1977	51.7	1,366.7	19,398.5	5,224.8	26,041.7

Cource: "Statistical Year Book of Jakarta, 1978",
Sensus Statistical Office, Jakarta, 1979

Table 3-4-2 CARGO LOADED/UNLOADED TRHOUGH HALIM AIRPORT

(Unit: Ton/year)

	INTERNATIONAL		DOMESTIC		TOTAL
	LOADED	UNLOADED	LOADED	UNLOADED	
1974	1,770.3	12,189.9	99.6	32.9	14,092.7
1975	2,377.1	12,996.6	755.8	225.7	16,355.2
1976	3,209.9	12,202.7	1,025.0	475.2	16,912.8
1977	3,098.2	13,538.1	1,206.7	280.1	18,123.1

Source: "Statistical Year Book of Jakarta, 1978",
Census Statistical Office, Jakarta, 1979

Table 3-5-1 INTERNATIONAL EXPORT CARGO LOADED AT TG. PRIOK PORT

(Unit: Tons/year)

YEAR	RUBBER	TEA	COFFEE	CATTLE FODDER	FISH	OTHERS	TOTAL
1970	19.303	10,344	511	3,979	-	186,758	220,894
1971	18,629	12,038	397	-	-	164,355	195,419
1972	41,715	20,465	3,632	19,268	-	151,060	236,140
1973	43,807	22,687	2,723	32,984	-	64,383	166,584
1974	40,508	28,628	1,140	7,542	4,328	73,168	155,314
1975	33,597	28,252	2,297	3,328	3,131	53,729	124,334
1976	32,579	29,445	2,639	52,408	4,063	81,534	202,668
1977	25,978	27,928	3,297	89,758	3,439	67,187	217,784

Source: "Statistical Year Book of Jakarta, 1978", Sensus and Statistical Office, Jakarta

Table 3-5-2 INTERNATIONAL IMPORT CARGO UNLOADED AT TG. PRIOK PORT

(Unit: Tons/year)

	1973	1974	1975	1976	1977
Rice	240,738	402,680	336,045	636,578	1,005,963
Wheatseed	-	280,044	10	-	-
Sugar	89,722	79,553	49,619	77,899	101,485
Textile	18,519	15,058	13,417	7,255	1,632
Weaving	-	35,663	-	-	-
Paper	56,712	79,624	118,769	160,774	152,149
Cement	965,499	1,172,990	955,252	539,487	48,536
Fertilizer	174,542	421,735	319,121	3,880	22,378
Asphalt	73,299	77,881	82,757	84,307	52,937
Cotton	-	23,052	-	-	-
Iron	411,412	585,903	573,290	614,704	659,032
Wheat Flour	12,603	-	-	-	-
Others	1,637,738	1,303,067	1,832,737	2,259,655	1,984,240
TOTAL:	4,180,784	4,477,250	4,285,017	4,284,939	4,028,352

Source: "Statistical Year Book of Jakarta, 1978" Sensus and Statistical Office, Jakarta

Table 3-5-3 FUEL FOR JAKARTA SHIPPED THROUGH TG. PRIOK PORT

(Unit: 1,000 ltr.)

	KEROSENE	SOLAR	BUNKER	GASOLINE	TOTAL
1970	459,707	94,007	-	307,230	860,944
1971	518,485	117,438	-	352,890	988,813
1972	559,778	165,516	-	389,022	1,109,316
1973	624,819	197,292	34,523	435,789	1,292,423
1974	680,827	275,527	60,225	477,722	1,494,301
1975	747,876	391,511	76,561	545,301	1,761,249
1976	768,501	575,455	110,835	587,982	2,042,773
1977	810,052	623,689	218,796	626,200	2,278,737

Table 3-6

SUNDA KELAPA PORT – HANDLING VOLUME

Unit : 1000 ton

Year	Handling Volume Inclusive Logs				Logs
	Loaded	Unloaded	Total	Growth Rate	
1974	217	517	734	1.09	402
1975	234	439	673	1.00	312
1976	247	426	673	1.00	314
1977	296	399	695	1.03	290
1978	366	426	792	1.18	311
1979	466	437	903	1.34	302
(1979%)	51.6	48.4	100.0	-	-

Source : "Statistic Year Book of Jakarta, 1979"

Census and Statical Office, Jakarta.

"Data from Sunda Kelapa Port Office".

3.2. Results of Traffic Survey

3.2.1. Roadside OD Survey

(1) Method of Survey

a) Method of Survey

In June 1980, an origin and destination survey was held on the existing road betwen Halim and Grogol intersections.
This time, in order to supplement this previous survey and especially to obtain OD data in the east and the north part of DKI Jakarta, an origin and destination survey was held on the roads between Halim and Tgl. Priok, Tg. Priok and Pluit and Pluit and Grogol, mainly related with the projected Jakarta Harbour Road. (Survey Locations are shown in Fig. 3-9).

In order to minimize inconvenience to traffic, the necessary information was obtained by handing vehicle occupants a post-card containing the necessary questions together with instructions. Occupants were requested to complete the card in their own time and return it within ten days. Postage on the cards was pre-paid. (Survey Card is shown in Fig. 3-10).

In order to relate the cards returned to the total volume of traffic, a classified vehicle count was undertaken simultaneously with the distribution of the survey cards.
Cards were given to vehicles as they entered the intersections.
Arrangements regarding traffic warning signs, police manpower, number of surveyors, etc. had bben worked out in detail for each survey location, prior to the implementation.

Survey schedule and other detail information on surveys are shown in the Working Paper No. 1 submitted November, 1980.

Fig.3-9 SURVEY LOCATIONS

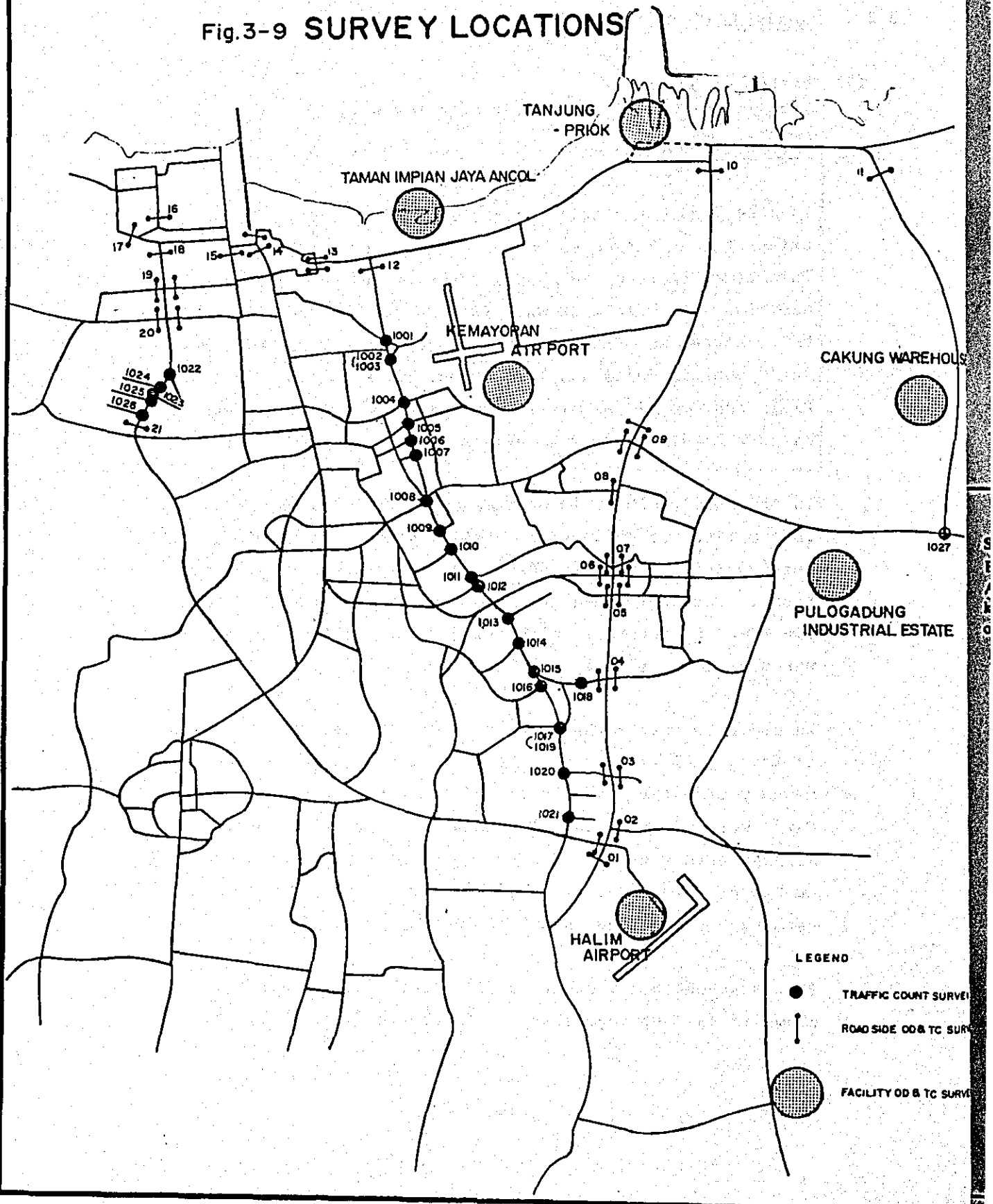


Fig. 3-10 SAMPLE OF SURVEY CARD

DAPAT DIKIRIM
TANPA PERANGKO
IZIN
NO.004/KIRB/80

KARTU BALASAN

Kepada :
Kepala Kantor Pos / Giro Besar I
Jakarta Pusat.

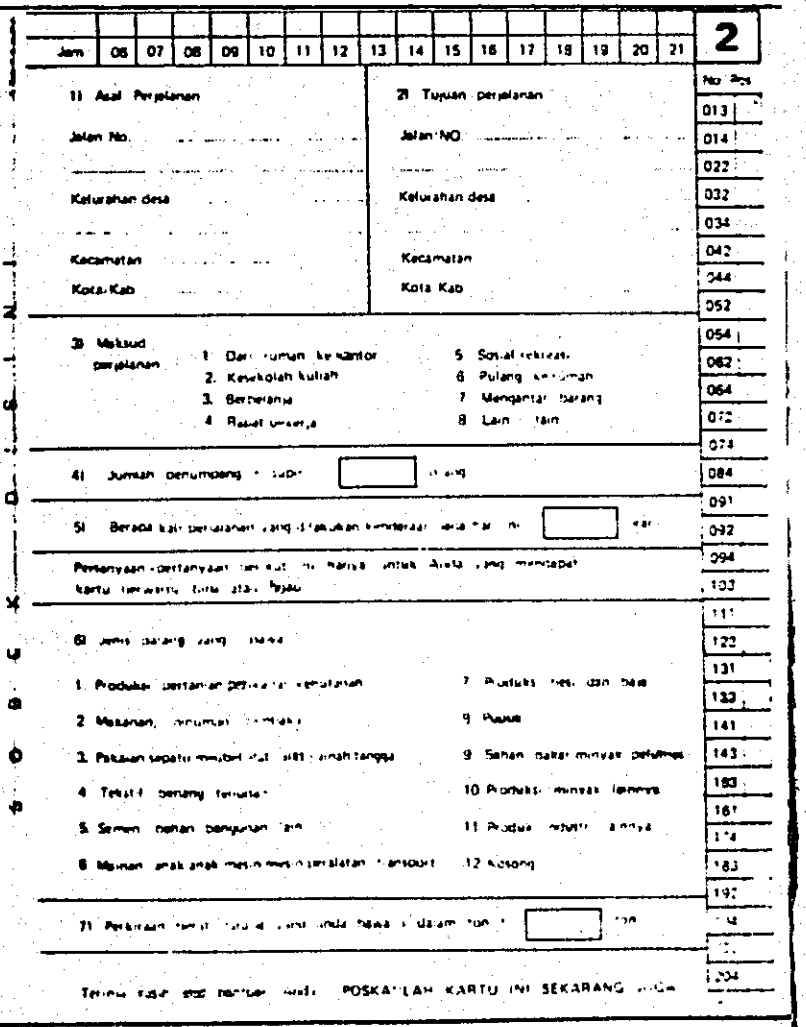
Serahkan Kepada :

Sub. Dit. Perencanaan Jalan Kota
Dit. Bipran - Dit. Jen. Bina Marga
Jl.Raden Patah No. 2
Kebayoran Baru, JAKARTA SELATAN

Survey ini diselenggarakan dalam rangka pembinaan jalan. Pembinaan ini adalah demi kepentingan anda juga. Anda dimohon untuk melengkapi dan mengirimkan kembali kartu ini. Nama anda tak perlu dicantumkan, ongkos perangko akan dibayar Bina Marga kemudian.

PETUNJUK

1. Lingkarilah angka jawaban yang anda berikan. Untuk pertanyaan No. 3 & 6
2. Yang dimaksud perjalanan disini adalah perjalanan antara 2 tempat perhentian.
3. Khusus untuk pertanyaan No. 5, jawab setelah kesibukan anda hari ini berakhir.
4. Apabila selama minggu survey Anda mendapat lebih dari satu (1) kartu, isi dan lengkapilah setiap kartu yang anda terima.
5. Setelah kartu ini diisi, lepaskan bagian yang telah Anda isi dan segera poskan pada kotak pos yang terdekat tanpa diberi perangko.



b) Number of Postcards distributed and returned

Number of postcards distributed to vehicles amounted to 281 thousand and the number of postcards returned have amounted to 15,652.
The return rate was therefore 5.6%. There were some differences differences in the return rate among the type of vehicles; Motorcycle 6.2%, sedan 6.0%, light truck 4.8% and heavy truck 2.6%.

The results of each station are listed in Tables in APPENDIX.

c) Procedure for Establishing OD Table

There are four major steps for establishing the OD Table from the results of the Roadside OD Survey:

1) Check sample data and Calculate expansion factors for each survey station.

2) Calculate the original OD Table and the expanded OD Table.

3) Compare the expanded OD Table with the previous OD Table obtained by using data mainly from the south and the west part of DKI Jakarta.

4) Establish Complete OD Table and check its reliability.

Most of the steps mentioned above were processed by using computer, and the major outputs are as shown in Table.

Table 3-8 MAJOR COMPUTER OUTPUTS

1. Sampling situations and expansion factors for each survey station

For morning peak & all day

2. Average passengers per vehicle

3. Trip length distribution for each type of vehicles

4. Original OD Table (prior to expension)

Cargo Tonnage		
Motorcycle	vehicle base &	Person base
Sedan	"	"
Light Truck	"	-
Heavy Truck	"	-
Truck Total	"	"
Grand Total	"	"

5. Trip Purpose by Origin base & destination base

Motorcycle
Sedan
Light Truck
Heavy Truck
Grand Total

6. Cango Type by Origin base & destination base

Light Truck
Heavy Truck
Truck Total

7. Trip Purpose by type of vehicle and hour band prior to expansion

   Motorcycle
   Sedan
   Truck
   Vehicle Total
   Person Total

8. Trip Purpose by survey station

9. Average passengers per vehicle and work trip ratio by zone

   Motorcycle
   Sedan
   Truck

10. Expanded OD Table especially for survey stations, 091, 092, 094, 131, 141.

11. Expanded OD Table on vehicle and person base

    Motorcycle
    Sedan
    Truck
    Grand Total

12. Complete OD Table on vehicle and person base

    Motorcycle
    Sedan
    Truck
    Bus without terminal and with terminal
    Grand Total

13. Summary of trip generation and attraction by zone

d) Screen Line Check for Complete OD Table

To check how will the complete OD table represent the actual traffic situation, screen line checking was carried out.

As shown on Figure and Table, the OD table shows a very good fit with the actual situation.

As a whole, the results for morning peak are much better than those of all day. This can be explained by the fact that, in the morning peak, a larger part of the traffic flow is destinating in the center of the city and passes through the screen lines on moving from one zone to another zone.

However, in day time destinations are dispersed in various directions, and include many intra-zonal trips which pass through screen lines frequently.

As shown in Table 3-7, in the center of the city, traffic volumes from the traffic count survey exceed those of the OD table.

Fig. 3-11 SCREEN LINE CHECK FOR COMPLETE OF TABLE

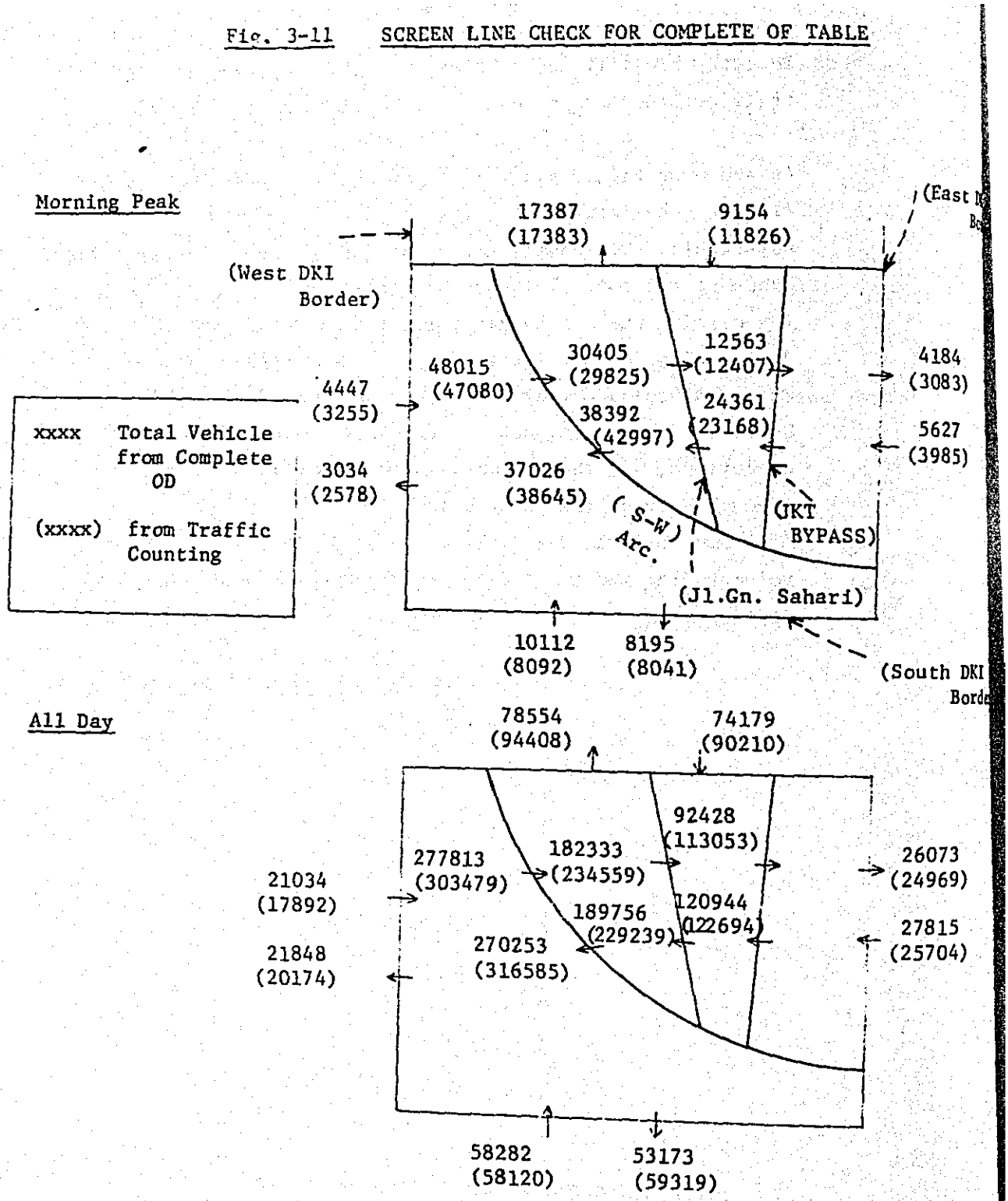
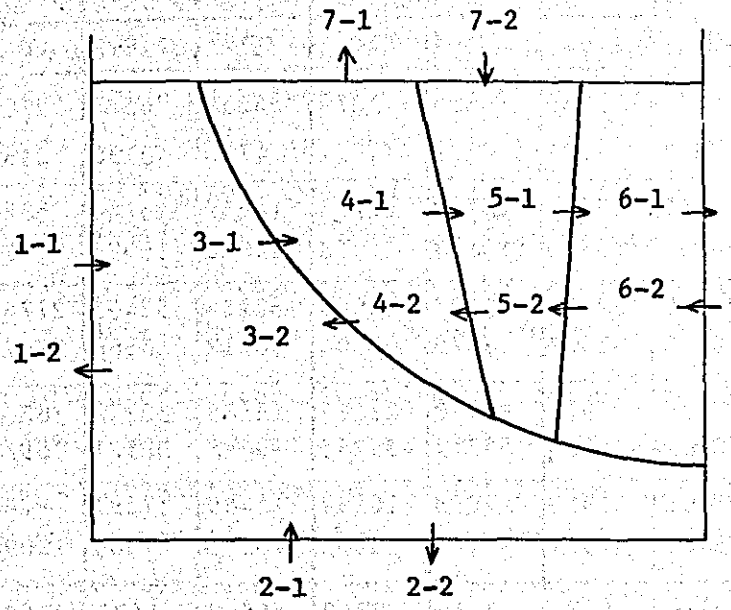


Table 3-7 SCREEN LINE CHECK FOR COMPLETE OD TABLE



OD---- Traffic volume from OD Table

TC --- Traffic volume from Traffic Count Survey

MORNING PEAK

	MOTORCYCLE		SEDAN		TRUCK		BUS		TOTAL		
	OD	TC	OD	TC	OD	TC	OD	TC	OD	TC	%
1 - 1	1931	1584	569	419	1208	551	739	701	4447	3255	136.6
1 - 2	740	668	543	435	990	646	761	829	3034	2578	117.7
2 - 1	2735	2688	2899	2081	2244	1346	2234	1977	10112	8092	125.0
2 - 2	2287	2194	2359	2027	1463	1046	2086	2774	8195	8041	101.9
3 - 1	14272	16259	21264	18528	5361	5108	7118	7185	48015	47080	102.0
3 - 2	9946	11012	15196	15498	4084	4290	7800	7845	37026	38645	95.8
4 - 1	11560	11125	11043	11810	4397	2840	3405	4050	30405	29825	101.9
4 - 2	16303	18928	14136	15756	4607	3128	3346	5185	38392	42997	87.3
5 - 1	3703	3879	4595	4864	2675	1616	1590	2048	12563	12407	101.3
5 - 2	9908	10030	8897	8947	3581	2114	1975	2077	24361	23168	105.1
6 - 1	1201	723	991	681	1199	885	793	794	4184	3083	135.7
6 - 2	1722	1230	1042	625	2104	1368	759	762	5627	3985	141.2
7 - 1	7881	8193	4460	4607	2640	3149	2406	1434	17387	17383	100.0
7 - 2	2942	4825	3359	3758	1639	1825	1214	1418	9154	11826	77.4
Total	87131	93338	91353	90036	38192	29912	36226	39079	252902	252365	
	93.3%		101.5%		127.7%		92.7%		100.2%		

ALL DAY

	MOTORCYCLE		SEDAN		TRUCK		BUS		T O T A L		
	OD	T.C.	OD	T.C.	OD	T.C.	OD	T.C.	OD	T.C.	
1 - 1	6237	5433	4437	2657	5525	5279	4835	4523	21034	17892	117.6
1 - 2	6290	6581	4521	3684	6287	4771	4750	5138	21848	20174	108.3
2 - 1	14683	15327	16162	15281	12780	11772	14657	15740	58282	58120	100.1
2 - 2	13565	18180	14917	16165	10813	8978	13878	15996	53173	59139	89.9
3 - 1	64477	77420	124878	127575	35193	44989	53265	53495	277813	303479	91.5
3 - 2	56169	81318	119093	131807	38379	46594	56612	56866	270253	316585	85.4
4 - 1	60752	83268	67476	97973	28920	23196	25185	30122	182333	234559	77.7
4 - 2	62260	80014	70588	91363	33280	25285	23628	32577	189756	229239	82.8
5 - 1	28998	37310	31863	41953	17098	16399	14469	17391	92428	113053	81.8
5 - 2	38846	42127	45640	44893	20145	18305	16313	17369	120944	122694	98.6
6 - 1	6737	5148	5329	4520	8458	9712	5549	5589	26073	24969	104.4
6 - 2	5536	5495	6776	4501	9819	10089	5684	5619	27815	25704	108.2
7 - 1	21656	37346	27011	30710	15281	17459	14606	8893	78554	94408	83.2
7 - 2	30599	35654	21470	28753	16018	16929	6092	8874	74179	90210	82.2
Total	416805	530621	560161	641835	257996	259757	259523	278192	1494485	1710405	
	78.6%		87.3%		99.3%		93.3%		87.4%		

(2) Person Trip and Vehicle Trip

The present situation of person trips in Jakarta has been obtained by Roadside OD Survey, Facility Survey and Home Interview Survey. The Roadside OD Survey aimed to obtain details of movement in Jakarta as a whole and the facility survey covered trips incoming and outgoing to/from such special facilities as Halim Airport, Kemayoran Airport and Ancol Recreation Area. The Home Interview Survey was performed to grasp the personal and trip characterictics of residents, but as a byproduct an OD Table was obtained.

In this section the situation of person trips in Jakarta is described by using the results of the Roadside OD Survey.
Special attention should be paid to the fact that Roadside OD Survey covers the trips made by private vehicles and does not include public transportation such as bus and railway.

a) Person Trip.

Number of person trips related to Jakarta is shown in Fig. 3-12 and Table 3-8 . In the morning Peak, the number of person trips amounts to 355,799, of which 285303 are intra Jakarta trips, ie. 80.2%. As for trips outgoing from Jakarta, 22058 destinate in BOTABEK area, and 5,689 trips are to outside BOTABEK area.
The number of the trips incoming to Jakarta amounts to 42,339, and this exceeds the outgoing trips by 14,590.
93.8 percent of the incoming trips originate in BOTABEK area.

For all-days, the number of trips amounts to 2,432,885 and the morning peak ratio is therefore 14.6%. The Intra Jakarta trip amounts to 1,990,610 trips, which is equivalent to 81.8% of all the trips.

For the modal split among three kinds of vehicle, it is conspicuous that trucks play an important role in transporting passengers incoming and outgoing to/from Jakarta.

In order to describe the intra Jakarta trips, Fig. 3-13 outlines which zone has on excessive inflow of trips and which zone has an excessive outflow in morning peak.

b) Vehicle Trip

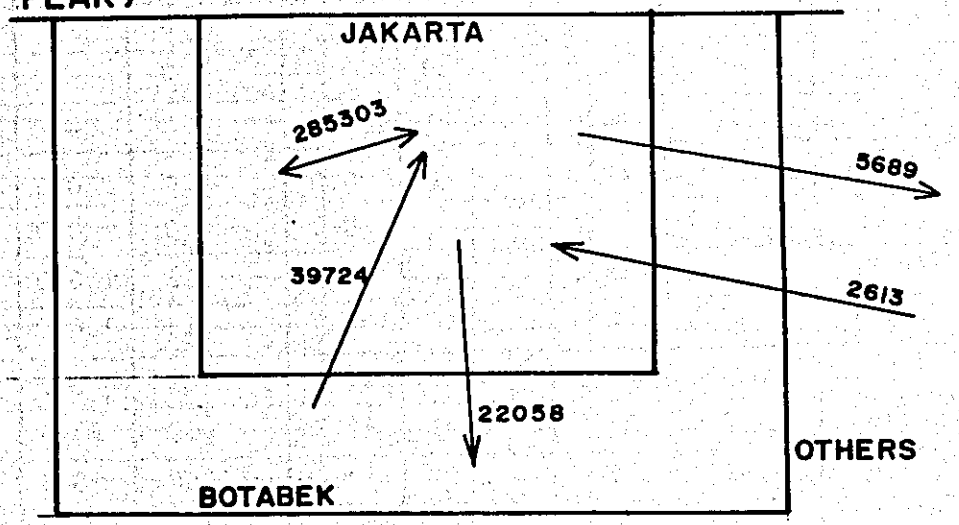
The present situation of vehicle trips is shown in Table
The number of trips amounts to 164,753 in the morning peak and 1,075,891 trips All Day. As is seen in the Table, motorcycle plays an important role and its share accounts for 40.0% in morning peak and 33.7% in All Day.

In the morning peak, 148,265 trips originate in Jakarta, 92.1% of which are intra Jakarta trips. Outgoing trips account for 11,657 trips, 84.3% of which destinate in BOTABEK area. On the other hand, the number of trips destinating in Jakarta is 152,947, 89.3% of which are intra Jakarta trips. Incoming trips account for 16,339 trips, 93.5% of which originate in BOTABEK area.

Fig. 3-12 PERSON TRIPS RELATED TO JAKARTA

From Roadside OD Survey

(MORNING PEAK)



(ALL DAY)

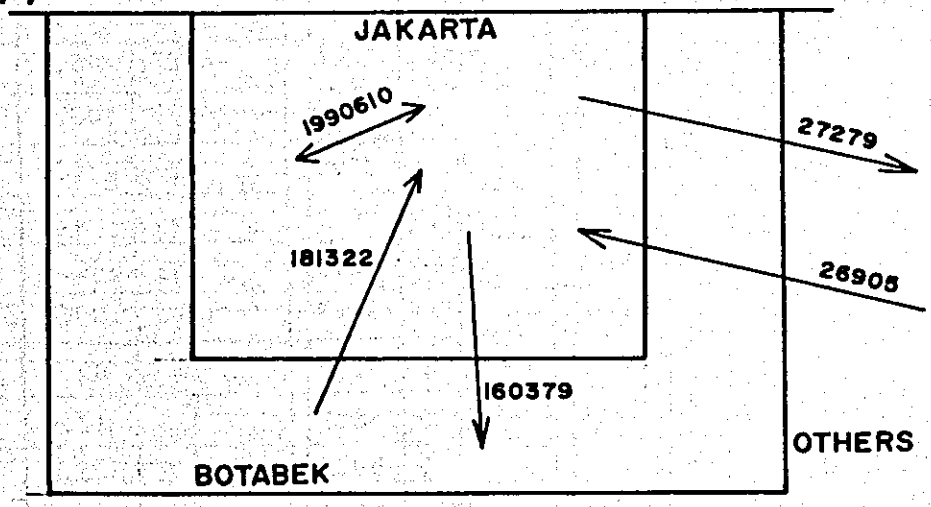


Table 3-8

COMPLETE O-D TABLE FROM ROADSIDE O-D SURVEY

Unit : Vehicle

Morning Peak Vehicle		D.K.I		BOTABEK		OTHERS		TOTAL	
		Volume	%	Volume	%	Volume	%	Volume	%
D.K.I	Motor-cycle	55290	40.5	4151	42.2	49	2.7	59490	40.1
	Sedan	67694	49.5	3457	35.2	432	23.6	71583	48.3
	Truck	13624	10.0	2220	22.6	1348	73.7	17192	11.6
	Total	136608	100.0	9828	100.0	1829	100.0	148265	100.0
BOTABEK	Motor-cycle	6191	40.5	28	30.8	0	-	6219	40.5
	Sedan	4199	27.5	4	4.4	0	-	4203	27.4
	Truck	4880	32.0	59	64.8	0	-	4939	32.1
	Total	15270	100.0	91	100.0	0	-	15361	100.0
OTHERS	Motor-cycle	172	16.1	0	0.0	0	0.0	172	15.3
	Sedan	307	28.7	0	0.0	0	0.0	307	27.2
	Truck	590	55.2	46	100.0	12	100.0	648	57.5
	Total	1069	100.0	46	100.0	12	100.0	1127	100.0
TOTAL	Motor-cycle	61653	40.3	4179	41.9	49	2.7	65881	40.0
	Sedan	72200	47.2	3461	34.7	432	23.4	76093	46.2
	Truck	19094	12.5	2325	23.4	1360	73.9	22779	13.8
	Total	152947	100.0	9965	100.0	1841	100.0	164753	100.0

Unit : Vehicle

All Day Vehicle		D.K.I		BOTABEK		OTHERS		TOTAL	
		Volume	%	Volume	%	Volume	%	Volume	%
D.K.I	Motor-cycle	305787	33.8	24937	37.7	1532	15.0	332256	33.9
	Sedan	473369	52.4	20978	31.7	3769	37.0	498116	50.8
	Truck	125092	13.8	20267	30.6	4888	48.0	150247	15.3
	Total	904248	100.0	66182	100.0	10189	100.0	980619	100.0
BOTABEK	Motor-cycle	25338	35.5	2247	22.9	436	31.7	28021	33.9
	Sedan	24566	34.4	2386	24.3	55	4.0	27007	32.7
	Truck	21449	30.1	5190	52.8	855	64.3	27524	33.4
	Total	71353	100.0	9823	100.0	1376	100.0	82552	100.0
OTHERS	Motor-cycle	1064	11.1	936	31.8	147	82.1	2147	16.9
	Sedan	2675	27.9	1122	38.1	23	12.9	3820	30.0
	Truck	5855	61.0	889	30.1	9	5.0	6753	53.1
	Total	9594	100.0	2947	100.0	197	100.0	12720	100.0
TOTAL	Motor-cycle	332189	33.7	28120	35.6	2115	18.0	362424	33.7
	Sedan	500610	50.8	24486	31.0	3847	32.8	528943	49.2
	Truck	152396	15.5	26346	33.4	5782	49.2	184524	17.1
	Total	985195	100.0	78952	100.0	11744	100.0	1075891	100.0

Note: Bus trips are excluded.

Table 3-8 COMPLETE O-D TABLE FROM ROADSIDE O-D SURVEY

Unit : Person

Morning Peak Person		D.K.I		BOTABEK		OTHERS		TOTAL	
		Volume	%	Volume	%	Volume	%	Volume	%
D.K.I	Motor - cycle.	73148	25.6	5216	23.6	63	1.1	78427	25.1
	Sedan	159511	55.9	8760	39.7	1464	25.7	169735	54.2
	Truck	52644	18.5	8082	36.7	4162	73.2	64888	20.7
	Total	285303	100.0	22058	100.0	5689	100.0	313050	100.0
BOTABEK	Motor-cycle	8190	20.6	35	14.3	0	-	8225	20.6
	Sedan	11062	27.9	9	3.7	0	-	11071	27.7
	Truck	20472	51.5	201	82.0	0	-	20673	51.7
	Total	39724	100.0	245	100.0	0	-	39969	100.0
OTHERS	Motor-cycle	250	9.6	0	0.0	0	0.0	250	9.0
	Sedan	585	22.4	0	0.0	0	0.0	585	21.0
	Truck	1778	68.0	135	100.0	32	100.0	1945	70.0
	Total	2613	100.0	135	100.0	32	100.0	2780	100.0
TOTAL	Motor-cycle	81588	24.9	5251	23.4	63	1.1	86902	24.4
	Sedan	171158	52.2	8769	39.1	1464	25.6	181391	51.0
	Truck	74894	22.9	8418	37.5	4194	73.3	87506	24.6
	Total	327640	100.0	22438	100.0	5721	100.0	355799	100.0

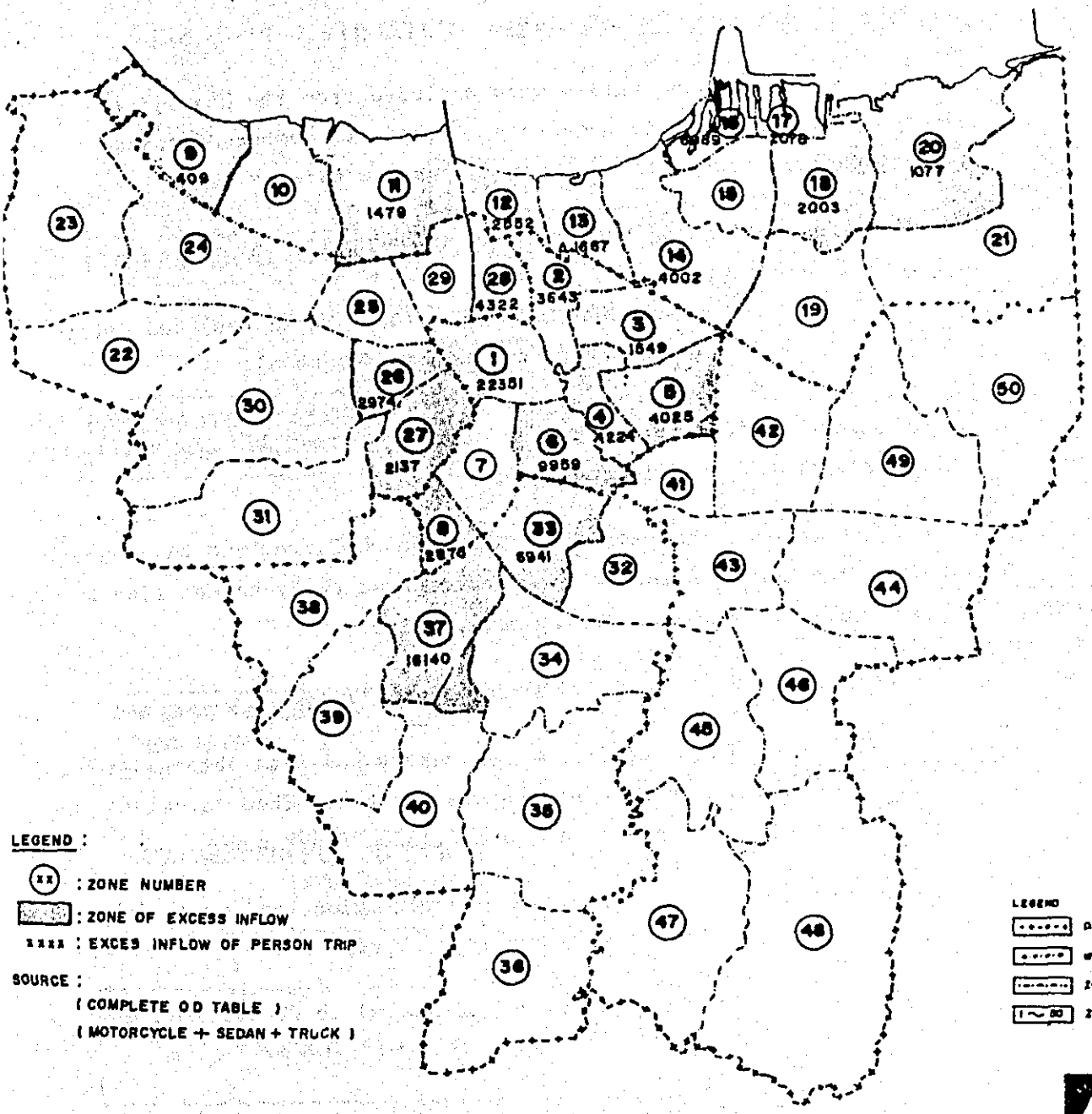
Unit : Person

All Day Person		D.K.I		BOTABEK		OTHERS		TOTAL	
		Volume	%	Volume	%	Volume	%	Volume	%
D.K.I	Motor-cycle	424734	21.3	35624	22.2	2332	8.6	462690	21.2
	Sedan	1167687	58.6	56733	35.4	9278	34.0	1233698	56.6
	Truck	401189	20.1	68022	42.4	15669	57.4	484880	22.2
	Total	1990610	100.0	160379	100.0	27279	100.0	2181268	100.0
BOTABEK	Motor-cycle	35978	19.9	3323	10.7	637	17.4	39938	18.5
	Sedan	66947	36.9	6685	21.4	155	4.2	73787	34.1
	Truck	78397	43.2	21157	67.9	2878	78.4	102432	47.4
	Total	181322	100.0	31165	100.0	3670	100.0	216157	100.0
OTHERS	Motor-cycle	1545	5.8	1523	18.7	298	73.4	3366	9.5
	Sedan	7591	28.2	3604	44.2	76	18.7	11271	31.8
	Truck	17769	66.0	3022	37.1	32	7.9	20823	58.7
	Total	26905	100.0	8149	100.0	406	100.0	35460	100.0
TOTAL	Motor-cycle	462257	21.0	40470	20.3	3267	10.4	505994	20.8
	Sedan	1242225	56.4	67022	33.5	9509	30.3	1318756	54.2
	Truck	497355	22.6	92201	46.2	18579	59.3	608135	25.0
	Total	2201837	100.0	199693	100.0	31355	100.0	2432885	100.0

Note : Bus trips are excluded

FIGURE . 3-13

ZONES OF EXCESS INFLOW



LEGEND :

(xx) : ZONE NUMBER

: ZONE OF EXCESS INFLOW

xxxx : EXCES INFLOW OF PERSON TRIP

SOURCE :

(COMPLETE OD TABLE)

(MOTORCYCLE + SEDAN + TRUCK)

LEGEND

D.K.I JAKARTA BOUNDARY

WILAYAH (CITY) BOUNDARY

ZONE BOUNDARY

1 ~ 50 ZONE NUMBER

0 1 2 3 5KM

(3) Estimate of Bus Trips in 1980

a) Method of Estimating Bus Trips 1980

Modes of public transportation were excluded from the Roadside OD Survey. Therefore, it is necessary to estimate number of trips made by public transportation, mainly bus and railway.

Procedure for estimating bus trips is as shown in Fig. 3-14, and described below:-

Here, bus means bus (Bus, Micro Bus) and Oplet (Oplet, Pick-up, Combi, Suburban).

a. Calculate traffic volume by bus at every screen line by utilizing the results of traffic count survey.

b. By reference to the results of Roadside OD Survey and bus routes, determine how to allocate the bus trips at every screen line to each super zone surrounded by screen line.

c. Calculate bus vehicle OD table for super zones.

d. By reference to the results of bus survey and data obtained from DLLAJR, determine average passengers per bus. Then calculate bus passenger OD table for the above-mentioned super zones.

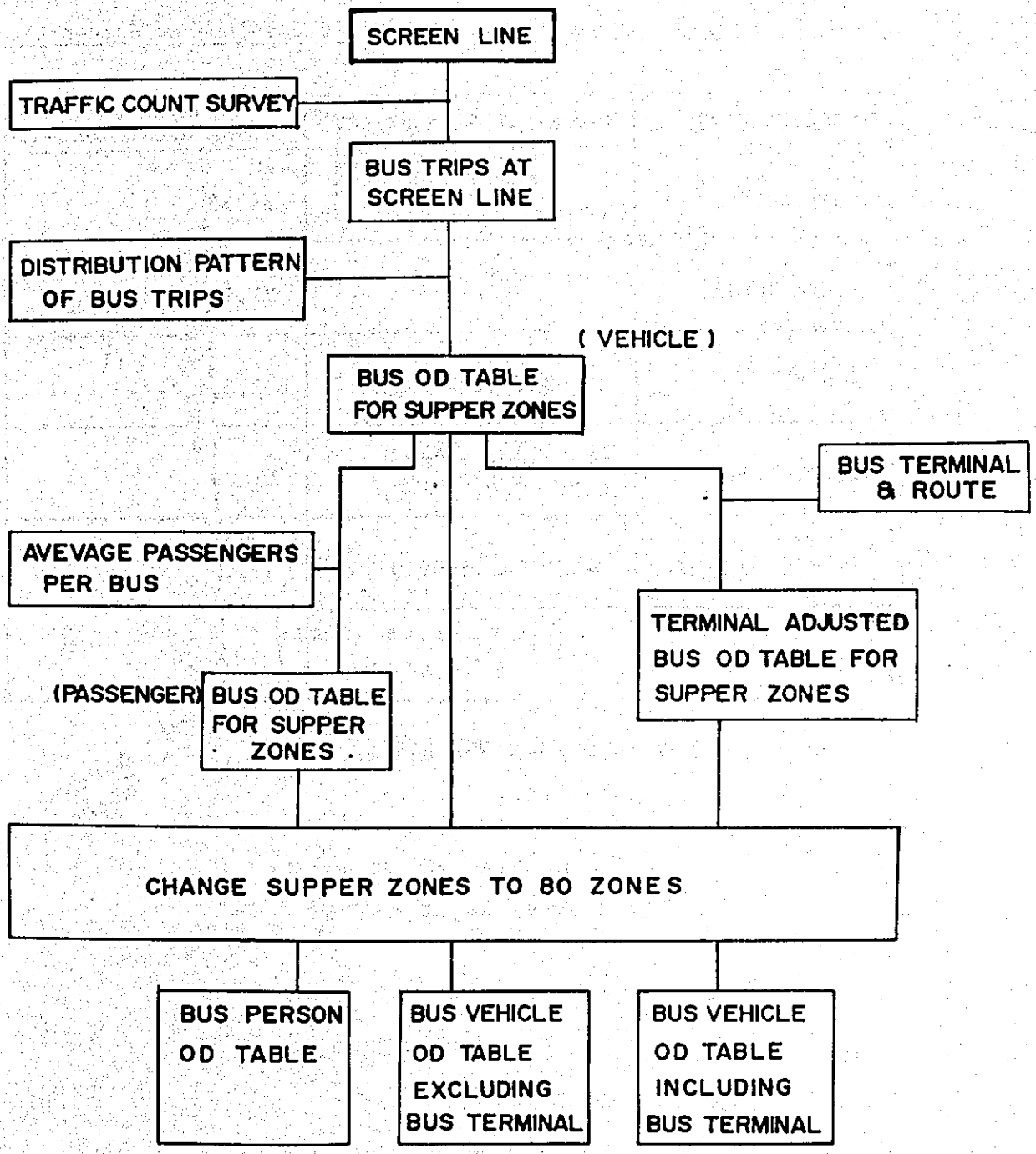
e. Take bus terminal and route into consideration, and establish another bus vehicle OD table for super zone.

f. Change OD table for super zones (c.d and e) to OD table for eighty analyzing zones.

g. Output at this stage

- Bus vehicle OD Table (not considered bus terminal system)
- Bus vehicle OD Table adjusted by bus terminal system
- Bus passenger OD Table

·Fig. 3-14 ESTIMATING FLOW OF BUS TRIPS



b) Screen Line and Traffic Count Data

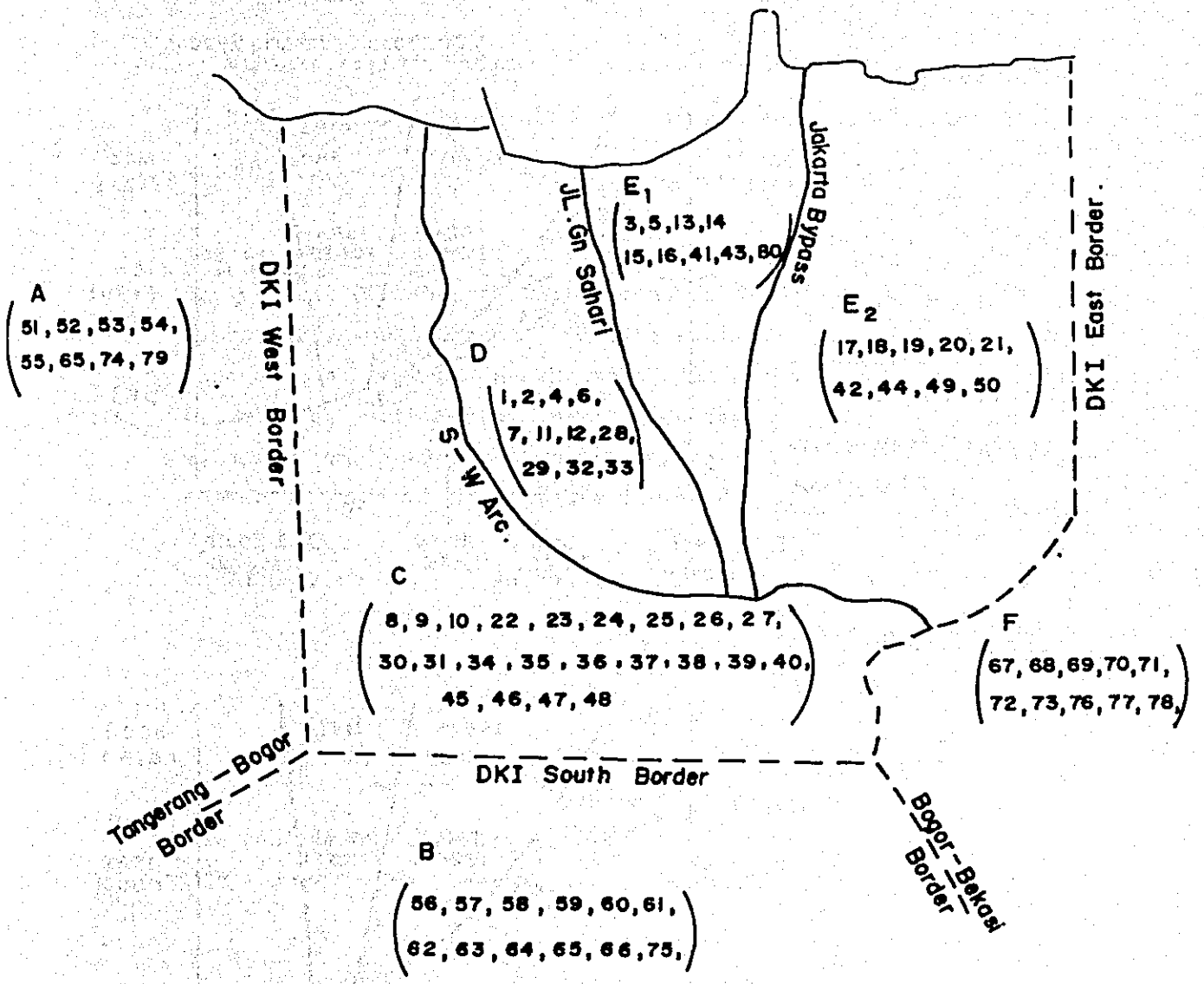
Screen lines were established as shown in Figure 3-15, and traffic volume at every screen line is calculated based on the results of traffic count survey. This is shown in Figure 3-15.

Table 3-9 Data used for calculating traffic volume at Screen Lines

SCREEN LINE	SURVEY ON HARBOUR ROAD	SURVEY ON INTRA URBAN TOLLWAY
West Border	-	34,35
South Border	-	27,28,29,30,31,32
S-W Arc	17, 19, 20	1,2,3,4,6,7.9.11.12
JL. Gn. SAHARI	1004, 1005, 1008, 1018, 1020.	17,20
Jakarta By Pass	02,03,04,05,06,07,09	-
East Border	1027	26

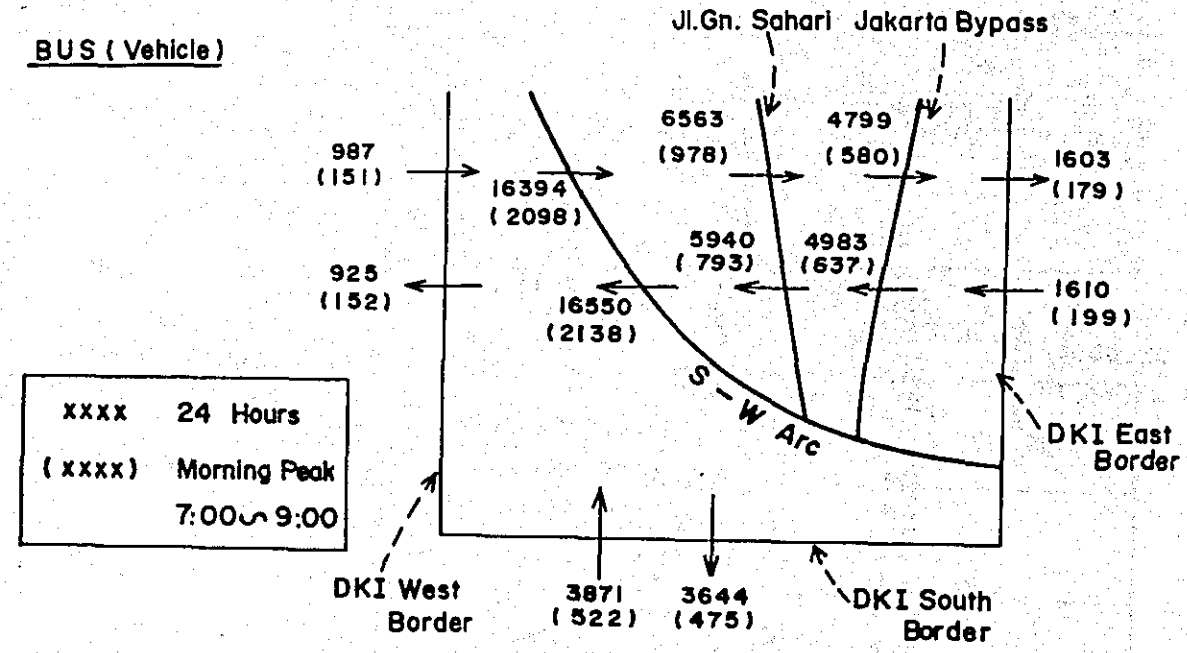
Figures indicate survey station number.

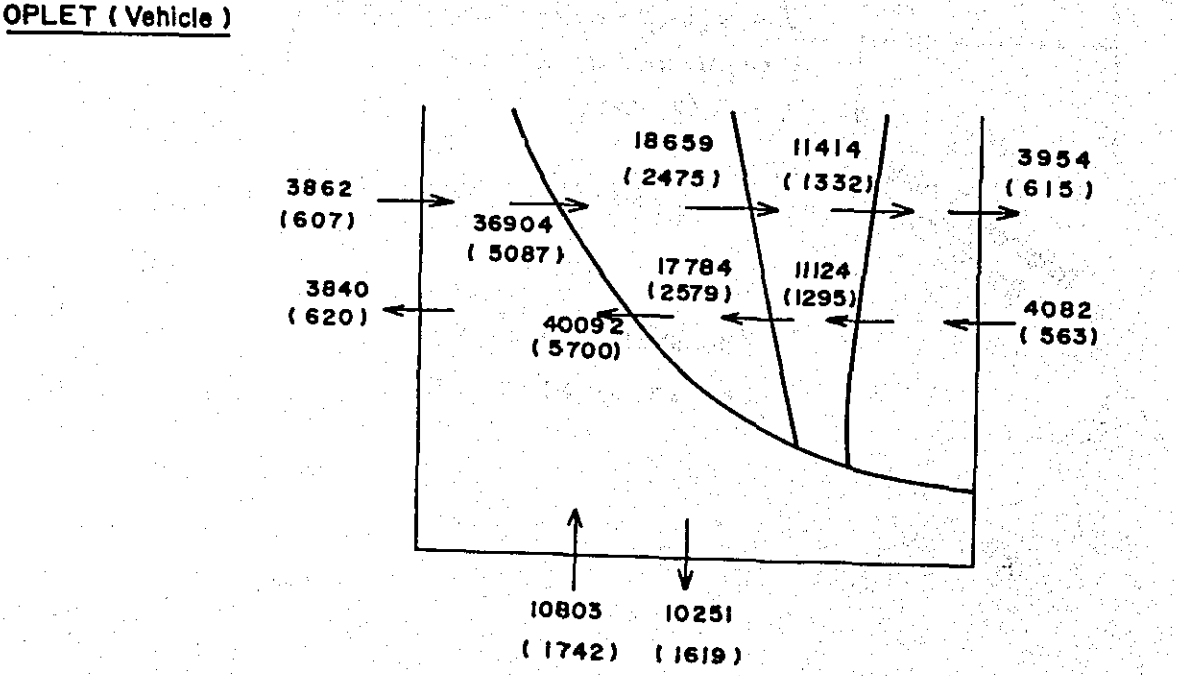
Fig. 3-15 SCREEN LINE



( ) --- Analysis Zone No.

Fig. 3-16
SCREEN LINE TRAFFIC VOLUME OF BUS & OPLET





c) Bus vehicle OD Table for Super zones

After having calculated traffic volume at every screen line, it is necessary to divide this volume into OD pair traffic.
Allocating ratios are set for this purpose from consideration of the following :-

- Vehicle traffic volume in relation to trip distance
- Distribution pattern of motorcycle abtained by Roadside OD survey
- Bus routes and terminals.

The ratios are as shown in Figure 3-17. .
Bus vehicle OD Table for super zone is calculated by using screen line traffic volume and allocating ratios.
In order to complete the OD Table, intra zonal trips should also be calculated. Intra zonal trip ratios for each super zone are determined by considering the results of Roadside OD Survey and the number of bus routes available for each super zone.

Super Zone	Intra Zonal Trip Ratio
C	5 %
D	15
E_1	15
E_2	10

Bus vehicle OD Table for super zones is as shown in Table 3-10.

Table 3-10 BUS OD TABLE BETWEEN SUPER ZONES

VEHICLE (BUS & OPLET) ALL DAY

O \ D	A	B	C	D	E1	E2	F	TOTAL
A	-	-	3197	1311	292	49	-	4849
B	-	-	9497	4056	927	194	-	14674
C	3151	8999	2931	32529	9294	4646	-	61550
D	1284	3838	35093	7505	5728	3111	981	57540
E1	284	877	10026	4282	3406	6275	957	26107
E2	46	181	5013	2288	7349	1850	3619	20346
F	-	-	-	730	1132	3830	-	5692
TOTAL	4765	13895	65757	52701	28128	19955	5557	190758

VEHICLE (BUS & OPLET) MORNING PEAK

O \ D	A	B	C	D	E1	E2	F	TOTAL
A	-	-	500	205	45	8	-	758
B	-	-	1480	619	139	26	-	2264
C	510	1371	401	4301	1228	614	-	8425
D	208	572	4797	1045	799	453	139	8013
E1	46	128	1371	651	430	585	87	3298
E2	8	23	685	349	646	228	568	2507
F	-	-	-	111	110	541	-	762
TOTAL	772	2094	9234	7281	3397	2455	794	26027

BUS OD TABLE BETWEEN SUPER ZONES

VEHICLE (BUS) ALL DAY

O \ D	A	B	C	D	E1	E2	F	TOTAL
A	-	-	494	345	99	49	-	987
B	-	-	1935	1355	387	194	-	3871
C	463	1823	813	9776	2793	1396	-	17064
D	324	1276	9987	1985	823	658	164	15217
E1	92	364	2853	490	921	1870	468	7058
E2	46	181	1427	392	2271	529	971	5817
F	-	-	-	98	568	944	-	1610
TOTAL	925	3644	17509	14441	7862	5640	1603	51624

VEHICLE (BUS) MORNING PEAK

O \ D	A	B	C	D	E1	E2	F	TOTAL
A	-	-	75	53	15	8	-	151
B	-	-	261	183	52	26	-	522
C	76	238	104	1233	352	176	-	2179
D	53	167	1277	277	174	140	35	2123
E1	15	47	365	76	105	156	39	803
E2	8	23	183	61	278	66	105	724
F	-	-	-	15	69	115	-	199
TOTAL	152	475	2265	1898	1045	687	179	6701

BUS OD TABLE BETWEEN SUPER ZONES

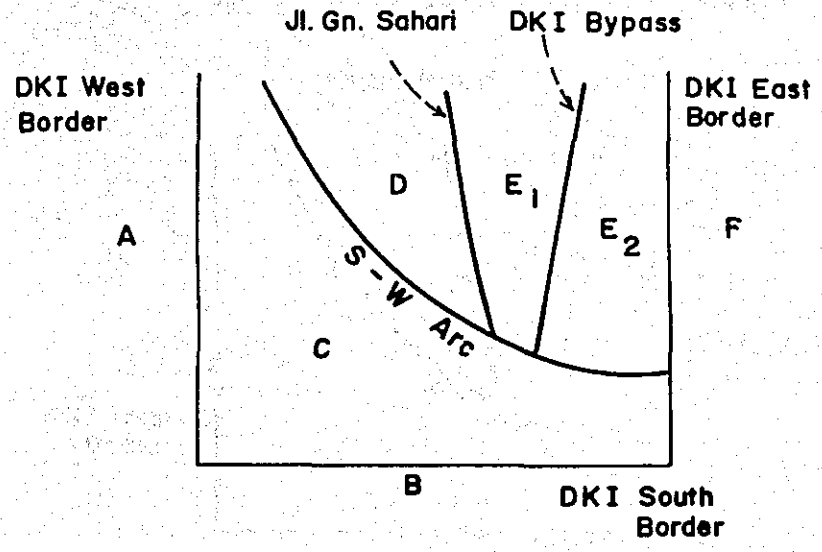
VEHICLE (OPLET) ALL DAY

O \ D	A	B	C	D	E1	E2	F	TOTAL
A	-	-	2703	966	193	-	-	3862
B	-	-	7562	2701	540	-	-	10803
C	2688	7176	2118	22753	6501	3250	-	44486
D	960	2562	25106	5520	4905	2453	817	42323
E1	192	513	7173	3792	2485	4405	489	19049
E2	-	-	3586	1896	5078	1321	2648	14529
F	-	-	-	632	564	2886	-	4082
TOTAL	3840	10251	48248	38260	20266	14315	3954	139134

VEHICLE (OPLET) MORNING PEAK

O \ D	A	B	C	D	E1	E2	F	TOTAL
A	-	-	425	152	30	-	-	607
B	-	-	1219	436	87	-	-	1742
C	434	1133	297	3068	876	438	-	6246
D	155	405	3520	768	625	313	104	5890
E1	31	81	1006	575	325	429	48	2495
E2	-	-	502	288	368	162	463	1783
F	-	-	-	96	41	426	-	563
TOTAL	620	1619	6969	5383	2352	1768	615	19326

DISTRIBUTION PATTERN OF BUS TRIPS



BUS

%

	C	D	E_1	E_2	F
A	50	35	10	5	–
B	50	35	10	5	–
C	–	70	20	10	–
D	–	–	50	40	10
E_1	–	–	–	80	20
E_2	–	–	–	–	100

OPLET

%

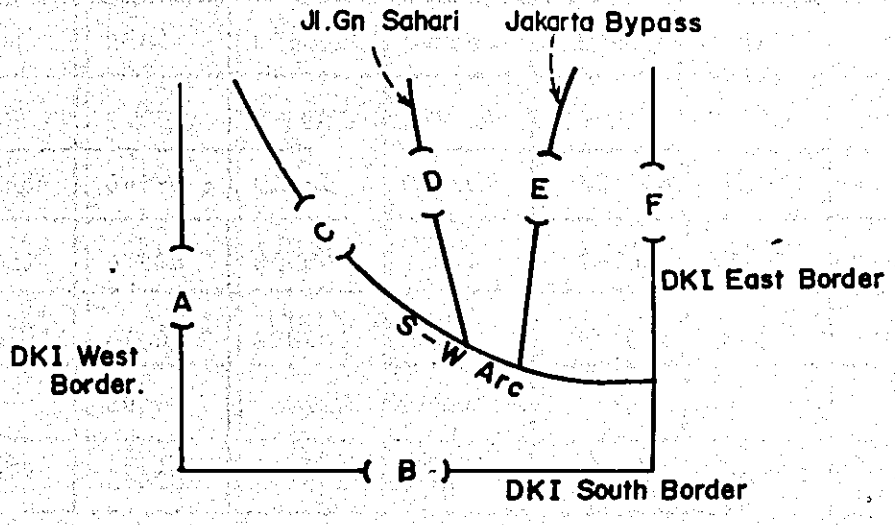
	C	D	E_1	E_2	F
A	70	25	5	–	–
B	70	25	5	–	–
C	–	70	20	10	–
D	–	–	60	30	10
E_1	–	–	–	90	10
E_2	–	–	–	–	100

d) Bus Passenger OD Table for Super Zone

Bus Passenger OD Table is obtained by multiplying bus vehicle OD table by average passengers per bus. This latter figure was estimated from the results of bus surveys and other data from DLLAJR. Average passengers per bus is as shown in Figure 3-18, and bus passenger OD Table is as shown in Table 3-11.

Fig. 3-18

AVERAGE PASSENGERS PER BUS & OPLET



BUS

(All Day)

Passengers / Bus

SCREEN LINE	INWARDS		OUTWARDS	
	ROUTE	OTHERS	ROUTE	OTHERS
A	39.2	27.5	38.1	26.7
B	39.8	27.9	40.4	28.3
C. D. E	26.7			
F	38.4	26.9	29.8	20.9
Average for A.B & F	38.1			

(Morning Peak) 38.1

OPLET

(All Day)
(Morning Peak) } 9.0

Table 3-11 BUS OD TABLE BETWEEN SUPER ZONES

PERSON (BUS & OPLET) ALL DAY

O \ D	A	B	C	D	E1	E2	F	TOTAL
A	-	-	39317	19161	4743	1490	-	64711
B	-	-	127221	65743	16693	5936	-	215593
C	37991	121378	40769	465796	133082	66523	-	865539
D	18294	62811	492607	102680	66119	39646	11226	793383
E1	4470	15958	140732	47211	46956	89574	15446	360347
E2	1365	5631	70375	27530	106338	26013	46751	284003
F	-	-	-	8646	22242	54496	-	85384
TOTAL	62120	205778	911021	736767	396173	283678	73423	2,668,960

PERSON (BUS & OPLET) MORNING PEAK

O \ D	A	B	C	D	E1	E2	F	TOTAL
A	-	-	6683	3387	842	305	-	11217
B	-	-	20915	10896	2764	991	-	35566
C	6802	19265	6635	74589	21295	10648	-	139234
D	3414	10008	80334	17466	12254	8151	2270	133897
E1	851	2520	22961	8071	6926	9805	1918	53052
E2	305	876	11490	4916	13904	3973	8168	43632
F	-	-	-	1436	2998	8216	-	12650
TOTAL	11372	32669	149018	120761	60983	42089	12356	429,248

Table 3-11-2 BUS OD TABLE BETWEEN SUPER ZONES

PERSON (BUS) ALL DAY

O \ D	A	B	C	D	E1	E2	F	TOTAL
A	-	-	14990	10467	3006	1490	-	29953
B	-	-	59163	41434	11833	5936	-	118366
C	13799	56794	21707	261019	74573	37273	-	465165
D	9654	39753	266653	53000	21974	17569	3873	412476
E1	2742	11341	76175	13083	24591	49929	11045	188906
E2	1365	5631	38101	10466	60636	14124	22919	153242
F	-	-	-	2958	17166	28522	-	48646
TOTAL	27560	113519	476789	392427	213779	154843	37837	1,416,754

PERSON (BUS) MORNING PEAK

O \ D	A	B	C	D	E1	E2	F	TOTAL
A	-	-	2858	2019	572	305	-	5754
B	-	-	9944	6972	1981	991	-	19888
C	2896	9068	3962	46977	13411	6706	-	83020
D	2019	6363	48654	10554	6629	5334	1334	80887
E1	572	1791	13907	2896	4001	5944	1486	30597
E2	305	876	6972	2324	10592	2515	4001	27585
F	-	-	-	572	2629	4382	-	7583
TOTAL	5792	18098	86297	72314	39815	26177	6821	255314

Table 3-11-3 BUS OD TABLE BETWEEN SUPER ZONES

PERSON (OPLET) ALL DAY

O \ D	A	B	C	D	E1	E2	F	TOTAL
A	-	-	24327	8694	1737	-	-	34758
B	-	-	68058	24309	4860	-	-	97227
C	24192	64584	19062	204777	58509	29250	-	400374
D	8640	23058	225954	49680	44145	22077	7353	380907
E1	1728	4617	64557	34128	223365	39645	4401	171441
E2	-	-	32274	17064	45702	11889	23832	130761
F	-	-	-	5688	5076	25974	-	36738
TOTAL	34560	92259	434232	344340	182394	128835	35586	1,252,206

PERSON (OPLET) MORNING PEAK

O \ D	A	B	C	D	E1	E2	F	TOTAL
A	-	-	3825	1368	270	-	-	5463
B	-	-	10971	3924	783	-	-	15678
C	3906	10197	2673	27612	7884	3942	-	56214
D	1395	3645	31680	6912	5625	2817	936	53010
E1	279	729	9054	5175	2925	3861	432	22455
E2	-	-	4518	2592	3312	1458	4167	16047
F	-	-	-	864	369	3834	-	5067
TOTAL	5580	14571	62721	48447	21168	15912	5535	173,934

e) Terminal Adjusted Bus OD Table for Super Zone

The Bus vehicle OD Table described in section 3 is based on the assumption that bus trips travel directly to personal destinations in a similar manner to private cars. However, in actual fact buses are operated on scheduled routes, most of which link a bus terminal with another. Accordingly some modification was necessary from consideration of the location of bus terminal. The procedure for modifying the original bus vehicle OD table is as follows :

a. Determine the method of bus operation for each OD pair.

b. Determine how to distribute buses among several terminals in one zone.

c. Calculate bus trips for each OD pair including bus terminal.

d. Complete OD table (zone plus terminal)

Bus Terminals in DKI

In DKI Jakarta, there are thirteen bus terminals, and these are located as shown in Figure 3-6 . Daily average buses and passengers using bus terminals in October 1980 amount to 2,950 vehicles and 1.325 thousand persons, respectively. Figures for each bus terminal are shown in Table 3-12 . Most of the bus routes originate from one of these bus terminals and destimate at another bus terminal.
The number of bus routes in DKI Jakarta excluding Metro Mini, amounts to 165 routes, and of these 152 bus routes connect two bus terminals.
In terms of the super zone mentioned before, bus routes are available for each zone as shown below.

	C	D	E1	E2
C	5	43	6	14
D		31	21	23
E1			4	3

Basic way of using bus terminals

In order to adapt these bus terminals into the trip calculation, it is necessary to make some simplifications on how bus terminals are used.

a. Twenty per cent of the bus trips between two super zones travel directly to their destination without using bus terminals.

b. Trips from outside Jakarta to inside, first terminate at bus terminals in their nearest super zone, in DKI (C or F), and then continue to bus terminals in their final destination supper zone.

c. Trips from inside Jakarta to outside, first terminate at bus terminals in C or F, and then continue to their final destination outside Jakarta.

d. Within Jakarta trips between two super zones are completed by using a bus terminals in each super zone. In other words, bus routes are available for every pair of super zones.

e. Excluding those in a) above, every trip in one supper zone is connected with a bus terminal there.

TABLE. 3-12

NUMBER OF BUSES & PASSENGERS AT BUS TERMINAL IN D.K.I (DAILY AVERAGE IN OCTOBER 1980)

ZONE	CODE NO	TERMINAL	BUS		MICRO BUS		TOTAL	
			VEHICLE	PASSENGER	VEHICLE	PASSENGER	VEHICLE	PASSENGER
C	81	GROGOL.	266	312490	37	22000	303	334490
	82	BLOK. M.	465	283500	211	52550	676	336050
	83	PASAR MINGGU.	268	41850	42	6300	310	48150
	84	CILILITAN.	207	115464	45	15514	252	130978
		TOTAL :	1206	753304	335	96364	1541	849668
D	85	KOTA.	97	20370	3	1270	100	21640
	86	L.P. BANTENG.	155	89280	103	59328	258	148608
	87	TANAH ABANG.	102	28505	18	3600	120	32105
	88	MANGGARAI.	96	54500	147	44100	243	98600
		TOTAL :	450	192655	271	108298	721	300953
E_1	89	TG. PRIOK.	100	60050	19	8600	119	68650
	90	SENEN.	9	1760	41	5535	50	7295
	91	KAMP. MELAYU.	62	11716	109	14243	171	25979
		TOTAL :	171	73526	169	28398	340	101924
E_2	92	PULO GADUNG	192	34973	51	3912	243	38885
	93	RAWAMANGUN.	105	33290	-	-	105	33290
		TOTAL	297	68263	51	3912	348	72157
		TOTAL	2124	1087748	826	236972	2950	1324720

Source : DLLAJR

Trip Distribution among bus terminals in each zone

The rate of distributing trips to each bus terminal in one zone is assumed to depend on the resistered number of buses at each bus terminal. These rates are as shown below.

SUPER ZONE	OD PAIR	No.	BUS TERMINAL	RATE OF DISTRIBUTION
C	A - C	81	Grogol	30.9%
		82	Blom M	69.1
	B - C	82	Blok M	54.6
		83	Pasar Minggu	25.0
		84	Cililitan	20.4
D		85	Kota	13.9
		86	Lp. Banteng	35.8
		87	Tanah Abang	16.6
		88	Manggarai	33.7
E_1		89	Tg. Priok	35.0
		90	Senen	14.7
		91	Kamp. Melayu	50.3
E_2		92	Pulo Gadung	69.8
		93	Rawamangun	30.2

Number of Bus Trips with Bus Terminal

If compared with the number of bus trips when ignoring bus terminals, the number of bus trips including the effect of bus terminals is higher by a factor of 2.38. This result is briefly shown below :

Unit : Vehicle trips

	MORNING PEAK .	ALL DAY
(1) without terminal	26,027	190,758
(2) With terminal	62,005	457,013
(3) (2) ÷ (1)	2.382	2.396

After having calculated how many bus trips originate from or destinate in each bus terminal, these trips are to added to each related zone.

(4) Railway OD Table in 1980.

An OD table between railway stations have been established by PJKA by utilizing the records of ticket sales in 1980.
In order to make use of this OD table, it has been rearranged to an OD table with eighty zones in accordance with the methodology of this study. In rearranging from station to zone, the following factors are taken into consideration :

a. Location of railway station

b. Road distance between railway station and zone centroid

c. Density of population in each zone

The result is shown in Table 3-13 . Attention should be paid to the fact that this table is mainly for JABOTABEK area and that long distance trips by railway are not included.

Person trips by railway in morning peak amount to 8.053, 50.8 percent of which, that is to say, 4.088 trips, originate in Bogor.
Most of the trips originate from BOTABEK area and destinate in Jakarta. Trips destinating in Jakarta amount to 7,085, which is equivalent to 88.0 per cent of total trips. As described already, trips in the morning peak tend to concentrate to Jakarta, but this tendency is most abvious for trips by railway.

In All Day, trips by railway amount to 43,693, but intra Jakarta trips amounts only to 5,130 trips, which is equal to 11.7 per cent of total trips.

TABLE. 3-13 RAILWAY O D TABLE

Morning Peak	DKI	Tangerang	Bogor	Bekasi	BOTABEK	OTHERS	TOTAL
DKI	1712	55	323	89	467	0	2179
Tangerang	589	32	1	0	33	0	622
Bogor	3672	7	409	0	416	0	4088
Bekasi	1112	0	0	52	52	0	1164
BOTABEK	5373	39	410	52	501	0	5874
OTHERS	0	0	0	0	0	0	0
TOTAL	7085	94	733	141	968	0	8053

ALL DAY	DKI	Tangerang	Bogor	Bekasi	BOTABEK	OTHERS	TOTAL
DKI	5130	1873	10777	2998	15648	0	20778
Tangerang	1966	313	7	2	322	0	2288
Bogor	12236	68	4093	0	4161	0	16397
Bekasi	3703	1	3	523	527	0	4230
BOTABEK	17905	382	4103	525	5010	0	22915
OTHERS	0	0	0	0	0	0	0
TOTAL	23035	2255	14880	3523	20658	0	43693

(5) Present situation of trips (1980).

Summing up the above descriptions, person trips by all transportation modes amount to 793 thousand trips in the morning peak, and 5,146 thousand trips in All Day. Shares of each transportation mode are briefly summerized as follows, and desire lines by all transportation modes excluding railway are shown in Figure 3-20 and 3-21.

FIG. 3 – 19 · **PERSON TRIPS IN 1980 BY MODE**

(THOUSAND TRIPS)

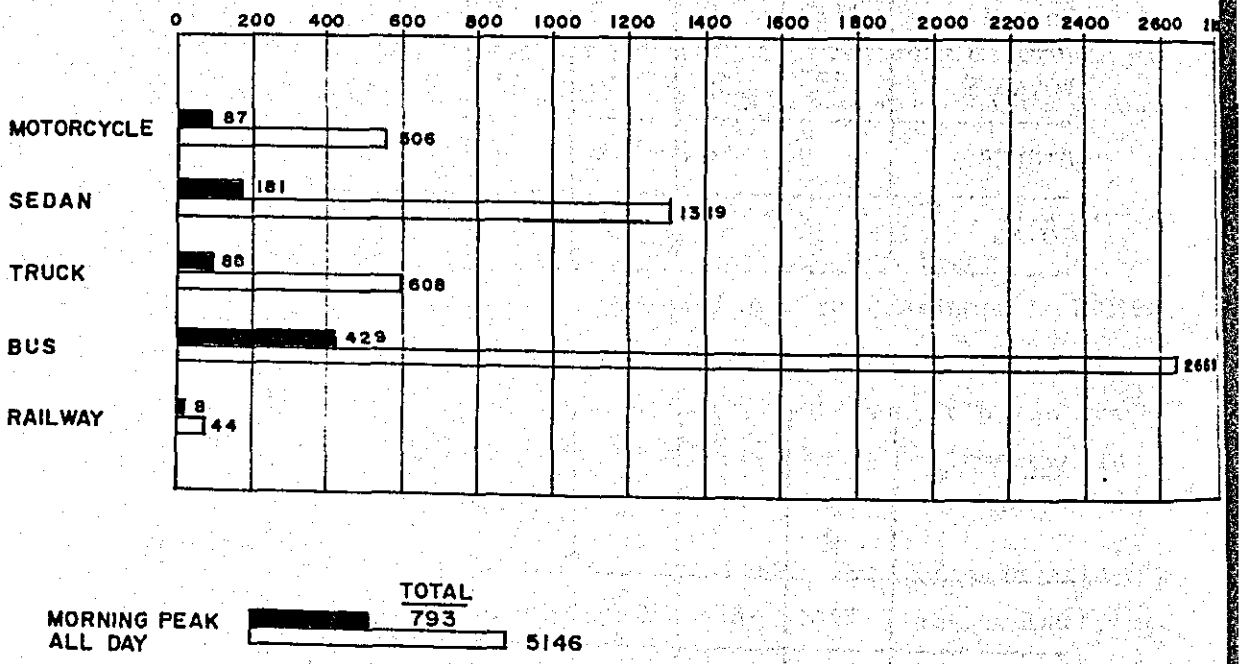


Table 3-14 Person trips by mode in DKI Jakarta in 1980

All Modes

1000 trips/days

Origin \ Destination		DKI Jakarta	BOTABEK	Out of Botabek	Sub-Total	Total
DKI Jakarta		3961	493	51	544	4505
Out of Jakarta	Botabek	538	36	4	40	578
	Out of Botabek	54	8	0	8	62
	Sub-Total	592	44	4	48	640
Total		4553	537	55	592	5145

Generated Person trips by Mode in 1980

1000 trips/days

		Motor Cycle	Sedan	Truck	Bus Microbus	Railway	Total
DKI Jakarta		463	1234	485	2302	21	4505
Out of Jakarta	Botabek	40	74	102	339	23	578
	Out of Botabek	3	11	21	27	0	62
	Sub-Total	43	85	123	366	23	640
Total		506	1319	608	2668	44	5145

Table 3-15 Person trips by mode in DKI Jakarta in 1980

All Modes

Morning Peak

1000 trips/2 hours

Origin \ Destination		DKI Jakarta	BOTABEK	Out of Botabek	Sub-Total	Total
DKI Jakarta		600	78	7	85	685
Out of JKT	Botabek	102	1	0	1	103
	Out of Botabek	5	0	0	0	5
	Sub-Total	107	1	0	1	108
Total		707	79	7	86	793

Generated Person trips by Mode in 1980

Morning Peak

1000 trips/2 hours

		Motor Cycle	Sedan	Truck	Bus Microbus	Railway	Total
DKI Jakarta		78	170	65	370	2	685
Out of JKT	Botabek	8	11	21	57	6	103
	Out of Botabek	0	1	2	2	0	5
	Sub-Total	8	12	23	59	6	108
Total		86	182	88	429	8	793

Fig. 3-20 PASSENGER DESIRE LINE IN 1980 BY ALL MODES IN ALL DAY

(EXCLUDING RAILWAY)

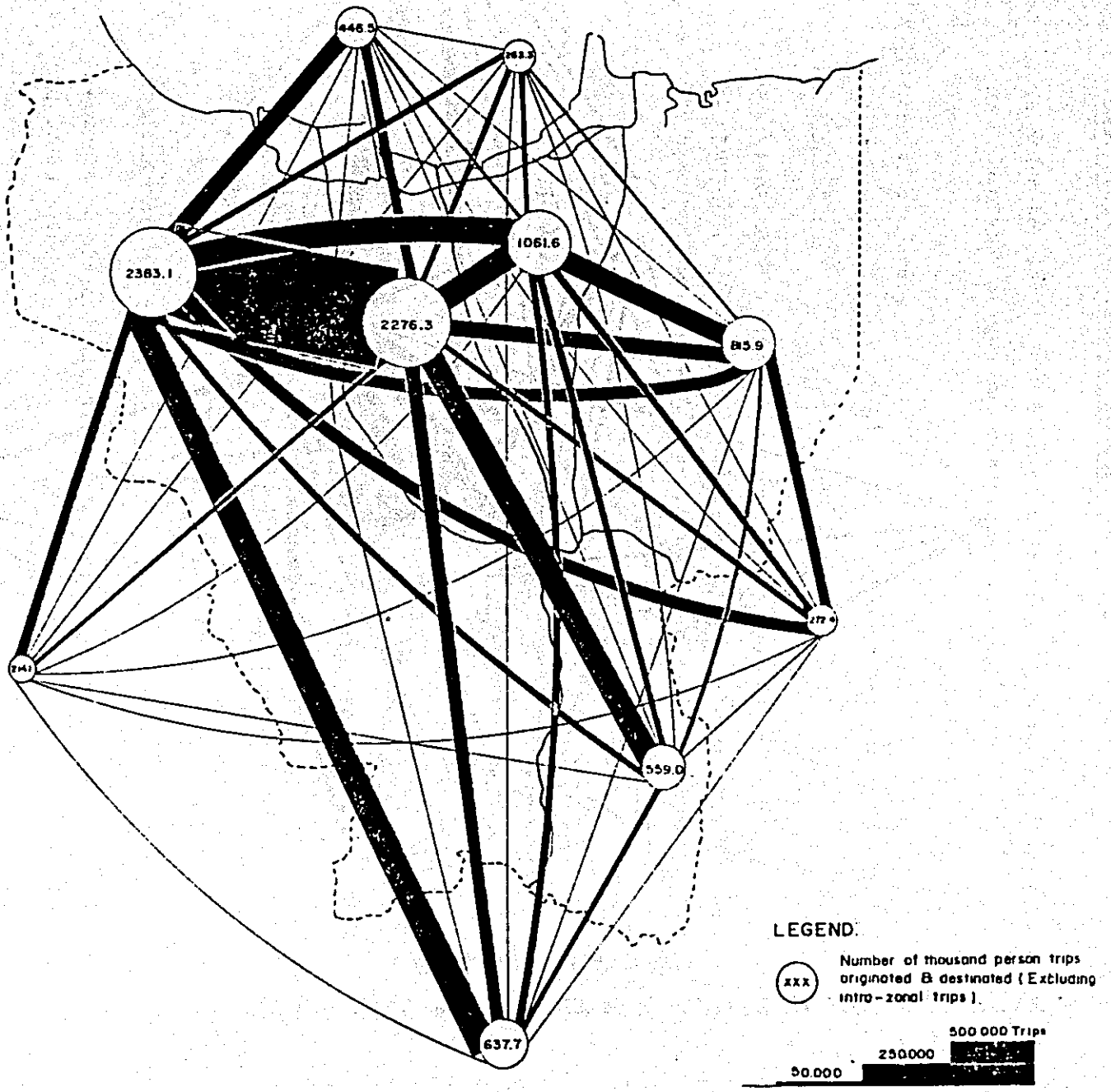
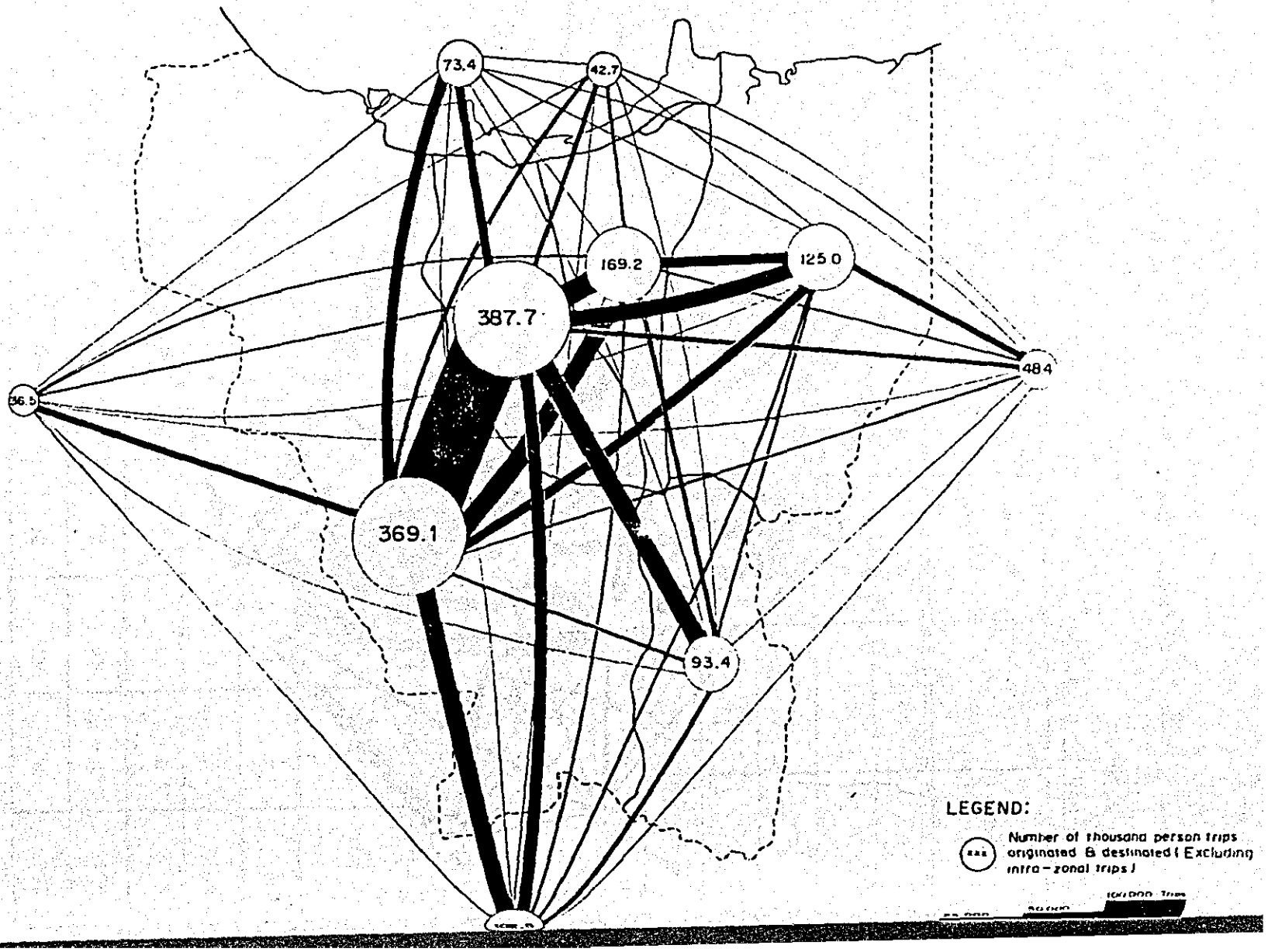


Fig. 3-21

PASSENGER DESIRE LINE IN 1980 BY ALL MODES IN MORNING PEAK

(EXCLUDING RAILWAY)



3.2.2 Home Interview Person Trip Survey

In order to clarify the characteristics of person trips in DKI, Home Interview Survey was conducted.

(1) Methode of Survey

Survey Period

Questionaire were distributed and collected during the period November 16, 1980 - November 23, 1980. A trip date was designated for a normal working day, that is from Monday to Thursday.

Survey District

The survey areas where sample households were selected cousist of the following 10 districts (Shown in Fig.3-22)

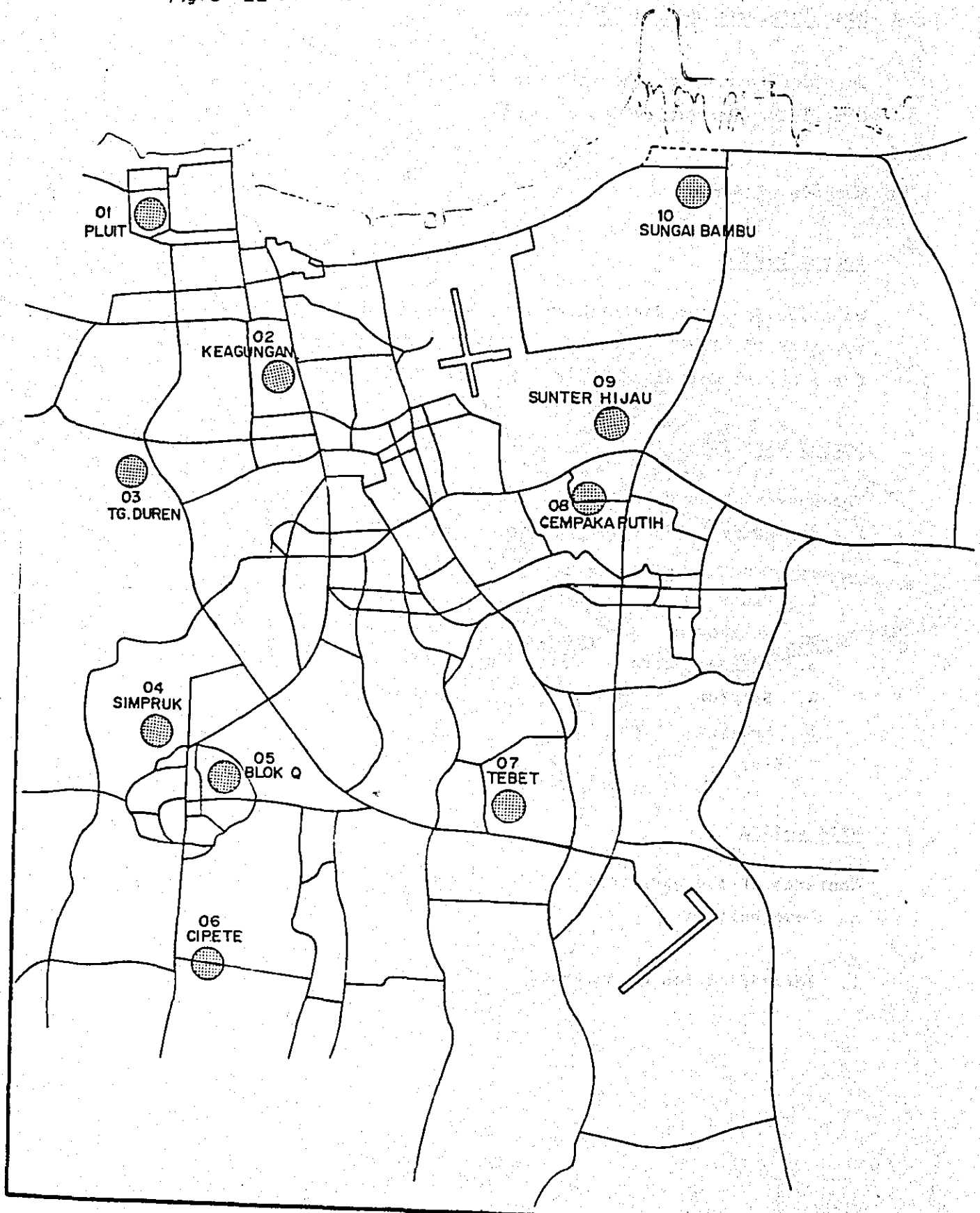
1. Pluit
2. Keagungan
3. Tanjung Duren
4. Simpruk
5. Kebayoran Baru Blok Q.
6. Cipete
7. Tebet
8. Cempaka Putih
9. Sunter Hijau
10. Sungai Bambu

Data Coding

Contents of the questionaire were classified in three categories as shown below :

1. Identification of Survey District

Fig. 3 - 22 HOME INTERVIEW SURVEY



2. Household Information

- Number of Persons who live in the same house
- Number of Persons older than 6 years
- Number of Persons who have jobs
- Number of Persons receiving education

  Junior High School, Senior High School, University, and special Training Course.

- Number of vehicles in the households possession.

  Motorcycle, Sedan, Colt, Others.

- Repair and Maintenance Budget for Transport

3. Information on Individuals

- Status in Household

  Husband, Wife, Child, etc.

- Sex
- Age
- Occupation
- Type of working Place
- Address of Working Place
- Trip Information

  Address of Destination

  Time of Departure

  Means of Transportation

  As a driver or as a passenger

  Trip Purpose

The questionair is sampled as shown as follows.

Fig.3-23 SAMPLE OF HOME INTERVIEW SHEET

DEPARTEMEN PEKERJAAN UMUM
DIT JEN BINA MARGA DIT BINA PROGRAM JALAN
SUB DIREKTORAT PERENCANAAN JALAN KOTA

HOME INTERVIEW SURVEY

Survey ini diselenggarakan dengan tujuan untuk mendapatkan informasi mengenai perjalanan di daerah perumahan ini. Rumah Saudara merupakan salah satu rumah yang terpilih dari sekian banyak rumah yang akan dikunjungi, untuk mana diharapkan keterangannya.

Saudara diminta untuk menjawab dengan lengkap pertanyaan pertanyaan yang tercantum dalam 2 lembar formulir I dan II.

Bagian A menanyai pertanyaan pertanyaan mengenai keadaan penghuni/keluarga. Bagian A diisi oleh Kepala Keluarga atau Wakilnya.

Bagian B mengenai keterangan pribadi, ditujukan untuk anggota keluarga yang telah berusia di atas 6 tahun.

Bagian C mengenai keterangan perjalanan, juga untuk anggota keluarga yang telah berusia di atas 6 tahun.

Petugas survey akan kembali ketempat Saudara pada :

Tanggal .....

Hari .....

Antara jam ..... dan jam .....

untuk mengambil formulir yang telah Saudara lengkapi dan juga untuk memberikan keterangan/petunjuk apabila Saudara mengalami kesulitan dalam mengisi/memberikan jawaban.

Atas perhatian serta partisipasi Saudara dalam survey ini, kami ucapkan terima kasih.

Jakarta, November 1980
Direktur Bina Program Jalan
Kasubdit. Dit. Perencanaan Jalan Kota

Ir. Widodo Wiyono MSc
NIP 110012959

CATATAN UNTUK SURVEYOR

Sample No. [ ]

Waktu berkunjung : Jam ..... Tanggal .....

Nama Penghuni .....

Alamat : Jl/no : ..... Kelurahan/desa : .....

Kecamatan ..... Wilayah .....

Jadwal waktu kunjungan berikutnya

Kunjungan Kedua Jam ..... Tanggal .....

Kunjungan Ketiga Jam ..... Tanggal .....

Jumlah formulir I & II yang diberikan kepada penghuni ..... lembar.

Nama Surveyor .....

I

A. DATA MENGENAI PENGHUNI/RUMAH TANGGA

Dijawab oleh Kepala Keluarga atau Wakilnya.

1. Alamat Rumah : Jalan/no .....
   Kelurahan/desa .....
   Kecamatan .....
   Wilayah .....
2. Jumlah penghuni tetap termasuk yang tinggal lebih dari 2 bulan (termasuk pembantu rumah tangga) ..... [ ] orang
3. Jumlah penghuni yang telah berusia diatas 6 tahun ..... [ ] orang
4. Jumlah penghuni yang telah bekerja ..... [ ] orang
5. Jumlah penghuni yang masih terdaftar mengikuti pendidikan/kursus :
   1). SLP [ ] orang 3). Perguruan Tinggi/Akademi : [ ] orang
   2). SLA [ ] orang 4). Kursus [ ] orang
6. Jumlah kendaraan tetap di rumah :
   1). Sedan/jeep : [ ] buah 3). Sepeda motor/scooter : [ ] buah
   2). Colt/combi : [ ] buah 4). Lain-lain (Sebutkan) [ ] buah
7. Jumlah biaya operasi dan pemeliharaan kendaraan-kendaraan di atas per bulan adalah [ ] Ribu rupiah

SURAT PERNYATAAN

(Diisi oleh Penghuni, untuk dikembalikan pada petugas setelah diisi)

Yang bertanda tangan di bawah ini :

Nama .....

Alamat : Jl/no. .....

Kelurahan/desa : .....

Kecamatan : ..... Wilayah .....

Menyatakan bahwa telah menyerahkan formulir isian yang telah lengkap/terisi kepada petugas survey

Nama .....

Pada tanggal : ..... Jam .....

Sebanyak ..... lembar formulir I & II.

Yang membuat pernyataan

DEPARTEMEN PEKERJAAN UMUM
DIT JEN BINA MARGA - DIT BINA PROGRAM JALAN
SUB DIREKTORAT PERENCANAAN JALAN KOTA

B. KETERANGAN PRIBADI

Untuk Penghuni yang telah berusia di atas 6 tahun.

KEDUDUKAN DALAM RUMAH TANGGA (lingkari jawaban yang benar)	JENIS KELAMIN (lingkari jawaban yang benar)	UMUR	PEKERJAAN (lingkari jawaban yang benar)	TEMPAT KERJA (lingkari jawaban yang benar)	ALAMAT TEMPAT KERJA (tulis selengkapnya)
1. Suami 2. Istri 3. Anak 4. Tamu (yang tinggal > 2 bulan) 5. Pembantu 6. Lain-lain (sebutkan)	1. Pria 2. Wanita	☐ Tahun	1. Tidak bekerja 2. Usaha di Rumah 3. Pegawai Kantor 4. Pegawai keliling 5. Pelajar 6. Mahasiswa 7. Supir 8. Pembantu Rumah Tangga 9. Buruh 10. Lain-lain (sebutkan)	1. Tempat tinggal 2. Hotel/asrama 3. Kantor 4. Pasar/toko 5. Industri 6. Sekolah 7. Rekreasi 8. Bengkel 9. Proyek bangunan 10. Rumah sakit 11. Lain-lain (sebutkan)	Jl/no : .... Kelurahan/desa .... Kecamatan .... Wilayah ....

C. DATA PERJALANAN

Untuk penghuni yang telah berusia di atas 6 tahun.
Dijawab menurut keadaan perjalanan tanggal : ..... Hari .....

	ALAMAT TUJUAN (tulis selengkapnya)	WAKTU BERANGKAT (jam)	KENDARAAN YANG DIGUNAKAN (bila lebih dari 1 jawaban, pilihlah satu yang utama dan lingkari)	SEBAGAI APA ? (lingkari jawaban yang benar)	MAKSUD PERJALANAN (bila lebih dari 1 jawaban, pilihlah satu yang utama dan lingkari)
TUJUAN KE 1	Jl/no .... Kelurahan/desa ..... Kecamatan ..... Wilayah	jam ☐	1. Naik sepeda/jalan kaki 2. Becak 3. Helicak/bemo/bajaj 4. Oplet/Colt/bus/mini-ceulet 5. Taxi 6. Sepeda motor/scooter 7. Sedan/jeep/st. wagon 8. Truk 9. Kereta Api	1. Pengemudi 2. Penumpang	1. Bekerja 2. Pulang 3. Sekolah/kuliah/kursus 4. Berbelanja 5. Business 6. Berobat 7. Berkunjung 8. Rekreasi/Sosial 9. Mengemudi 10. Mengantar barang 11. Lain-lain (sebutkan)
TUJUAN KE 2	Jl/no .... Kelurahan/desa ..... Kecamatan ..... Wilayah	jam ☐	1. Naik sepeda/jalan kaki 2. Becak 3. Helicak/bemo/bajaj 4. Oplet/Colt/bus/mini-ceulet 5. Taxi 6. Sepeda motor/scooter 7. Sedan/jeep/st. wagon 8. Truk 9. Kereta Api	1. Pengemudi 2. Penumpang	1. Bekerja 2. Pulang 3. Sekolah/kuliah/kursus 4. Berbelanja 5. Business 6. Berobat 7. Berkunjung 8. Rekreasi/Sosial 9. Mengemudi 10. Mengantar barang 11. Lain-lain (sebutkan)
TUJUAN KE 3	Jl/no : .... Kelurahan/desa : .... Kecamatan .... Wilayah	jam ☐	1. Naik sepeda/jalan kaki 2. Becak 3. Helicak/bemo/bajaj 4. Oplet/Colt/bus/mini-ceulet 5. Taxi 6. Sepeda motor/scooter 7. Sedan/jeep/st. wagon 8. Truk 9. Kereta Api	1. Pengemudi 2. Penumpang	1. Bekerja 2. Pulang 3. Sekolah/kuliah/kursus 4. Berbelanja 5. Business 6. Berobat 7. Berkunjung 8. Rekreasi/Sosial 9. Mengemudi 10. Mengantar barang 11. Lain-lain (sebutkan)
TUJUAN KE 4	Jl/no .... Kelurahan/desa .... Kecamatan .... Wilayah	jam ☐	1. Naik sepeda/jalan kaki 2. Becak 3. Helicak/bemo/bajaj 4. Oplet/Colt/bus/mini-ceulet 5. Taxi 6. Sepeda motor/scooter 7. Sedan/jeep/st. wagon 8. Truk 9. Kereta Api	1. Pengemudi 2. Penumpang	1. Bekerja 2. Pulang 3. Sekolah/kuliah/kursus 4. Berbelanja 5. Business 6. Berobat 7. Berkunjung 8. Rekreasi/Sosial 9. Mengemudi 10. Mengantar barang 11. Lain-lain (sebutkan)
TUJUAN KE 5	Jl/no : .... Kelurahan/desa : .... Kecamatan .... Wilayah	jam ☐	1. Naik sepeda/jalan kaki 2. Becak 3. Helicak/bemo/bajaj 4. Oplet/Colt/bus/mini-ceulet 5. Taxi 6. Sepeda motor/scooter 7. Sedan/jeep/st. wagon 8. Truk 9. Kereta Api	1. Pengemudi 2. Penumpang	1. Bekerja 2. Pulang 3. Sekolah/kuliah/kursus 4. Berbelanja 5. Business 6. Berobat 7. Berkunjung 8. Rekreasi/Sosial 9. Mengemudi 10. Mengantar barang 11. Lain-lain (sebutkan)

(2) Samples obtained by Home Interview Survey

Home Interview Survey was performed to supplement the Roadside OD Survey and the number of samples obtained was limited for this reason. This means that the number of samples obtained was insufficient to allow an estimate of the total person trips in DKI.

Number of households interviewed was 2,893, and 88.6 per cent of these produced effective results. If compared with the number of households in the Kelurahan containing the Survey District, the ratio of collected samples was an everage of about 5.2 per cent. If compared with total households in DKI, less than 0.3 per cent of all households were surveyed.

Table : 3-16. SAMPLES RATE FOR THE HOME INTERVIEW SURVEY

SURVEY DISTRICT	ZONE NO.	KELURAHAN		SAMPLE HOUSEHOLD			
		Name	NO. OF HOUSEHOLD	SELECTED		ANSWERED	
				No. of Household	%	No. of Household	%
Pluit	11	Penjaringan	11006	252	2.290	123	1.118
Keagungan	28	Keagungan	4343	300	6.908	295	6.793
Tanjung Duren	26	Tanjung Duren	5153	400	7.762	396	7.685
Simpruk	38	Grogol Utara	5894	150	2.545	114	1.934
Blok Q	37	Selong	764	300	39.267	281	36.780
Cipete	40	Cilandak	2517	450	17.878	418	16.607
Tebet	32	Tebet Timur	3597	375	10.425	365	10.147
Cempaka Putih	5	Cempaka Putih Timur.	4024	216	5.368	176	4.374
Sunter Hijau	14	Sunter	5667	150	2.647	146	2.576
Sungai Bambu	15	Sungai Bambu	6394	300	4.692	250	3.910
Total			49359	2893	5.861	2564	5.195
DKI TOTAL			971960		0.298		0.264

Unknown Reply (11)are excluded from Samples Answerd
phusehold in DKI 1976 967644 1977 963196

These selected ten districts are considered to be wealthy areas in DKI, and this can be confirmed by showing passenger car/household Ratio.

	Passenger Cars/Household
- Simpruk	2.175
Cempaka Putih	1.352
Pluit	1.041
	----------0.718 Sample Average
Blok Q	0.626
Tebet	0.605
Tanjung Duren	0.591
Cipete	0.586
Sunter Hijau	0.342
	----------0.220 DKI Average
Sungai Bambu	0.180
Keagungan	0.047

It is expected that the higher the income level, the more trips will be generated. In view of this, the data obtained by Home Interview Survey will tend to be biased towards higher trip generation rates.

Table. 3 – 17 SUMMARY OF ANSWERS

		Pluit Zone II	Kebagungan Zone 28	Tg. Duren Zone 26	Simpruk Zone 38	Blok. Q Zone 37	Cipete Zone 40	Tebet Zone 32	Cempaka. P Zone 05	Sunter Hijau Zone 14	Sungai Bambu Zone 15	Unknown	Total
Number of Households Answered		123	295	396	114	281	418	365	176	146	250	11	2575
Number of Residents		671	1090	2495	592	1810	2567	2515	1287	531	1622	602	15782
Number of Answered Samples		586	877	1819	572	1693	2084	2168	943	445	1156	50	12393
Sex	Male	271	429	826	237	790	993	1058	455	187	593	19	5858
	Female	313	443	942	333	902	1078	1098	479	241	552	30	6411
	Unknown	2	5	51	1	1	13	12	9	17	11	1	124
Status in Family	Husband	115	259	331	109	242	354	333	154	120	221	4	2242
Family	Wife	112	273	334	110	259	344	340	140	129	192	7	2240
	Child	163	183	733	116	772	891	1042	416	106	647	25	5194
	Guest	22	7	54	1	28	45	49	33	5	40	1	285
	Servant	114	30	226	236	219	265	211	145	50	38	10	1544
	Others	59	22	90	0	173	148	94	39	31	11	3	670
	Unknown	1	3	51	0	0	37	99	16	4	7	0	218
Age	6 – 9	28	22	160	0	67	132	175	70	21	76	7	758
	10 – 19	125	177	593	122	476	730	725	326	88	438	20	3820
	20 – 29	197	237	386	215	513	424	523	218	136	223	10	3082
	30 – 39	116	179	298	83	186	268	274	124	111	127	6	1772
	40 – 49	75	125	211	99	153	269	253	120	35	152	2	1494
	50 – 59	25	76	80	42	171	138	135	57	14	95	3	836
	60 – 69	12	35	34	11	80	66	52	21	5	14	1	331
	70 –	4	19	12	0	27	34	22	6	0	4	1	129
	Unknown	4	7	45	0	20	23	9	1	35	27	0	171
Number of Vehicles	Motorcycle	67	57	104	26	93	84	108	53	55	91	180	918
	Sedan	122	14	207	247	157	205	190	217	37	43	57	1496
	Colt	6	0	27	1	19	40	31	21	13	2	192	352
	Others	1	3	98	0	11	37	26	16	7	3	150	2118
	Total	196	74	436	274	280	366	355	207	112	139	579	3118
Average Cost for Vehicles per Month Per Household (1.000 Rp)		18,5	2,2	24,9	2,3	19,0	21,8	35,3	42,3	10,4	2,7	47,2	18,3
Total Trips		1518	1647	3460	871	3482	5124	4407	2132	761	1912	98	25412
Average Trips per Household		12.341	5.583	8.737	7.640	12.391	12.258	12.074	12.114	5.212	7.648	8.909	9.869
Average Trips per Person		2.590	1.878	1.902	1.523	2.057	2.459	2.033	2.261	1.710	1.654	1.960	2.051
Average Carowner Ship per House Hold		1.593	0.251	1.101	2.404	0.996	0.876	0.973	1.176	0.767	0.556	-	1.211

(1) Characteristics of Person Trip

1) Trips Per Person

As is shown on Figure, average trips per person is 2.051. In relation to age classification there is no significant differences among age group, except for the group older than 60 years old.
However in relation to status in household, children (older than 6 years old) and husband show higher trips/person ratio, namely 2.288 and 2.283 respectively. On the other hand, as would be expected, servants show a lower ratio, 1.354. Composition ratio of children in households, amounts to 41.9 per cent so that children can be expected to greatly affect the generation of total person trips.

Distribution of trips/person ratio is shown in Table 3-18.

2) Short Distance Trips

Assuming that "Foot", "Becak" and "Helicak" represent means of short distance transportation, we can derive the ratio of short to long distance trips. Average ratio of short to long distance trips is 33.5 per cent. The group of "Husband" shows the lowest ratio, 9.5 per cent, and the highest is for servants 60.3 per cent.
With respect to Age, the 6-9 age group shows the highest ratio,70.7%.

From the other point of view, the intra zonal trips can be defined as short distance trips. As is shown in Table 3-9 short distance trips amounts to about 70 percent of all trips.

Table 3-18 DISTRIBUTION OF TRIPS/PERSON

TRIPS	NO. OF SAMPLES	RATIO
0	1633	13.2
1	527	4.2
2	8120	65.5
3	480	3.9
4	1212	9.8
5	279	2.3
6	95	0.8
7	17	0.1
8	13	0.1
9 over	17	0.1
Total	12393	100.0

(Unknown reply excluded)

Average Trips per Household 9.869
Average Trips per Person 2.051

Table 3-19 TRIP CHARACTERISTICS

	SAMPLES	TRIPS	TRIPS/ PERSON	*(Foot, Becak, Helicak) Short Distance Trip	*Short Distance Trip Ratio
STATUS TOTAL	12393	25412	2.051	8507	33.5
Husband	2242 (18.1)	5119 (20.2)	2.283	487	9.5
Wife	2240 (18.1)	3899 (15.3)	1.741	1646	42.2
Child	5194 (41.9)	11882 (46.8)	2.288	4661	39.2
Guest Staying	285 (2.3)	538 (2.1)	1.888	69	12.8
Servent	1544 (12.5)	2090 (8.2)	1.354	1261	60.3
Others	670 (5.4)	1435 (5.6)	2.142	287	20.0
Unknown	218 (1.7)	449 (1.8)	2.060	96	21.4
AGE					
6 — 9	758 (6.1)	1654 (6.5)	2.182	1170	70.7
10 — 19	3820 (30.8)	8230 (32.4)	2.154	3791	46.1
20 — 29	3082 (24.9)	6276 (24.7)	2.036	1464	23.3
30 — 39	1772 (14.3)	3607 (14.2)	2.036	815	22.6
40 — 49	1494 (12.1)	3163 (12.5)	2.117	637	20.1
50 — 59	836 (6.7)	1608 (6.3)	1.923	403	25.1
60 — 69	331 (2.7)	506 (2.0)	1.529	150	29.6
70 — —	129 (1.0)	156 (0.6)	1.209	35	22.4
Unknown	171 (1.4)	212 (0.8)	1.240	42	19.8

Table 3-20. DESTINATION ZONE (ALL TRIPS)

ZONE	INTER ZONAL / TRIP		INTRA ZONAL TRIP		TOTAL
	TRIPS	%	TRIPS	%	
P l u i t	953	(63.1)	557	(36.9)	1510
Keagungan	1327	(80.9)	314	(19.1)	1641
Tanjung Duren	2179	(66.0)	1125	(34.0)	3304
Simpruk	353	(47.4)	391	(52.6)	744
Blok Q	2488	(76.4)	769	(23.6)	3257
Cipete	2897	(68.8)	1315	(31.2)	4212
Tebet	3141	(72.2)	1212	(27.8)	4353
Cempaka Putih	1337	(64.0)	753	(36.0)	2090
Sunter Hijau	362	(47.8)	395	(52.2)	757
Sungai Bambu	1386	(72.6)	523	(27.4)	1909
T O T A L	16423	(69.1)	7354	(30.9)	23777 (100.0)

3) Trip Purpose

Trip purposes are grouped into 11 categories. A large part of trips are related to "home", so that "Returning home" accounts for the biggest per centage of all the trip purposes. As is shown in Table 3-21 , " Returning home" amounts to 10910 trips, that is equivalent to 43.0 percent of all trips. Within this ratio, there are no significant differences due to status in the household. The next biggest trip purpose is "Going to school" the composition ratio of which accounts for 19.5%. This trip is mostly made by children, so it is expected that this trip is a rather short distance trip or intra zonal trip. The third biggest trip purpose is "Going to office from home". This trip is mostly made by husbands as shown Table 3-2 Land this trip form long distance trip or inter zonal trip.

In order to examine "Going to office from home" trip, Table 3-22 was prepared to show the distribution of work places. 52.4 per cent of all work places are located in the same zone as the house and 47.6 per cent are in outside zones. Caps of per centage among each zone depend on the situation of land use and the composition of occupation of the inhabitants in each zone.

In Table 3-23 , the relationship between trip purposes is given. 74.1 per cent of all second trips are for the purpose of " Returning Home " and the rest are for " Other purposes except Returning Home ". As expected, former trip purposes such as " Going to scholl ", " Go Shopping " and " Going to Office " are highly related to " Returning Home ". They amount to 91.5%, 89.2% and 82.0% respectively.

On the other hand, " Bussiness trip " and " Cargo Delivery " are rather related to " Other purpose ".

Table 3-21

TRIP PURPOSES BY STATUS IN FAMILY (ALL DAY)

Purpose \ Status in Household	Husband	Wife	Child	Guest	Servant	Others	Unknow	Total
1. Work	1839 (35.9)	258 (6.6)	644 (5.4)	90 (16.7)	25 (1.2)	220 (15.3)	83 (18.5)	3159 (12.4)
2. Home	2140 (41.8)	1607 (41.2)	5381 (45.3)	229 (42.6)	793 (38.0)	577 (40.2)	183 (40.3)	10910 (43.0)
3. School	64 (1.3)	80 (2.1)	4382 (36.9)	73 (13.6)	28 (1.3)	250 (17.4)	85 (18.9)	4962 (19.5)
4. Shopping	112 (2.2)	902 (23.1)	188 (1.6)	26 (4.8)	627 (30.0)	69 (4.8)	19 (4.2)	1943 (7.7)
5. Business	254 (5.0)	59 (1.5)	68 (0.6)	14 (2.6)	1 (0.0)	35 (2.4)	10 (2.2)	441 (1.7)
6. Hospital	47 (0.9)	98 (2.5)	51 (0.4)	8 (1.5)	7 (0.3)	15 (1.1)	3 (0.7)	229 (0.9)
7. Visit	171 (3.3)	227 (5.8)	320 (2.7)	33 (6.1)	24 (1.1)	69 (4.8)	14 (3.1)	858 (3.4)
8. Recreation	49 (1.0)	76 (2.0)	153 (1.3)	8 (1.5)	6 (0.3)	20 (1.4)	3 (0.7)	315 (1.2)
9. Driving	32 (0.6)	1 (0.0)	15 (0.1)	1 (0.2)	24 (1.2)	10 (1.7)	4 (0.9)	87 (0.4)
10. Cargo Delivery	49 (1.0)	26 (0.7)	40 (0.3)	4 (0.8)	44 (2.1)	14 (1.0)	4 (0.9)	181 (0.7)
11. Others	130 (2.5)	170 (4.4)	170 (1.4)	18 (3.3)	110 (5.3)	35 (2.5)	10 (2.2)	643 (2.5)
12. Unknown	232 (4.5)	395 (10.1)	470 (3.9)	34 (6.3)	401 (19.2)	121 (8.4)	31 (6.9)	1684 (6.6)
TOTAL	5119 (100.0)	3899 (100.0)	11882 (100.0)	538 (100.0)	2090 (100.0)	1435 (100.0)	449 (100.0)	25412 (100.0)

Table 3-22

Dirtribution of Work Place

ZONE	Within Zone	OUTSIDE ZONE			TOTAL
		D.K.I	Outside D.K.I	Total	
Pluit	290 (58.6)	200	5	205 (41.4)	495
Keagungan	377 (61.0)	231	10	241 (39.0)	618
Tanjung Duren	613 (48.9)	633	7	640 (51.1)	1253
Simpruk	151 (42.7)	197	6	203 (57.3)	354
Blok Q	570 (52.2)	510	13	523 (47.8)	1093
Cipete	788 (52.5)	695	18	713 (47.5)	1501
Tebet	961 (58.0)	690	5	695 (42.0)	1656
Cempaka Putih	397 (51.0)	376	6	382 (49.0)	779
Sunter Hijau	70 (22.2)	242	3	245 (77.8)	315
Sungai Bambu	457 (52.8)	414	10	424 (47.2)	899
TOTAL	4692 (52.4)	4188 (46.7)	83 (0.9)	4271 (47.6)	8963

Table : 3-23

RELATIONSHIP BETWEEN TRIP PURPOSES

Next Purpose / Former Trip Purpose.	Returning Home		Other Purposes		Total
	Trips	%	Trips	%	
1. Work	2581	82.0	567	18.0	3148
2. Go Back Home	-	0.0	1336	100.0	1336
3. School	4506	91.5	421	8.5	4927
4. Shopping	1721	89.2	208	10.8	1929
5. Business	233	53.7	201	46.3	434
6. Hospital	180	81.1	42	18.9	222
7. Visit	618	73.9	218	26.1	836
8. Recreation	248	80.3	61	19.7	309
9. Driving	54	65.9	28	34.1	82
10. Cargo Delivery	104	59.1	72	40.9	176
11. Others	431	71.5	172	28.5	603
12. Unknown	112	17.2	538	82.8	650
Total	10863	74.1	3789	25.9	14652

Note: This table does not include the first trip outward from the home, because there is no previous trip on which to base a relationship.

Table : 3-24

COMPOSITION RATIO OF TRIP PURPOSES

NO.	PURPOSE	MORNING PEAK		ALLDAY		MORNING PEAK RATIO (%)
		TRIPS	%	TRIPS	%	
1	Work	2304	34.7	3159	12.4	72.9
2	Go Back Home	318	4.8	10910	43.0	2.9
3	School	2651	39.9	4962	19.5	53.4
4	Shopping	896	13.5	1943	7.7	46.1
5	Business	82	1.2	441	1.7	18.6
6	Hospital	52	0.8	229	0.9	22.7
7	Visit	76	1.2	858	3.4	8.9
8	Recreation	24	0.4	315	1.2	7.6
9	Driving	35	0.5	87	0.4	40.2
10	Carying Delivery	41	0.6	181	0.7	22.7
11	Other	98	1.5	643	2.5	15.2
12	Unknown	61	0.9	1684	6.6	3.6
	T o t a l	6638	100.0	25412	100.0	26.1

Morning Peak : 7:00 ∽ 9:00

4) Morning Peak vs All Day

As shown in Table 3-24 , morning peak period trips account for 26.1 per cent of all trips. The biggest morning peak ratio is for " Going to Office from home ", which amounts to 72.9%.
" Going to School ", " Shopping " and " Driving " also show rather high percentages, namaly, 53.4%, 46.1% and 40.2%, respectively.

In the morning peak, " Going to School " and " Going to Office " are the two biggest trip purposes and the total of both trip purposes account for 74.6 per cent of all trips in this period.

3.2.3 OD Survey at Major facilities

As shown in Fig 3-9 , at major trip generation facilities such as Ancol, Kemayoran Airport, and Halim Airport, the OD surveys were carried out to passenger cars.
Major results are shown in Tables 3-24, 3-25 and 3-26.

Table 3-24

Origin of Passenger Car To Ancol

	No. of Pass. Car	No. of Passenger	Average Pass./Veh.		No. of Pass. Car	No. of Passenger	Average Pass./Veh.
Pusat	2.111	9.859	4.7	Tangerang	34	101	3.0
Utara	793	4.627	5.3	B o g o r	140	320	1.579
Barat	2.292	11.469	5.0	Bekasi	320	1.579	4.9
Selatan	2.032	9.604	4.7	Botabek Total	494	2.339	4.7
Timur	1.517	8.052	5.3	Outside Jabotabek	953	3.379	3.5
DKI Total	8.745	43.611	5.0	Total	10.192	49.329	4.8

Destination of Passenger Car from Halim Airport

	No. of Pass. Car	No. of Passenger	Average Pass./Veh.		No. of Pass. Car	No. of Passenger	Average Pass./Veh.
Pusat	960	2.878	3.0	Tangerang	-	-	-
Utara	222	896	4.0	B o g o r	31	62	2
Barat	380	1.330	3.5	Bekasi	-	-	-
Selatan	634	1.529	2.4	Botabek Total	31	62	2
Timur	527	2.189	4.2	Outside Jabotabek	974	3.912	4.0
DKI Total	2.723	8.822	3.2	Total	3.728	12.796	3.4

Destination of Passenger Car from Kemayoran Airport

	No. of Pass. Car	No. of Passenger	Average Pass./Veh.		No. of Pass. Car	No. of Passenger	Average Pass./Veh.
Pusat	2.309	6.527	2.8	Tangerang	-	-	-
Utara	107	291	2.7	B o g o r	220	721	3.3
Barat	417	1.059	2.5	Bekasi	-	-	-
Selatan	1.014	3.130	3.1	Botabek Total	220	721	3.3
Timur	607	1.908	3.1	Outside Jabotabek	610	1.787	2.9
DKI Total	4.454	12.915	2.9	Total	5.284	15.423	2.9

Table 3-25 Number of Passenger Cars To Ancol by Purpose of Visit

	Work	Shopping	Business	Recre - ation	Service	Others	Unknown	Total Vehicle	Total Passenger	Pas
7:00-9:00	-	-	-	741	-	-	-	741	3.980	
9:00-16:00	-	34	84	7.741	-	180	135	8.174	39.808	
16:00-19:00	-	-	140	821	-	133	-	1.094	4.787	
19:00-6:00	-	-	-	147	-	18	18	183	754	
24 hours	-	34	224	9.450	-	331	153	10.192	49.329	

Number of Passenger Cars from Halim Airport by Purpose of Visit

	Arrival	Return to Indonesia	To Meet Arriving Pass.	To see off Depar ting Pass.	Work	Service	Others	Unknown	Total Vehicle	Total Pass.	Pas Ave
7:00-9:00	-	-	39	224	69	17	74	-	423	1,139	
9:00-16:00	-	254	47	443	806	308	288	21	2,167	6,655	
16:00-19:00	-	-	140	821	-	133	-	-	1,094	4,787	
19:00-6:00	2	3	6	13	19	-	-	1	44	215	
24 hours	2	257	232	1,501	894	458	362	22	3,728	12,796	

Number of Passenger Cars from Kemayoran Airport by Purpose of Visit

	Arrival	Return to Indonesia	To Meet Arriving Pass.	To see off Depar ting Pass.	Work	Service	Others	Unknown	Total Vehicle	Total Pass.	Pass Ave
7:00-9:00	-	-	-	270	181	-	-	-	451	1,430	
9:00-16:00	172	749	363	1,105	473	126	89	52	3,129	9,449	
16:00-19:00	107	484	72	216	201	-	47	-	1,127	3,055	
19:00-6:00	34	69	34	313	81	46	-	-	577	1,489	
24 hours	313	1,302	469	1,904	936	172	136	52	5.284	15,423	

Table 3-26 At Jaya Ancol (Unit : Vehicle)

Gate	In/Out	Hours	Motor Cycle	For Passengers				For Cargoes			Total	Total Excluding Motor Cycle
				Sedan Station Wagon Jeep	Oplet Pick-Up. Combi	Micro Bus, B U S	Total	Pick-Up. Micro-Truck	Truck Trailer	Total		
East	In	6:00 ~ 18:00	820	1,162	150	4	1,316	• 119	3	122	2,258	1,438
		7:00 ~ 9:00	119	81	4	-	85	13	-	13	217	98
	Out	6:00 ~ 18:00	635	1,441	233	18	1,692	161	8	169	2,496	1,861
		7:00 ~ 9:00	58	82	7	-	89	11	-	11	158	100
	Total	6:00 ~ 18:00	1,455	2,603	383	22	3,008	280	11	291	4,754	3,299
		7:00 ~ 9:00	177	163	11	-	174	24	-	24	375	198
West	In	6:00 ~ 18:00	2,422	8,947	975	71	9,993	536	19	555	12,970	10,548
		7:00 ~ 9:00	340	660	84	19	763	52	2	54	1,157	817
Pintu Tengah	Out	6:00 ~ 18:00	1,783	9,239	824	39	10,102	182	5	187	12,072	10,289
		7:00 ~ 9:00	65	265	25	4	294	12	1	13	372	307
Total	In	6:00 ~ 18:00	3,242	10,109	1,125	75	11,309	655	22	677	15,228	11,986
		7:00 ~ 9:00	459	741	88	19	848	65	2	67	1,374	915
	Out	6:00 ~ 18:00	2,418	10,680	1,057	57	11,794	343	13	356	14,568	12,150
		7:00 ~ 9:00	123	347	32	4	383	23	1	24	530	407
	Total	6:00 ~ 18:00	5,660	20,789	2,182	132	23,103	998	35	1,033	29,796	24,136
		7:00 ~ 9:00	582	1,088	120	23	1,231	88	3	91	1,904	1,322

At Halim Airport

Gate	In/Out	Hours	Motor Cycle	For Passengers				For Passengers			Total	Total Excluding Motor Cycle
				Sedan Station Wagon Jeep	Oplet Pick-Up. Combi	Micro-Bus, B u s	Total	Pick-Up. Micro Truck	Truck Trailer	Total		
	Out	6:00 ~ 22:00	1,140	4,827	745	88	5,660	221	54	275	7,075	5,935
		7:00 ~ 9:00	93	423	69	7	499	14	3	17	609	516

At Kemayoran Airport

Gate A	Out	6:00 ~ 22:00	169	2,371	196	8	2,575	9	2	11	2,755	2,564
		7:00 ~ 9:00	-	-	-	-	-	-	-	-	-	-
Gate B	Out	6:00 ~ 22:00	729	2,863	532	9	3,404	153	7	160	4,356	3,564
		7:00 ~ 9:00	105	451	61	6	518	18	2	20	643	538
Total	Out	6:00 ~ 22:00	961	5,234	728	17	5,979	162	9	171	7,111	6,150
		7:00 ~ 9:00	105	451	61	6	518	18	2	20	643	538

3.2.4 OD Survey at cargo facilities by interview

OD Survey on trucks was performed by interview at the following facilities.

- Tanjung Priok Port
- Pulo Gadung Industrial Estate
- Cakung Warehouse
- Weight Bridges

Total samples collected amount to 12,635. Number of vehicles, passengers, tonnages and capacities at each survey Station are shown in Table 3-27. Average tonnage per vehicle (4.) exceeds average capacity of vehicle (3.6). Capacity of vehicle at Cakung Warehouse and Tg. Priok Port are 4.6 and 4.4 respectively, and these are bigger than those of Pulo Gadung Industrial Estate and Weight Bridges. Table 3-28 shows the compasition of types of truck. Regarding Tg. Priok Port, its composition is far heavier than those of others. Type of cargo carried by truck is shown on Table 3-29 (vehicle) and 3-30 (tonnage).

In order to explain the general situation of truck flow, Fig. 3-24, 3-27 have been prepared, showing truck flow between each facility and main zones.

Table 3-27 TRUCK INTERVIEW SURVEY

SURVEY LOCATION	SURVEY STATION	VEHICLE	PASSENGER	P/V	TONNAGE	T/V	CAPACITY	C/V
TG. PRIOK PORT	Gate 1	50	101	2.1	211	4.2	205	4.1
	2	904	1868	2.1	3001	3.3	4119	4.6
	3	181	402	2.2	384	2.1	775	4.3
	6	454	980	2.2	1907	4.2	1860	4.1
	7	754	1555	2.1	2949	3.9	3267	4.3
	Total	2343	4906	2.1	8452	3.6	10226	4.4
PULO GADUNG Industrial Estate	A	800	1741	2.2	1748	2.2	2749	3.4
	B	609	1403	2.3	1060	1.7	1655	2.7
	C	509	1281	2.5	884	1.7	1648	3.2
	Total	1918	4425	2.3	3692	1.9	6052	3.2
CAKUNG WAREHOUSE		2053	4181	2.0	15518	7.6	9368	4.6
TOTAL		6314	13512	2.1	27662	4.4	25646	4.1
WEIGHT BRIDGE	Batu Ceper	1543	3939	2.6	6656	4.3	4921	3.2
	Bulak Kapal	1165	3259	2.8	5351	4.6	3732	3.2
	Cibutung	1162	2789	2.4	6979	6.0	4640	4.0
	Kramat Jati	804	1992	2.5	2451	3.0	2272	2.8
	Parung	382	949	2.5	1756	4.6	1122	2.9
	Pasar Rebu	598	1315	2.2	2112	3.5	1628	2.7
	Tajur	667	1705	2.6	2625	3.9	2019	3.0
	Total	6321	15949	2.5	27930	4.4	20333	3.2
GRAND TOTAL		12635	29461	2.3	55592	4.4	45979	3.6

Note : 1) All sample are included in this table
2) P/V passenger/Vehicle
3) T/V Tonnage/Vehicle
4) C/V Capacity/Vehicle

Table 3-28

KIND OF TRUCK AT EACH SURVEY STATION

SURVEY LOCATION / STATION \ KIND OF TRUCK / VOLUME		A		B		C		D		E		Total	
		Vehicle	%	Vehicle	%	Vehicle	%	Vehicle	%	Vehicle	%	Vehicle	%
TG. PRIOK PORT	Gate 1	0	0	0	0	0	0	16	32	34	68	50	100
	2	487	57	236	28	109	13	13	1	12	1	857	100
	3	163	90	1	1	12	7	0	0	4	2	180	100
	6	394	88	24	6	5	1	5	1	19	4	447	100
	7	496	66	228	30	21	3	2	0	7	1	754	100
	Total	1540	67	489	21	147	7	36	2	76	3	2288	100
PULO GADUNG Industrial Estate	A	749	93	24	3	0	0	1	0	26	3	800	100
	B	588	98	9	1	0	0	1	0	4	1	602	100
	C	399	79	51	10	55	11	2	0	2	0	509	100
	Total	1736	91	84	4	55	3	4	0	32	2	1911	100
CAKUNG WAREHOUSE		1930	94	35	1	61	3	15	1	12	1	2053	100
TOTAL		5206	83	608	10	263	4	55	1	120	2	6252	100
WEIGHT BRIDGE	Batu Ceper	1468	95	4	0	3	0	0	0	67	5	1542	100
	Bulak Kapal	1078	93	2	0	0	0	0	0	84	7	1164	100
	Cibitung	985	85	6	1	1	0	0	0	170	14	1162	100
	Kramat Jati	798	99	0	0	1	0	0	0	5	1	804	100
	Parung	349	92	31	8	0	0	1	0	1	0	382	100
	Pasar Rebo	573	96	1	0	1	0	0	0	23	4	598	100
	Tajur	560	84	102	15	0	0	0	0	5	1	667	100
	Total	5811	92	146	2	6	0	1	0	355	6	6319	100
GRAND TOTAL		11017	88	754	6	269	2	56	0	475	4	12571	100

Note : Kind of Truck A Truck 2 axis
B Truck 3 axis
C Trailer
D Semi Trailer
E Truck Gandengan

Unknown Reply Excluded

Table 3-29 TYPE OF CARGO CARRIED BY TRUCK

(Unit: Vehicle/Day)

SURVEY LOCATION	SURVEY SITUATION	1	2	3	4	5	6	7	8	9	10	11	12	13	Un-known	Total
TG. PRIOK PORT	Gate 1	2	16	0	8	4	4	0	0	2	4	20	4	34	2	100
	2	56	90	28	34	30	14	72	0	42	106	286	66	920	64	1,808
	3	14	6	2	6	30	2	10	0	16	2	10	18	244	2	362
	6	62	54	2	20	42	0	42	2	50	28	162	16	390	38	908
	7	48	40	24	50	96	44	206	6	44	46	308	88	472	36	1,508
	Total	182	206	56	118	202	64	330	8	154	186	786	192	2,060	142	4,686
PULO GADUNG INDUSTRIAL ESTATE	A	12	82	34	22	156	18	234	2	96	22	108	122	690	2	1,600
	B	26	104	30	4	100	16	126	2	50	16	82	52	584	26	1,218
	C	16	50	24	6	182	10	110	2	26	22	90	12	458	10	1,018
	Total	54	236	88	32	438	44	470	6	172	60	280	186	1,732	38	3,836
CAKUNG WAREHOUSE		92	6	74	48	136	306	738	2	324	60	1,800	514	0	6	4,106
TOTAL		328	448	218	198	776	414	1,538	16	650	306	2,866	892	3,792	186	12,628
WEIGHT BRIDGE	Batu Ceper	260	294	112	178	842	16	178	2	110	42	346	686	10	10	3,086
	Bulak Kapal	384	172	34	18	1,500	0	64	12	2	10	92	32	0	10	2,330
	Cibitung	176	386	74	56	276	154	158	18	256	62	414	292	2	0	2,324
	Kramat Jati	514	396	54	82	210	6	44	2	14	18	132	124	10	2	1,608
	Parung	38	26	22	2	614	0	12	10	2	2	28	8	0	0	764
	Pasar Rebo	28	190	76	66	100	32	42	6	338	76	216	20	0	6	1,196
	Tajur	214	194	44	76	484	20	32	36	106	28	90	4	2	4	1,334
	Total	1,614	1,658	416	478	4,026	228	530	86	828	238	1,318	1,166	24	32	12,642
GRAND TOTAL:		1,942	2,106	634	676	4,802	642	2,068	102	1,478	544	4,184	2,058	3,816	218	25,270

Note: 1) Vehicle shows in & out total

2) Type of cargo is as follows:

1	Agriculture, forestry and fishery products	7	Iron and steel products
2	Food, beverages and tobacco	8	Fetilizer
3	Clothing, shoes, furniture and house hold goods	9	Fuel and lubricating oil
4	Textile, weaving yarn	10	Other petroluem products
5	Cement and other construction materials	11	Other manufactures products
6	Tools, machinery and transportation equipment	12	Others
		13	Vehicle empty

Table 3-30 TYPE OF CARGO CARRIED BY TRUCK

(Unit: Tonnage/Day)

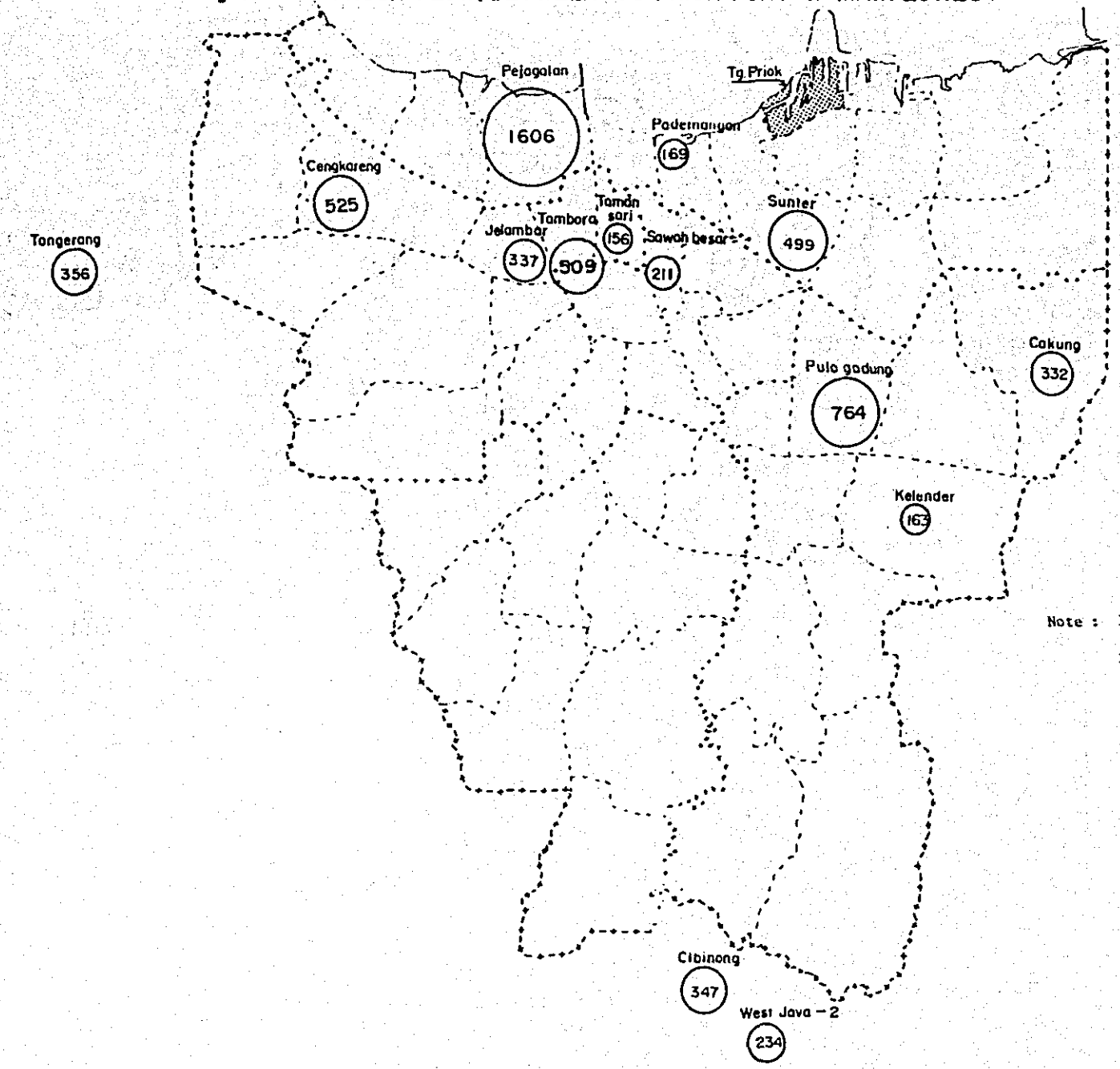
SURVEY LOCATION	SURVEY SITUATION	1	2	3	4	5	6	7	8	9	10	11	12	13	Un-known	Total
TG. PRIOK PORT	Gate 1	20	104	0	34	20	24	0	0	8	36	140	18	0	16	420
	2	549	671	89	172	192	74	568	0	233	813	2,023	453	125	18	5,980
	3	136	46	10	10	254	4	58	0	84	20	38	106	0	0	766
	6	409	368	2	80	344	0	354	10	292	230	1,043	43	218	414	3,807
	7	351	327	74	198	565	230	1,584	40	236	390	1,295	304	0	296	5,890
	Total	1,465	1,516	175	494	1,375	332	2,564	50	853	1,489	4,539	924	343	744	16,863
PULO GADUNG INDUSTRIAL ESTATE	A	70	256	101	44	628	62	1,038	2	497	118	383	257	12	0	3,468
	B	84	222	53	0	444	28	385	6	314	28	157	133	22	216	2,092
	C	50	106	12	6	746	18	282	4	110	118	221	33	20	14	1,740
	Total	204	584	166	50	1,818	108	1,705	12	921	264	761	423	54	230	7,300
CAKUNG WAREHOUSE		712	74	370	270	868	2,222	8,941	40	2,850	462	11,647	2,542	0	24	31,022
TOTAL		2,381	2,174	711	814	4,061	2,662	13,210	102	4,624	2,215	16,947	3,889	397	998	55,185
WEIGHT BRIDGE	Butu Ceper	1,317	1,142	441	684	3,738	76	856	8	578	168	1,369	2,820	0	59	13,256
	Bulak Kapal	2,460	1,279	138	106	5,425	0	368	50	6	80	558	112	0	86	10,668
	Cibitung	1,119	2,269	262	272	2,258	713	1,340	126	1,314	339	2,447	1,471	0	0	13,930
	Kramat Jati	1,364	1,341	104	227	911	24	214	14	46	36	330	249	0	8	4,868
	Parung	148	71	74	6	2,975	0	39	48	10	4	111	18	0	0	3,504
	Pasar Rebo	92	445	82	154	278	46	97	12	2,220	312	420	18	0	16	4,192
	Tajur	654	590	121	250	2,165	52	124	163	728	97	247	4	6	10	5,211
	Total	7,154	7,137	1,222	1,699	17,750	911	3,038	421	4,902	1,036	5,482	4,692	6	179	55,629
GRAND TOTAL:		9,535	9,311	1,933	2,513	21,811	3,573	16,248	523	9,526	3,251	22,429	8,581	403	1,177	110,814

Note: 1) Tonnage shows in & out total

2) Type of cargo is as follows:

1	Agriculture, forestry and fishery products	8	Iron and steel products
2	Food, beverages and tobacco	9	Fertilizer
3	Clothing, shoes, furniture and house hold goods	10	Fuel and lubricating oil
5	Textile, weaving yarn	11	Other petroleum products
6	Cement and other construction materials	12	Other manufactured products

Fig. 3-24 TRUCK FLOW BETWEEN TG. PRIOK PORT & MAIN ZONES

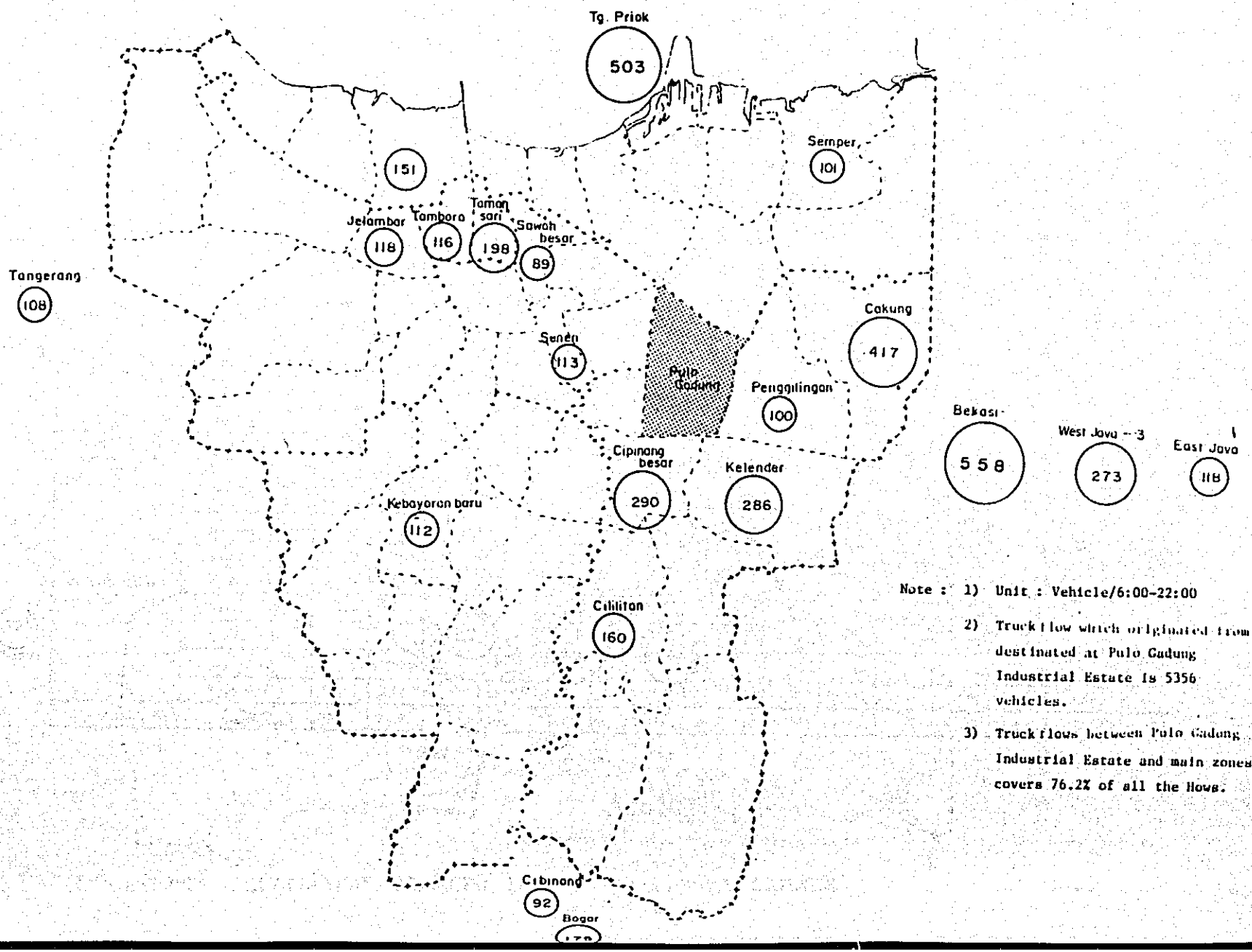


Note : 1) Unit vehicle/6:00 - 22:00

2) Truck flow which originated from & destinated at Tg. Priok Port is 8094 vehicles.

3) Truck flow between Tg. Priok Port and main zones covers 76.7% of all the flows.

Fig. 3-25 TRUCK FLOW BETWEEN PULO GADUNG INDUSTRIAL ESTATE AND MAIN ZONES

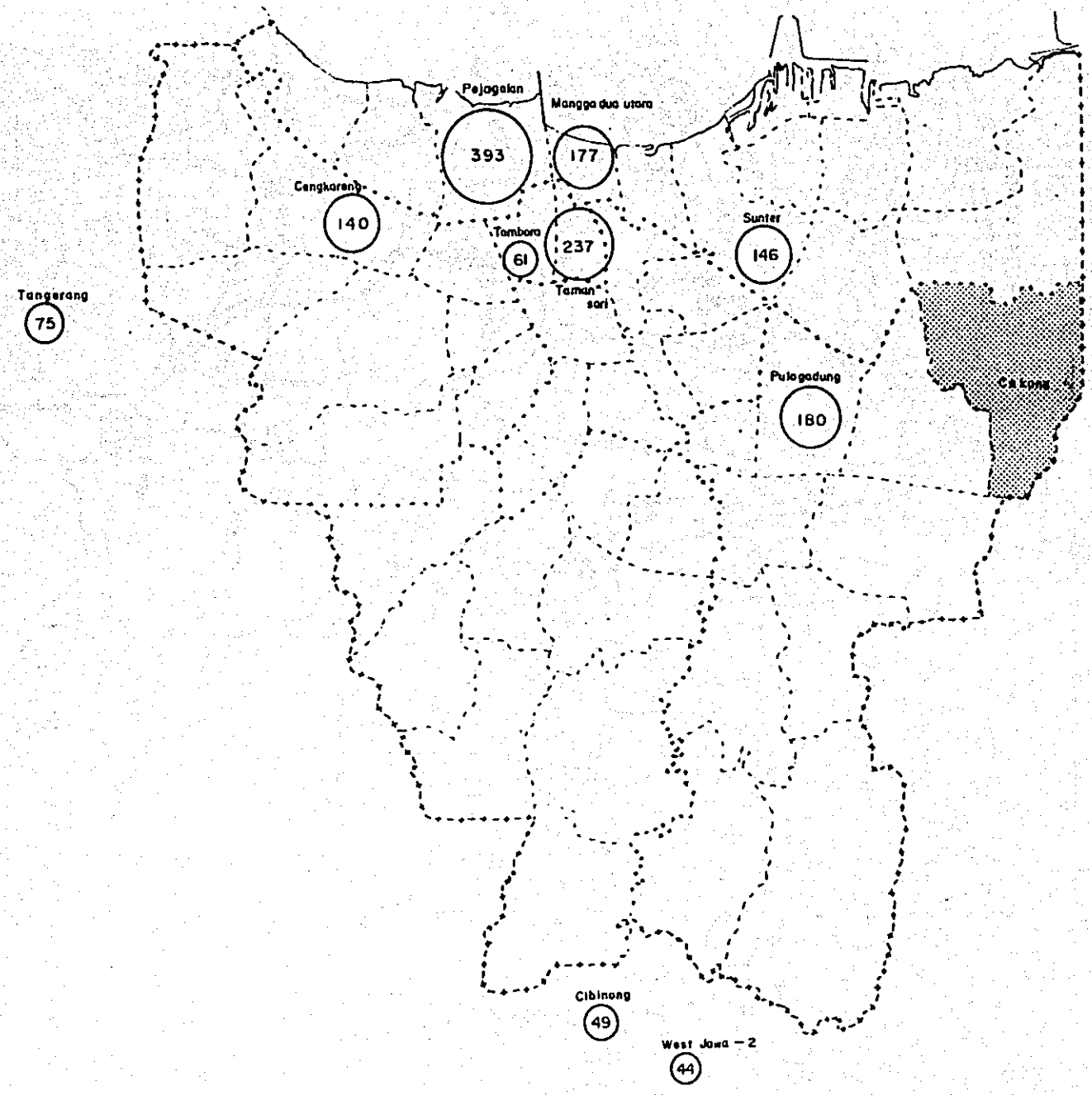


Note : 1) Unit : Vehicle/6:00-22:00

2) Truck flow which originated from & destinated at Pulo Gadung Industrial Estate is 5356 vehicles.

3) Truck flows between Pulo Gadung Industrial Estate and main zones covers 76.2% of all the flows.

Fig. 3-26 TRUCK FLOW BETWEEN CAKUNG WAREHOUSE & MAIN ZONES

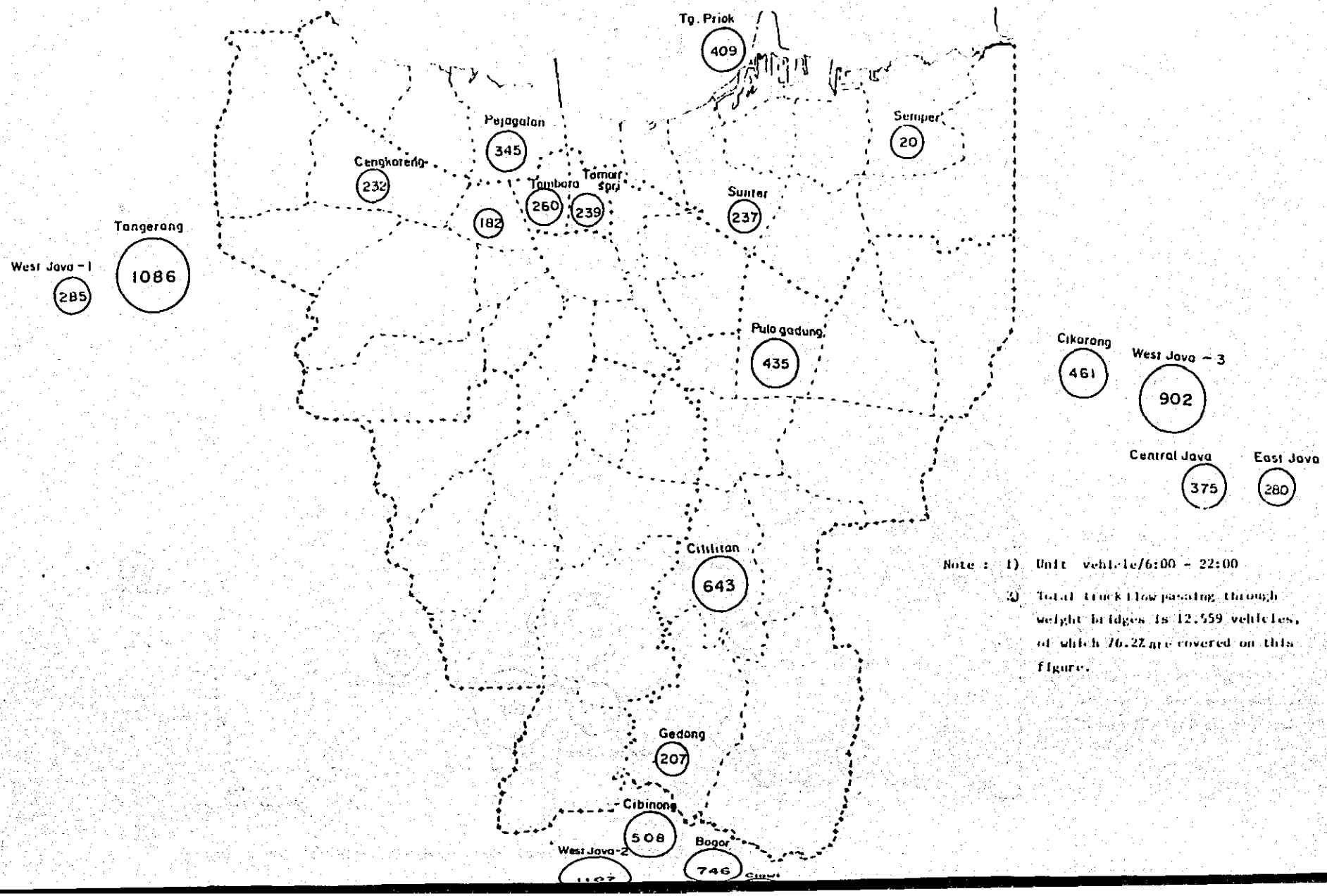


Note : 1) Unit : vehicle /9:00 - 16:00 for one week except Sunday

2) Truck flow originated from Cakung Warehouse is 1961 vehicles.

3) Truck flow between Cakung Warehouse and main zones covers 76.4 % of all the flows.

Fig. 3-27 TRUCK FLOW PASSING THROUGH WEIGHT BRIDGES



Note : 1) Unit vehicle/6:00 - 22:00

2) Total truck flow passing through weight bridges is 12,559 vehicles, of which 76.2% are covered on this figure.

Fig. 3-28

O-D & T.C SURVEY AT WEIGHT BRIDGES

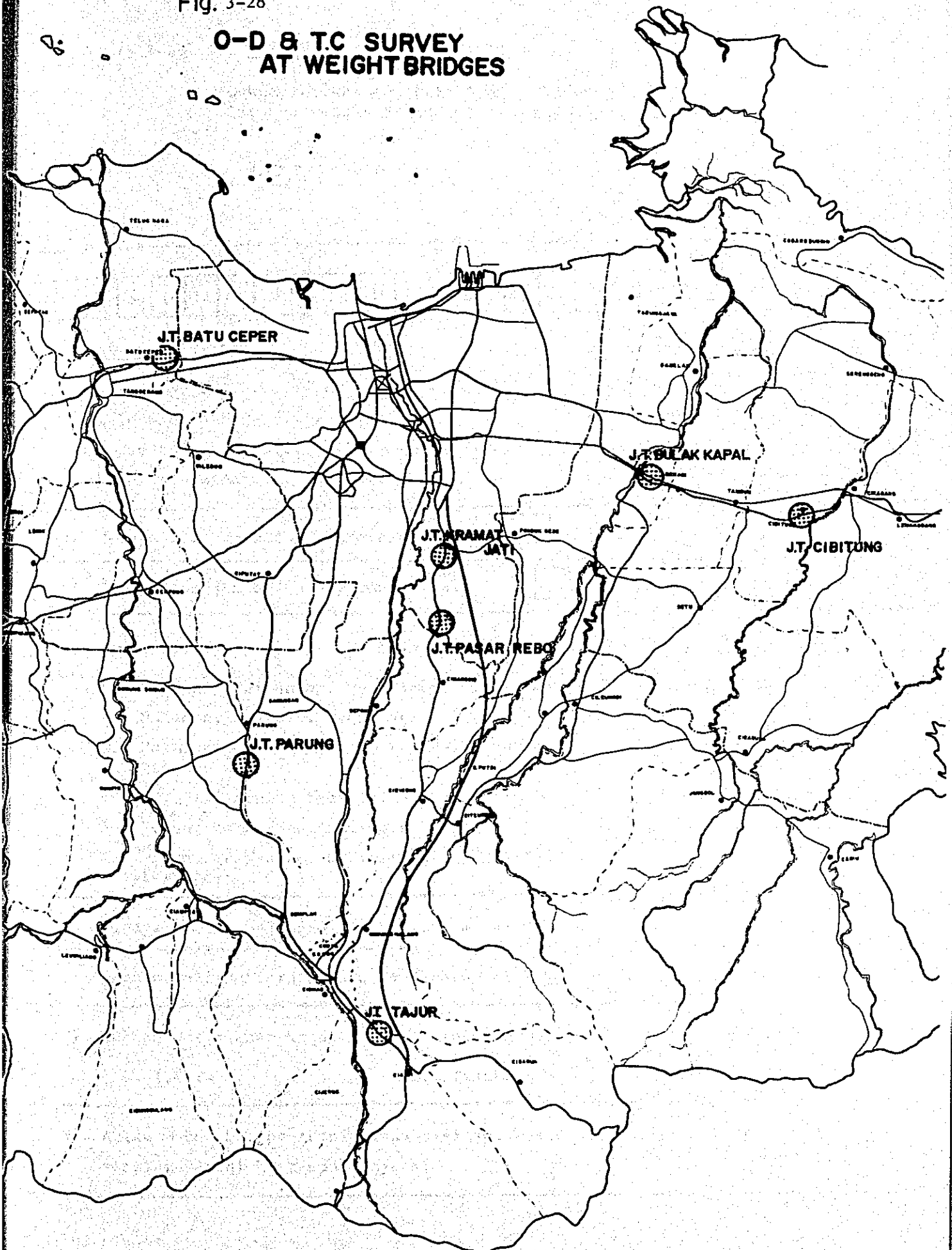


Table 3-29 INTERVIEW SHEET FOR TRUCK O-D SURVEY

Attachment No. 12

Cakung Warehouse, Pulo Gadung Industrial Estate, Weight Bridges & Tanjung Priok Port

L O K A S I : .....

Jam																Jenis Kendaraan				
6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	A	B	C	D	E

1) Asal Perjalanan:

Jalan/No. .....
Kelurahan/desa .....
Kecamatan .....
Kota/Kabupaten .....

2) Tujuan Perjalanan:

Jalan/No. .....
Kelurahan/desa .....
Kecamatan .....
Kota/Kabupaten .....

3) Berapa ton kapasitas kendaraan ini ? [ ] ton.

4) Berapa ton jumlah barang yang dimuat ? [ ] ton.

5) Jenis barang apa yang Anda bawa dalam kendaraan ini ?

1. Produksi Pertanian, Perikanan, Kehutanan.
2. Makanan, minuman, tembakau.
3. Pakaian, sepatu, meubel, alat-alat rumah tangga.
4. Tekstil, benang tenunan.
5. Semen, bahan bangunan lain.
6. Mainan anak-anak, mesin-mesin, peralatan transport.
7. Produksi besi dan baha
8. Pupuk
9. Bahan bakar, minyak pelumas.
10. Produk minyak lainnya.
11. Produk industri lainnya.

6) Berapa jumlah penumpang + supir dalam kendaraan ini ? [ ] orang.

7) Berapa kali/hari rata-rata kendaraan ini lewat disini ? [ ] kali.

8) Apakah perjalanan kendaraan ini langsung menuju ketempat tujuan akhir ?

1. Ya. 2. Tidak.

9) Kalau tidak, berapa tempat yang disinggahi kendaraan ini sebelum sampai ke tempat tujuan? [ ] tempat.

Table 3-31 Results of Traffic Counting Survey at Tanjung Priok

(Unit : Vehicle)

Gate No.	In/Out	Hours	Motor Cycle	for Passengers				for Cargoes			Total	
				Sedan St.Wagn Jeep	Oplet Pick-Up. Combi	Micro-Bus, Bus	Total	Pick-Up. Micro Truck	Truck Trailer	Total		
1.	In	6:00~22:00	1,713	423	271	-	694	104	576	680	3,087	1,3
		7:00~ 9:00	444	107	47	-	154	17	83	103	704	
	Out	6:00~22:00	1,741	437	293	1	731	96	534	630	3,102	1,3
		7:00~ 9:00	168	55	26	1	82	6	1	7	257	
	Total	6:00~22:00	3,454	860	564	1	1,425	200	1,110	1,310	6,189	2,7
		7:00~ 9:00	612	162	73	1	236	33	90	113	961	
2.	In	6:00~18:00	171	87	20	1	108	44	591	635	914	
		7:00~ 9:00	20	8	-	1	9	3	121	124	153	
	Out	6:00~18:00	1,017	363	76	-	439	79	592	671	2,127	1,1
		7:00~ 9:00	118	35	13	-	48	10	37	47	213	
	Total	6:00~18:00	1,188	450	96	1	547	123	1,183	1,306	3,041	1,8
		7:00~ 9:00	138	43	13	1	57	13	158	171	3, 66	
3.	In	6:00~18:00	368	169	16	2	197	43	550	593	1,148	
		7:00~ 9:00	117	48	7	-	55	17	229	246	418	
	Out	6:00~18:00	212	126	5	1	132	3	3	6	350	
		7:00~ 9:00	51	42	-	-	42	-	-	-	93	
	Total	6:00~18:00	580	295	21	3	319	46	553	599	1,498	
		7:00~ 9:00	168	90	7	-	97	17	229	246	511	
4.	In	6:00~18:00	1,543	631	113	16	820	104	3	107	2,470	
		7:00~ 9:00	365	144	27	6	177	15	1	16	558	
6.	In	6:00~18:00	798	263	40	-	303	28	403	431	1,532	
		7:00~ 9:00	-	-	-	-	-	-	-	-	-	-
	Out	6:00~18:00	1,984	466	134	27	627	57	309	366	2,977	
		7:00~ 9:00	-	-	-	-	-	-	-	-	-	
	Total	6:00~18:00	2,782	729	174	27	930	85	712	797	4,509	1,7
		7:00~ 9:00	-	-	-	-	-	-	-	-	-	-

Results of Traffic Counting Survey at Tanjung Priok

(Unit : Vehicle)

Gate No.	In/ Out	Hours	Motor Cycle	for Passenger				for Cargoes			Total	Total Excluding Motor Cycle
				Sedan St.Wagon Jeep	Oplet Pick-Up Combi	Micro-Bus, Bus	Total	Pick-Up. Micro Truck	Truck Trailer	Total		
7	In	6:00~18:00	264	40	12	-	52	32	321	353	669	405
		7:00~ 9:00	87	7	1	-	8	4	117	121	216	129
	Out	6:00~18:00	488	173	26	7	206	17	1,073	1,090	1,784	1,296
		7:00~ 9:00	36	7	2	-	9	1	73	74	119	83
	Total	6:00~13:00	752	213	38	7	258	49	1,394	1,443	2,453	1,701
		7:00~ 9:00	123	14	3	7	17	5	190	195	335	212
9	In	6:00~22:00	6,688	2,141	522	42	2,705	241	1,087	1,328	10,721	4,033
		7:00~ 9:00	2,204	633	124	24	781	66	214	280	265	1,061
	Out	6:00~22:00	5,346	2,049	306	24	2,379	377	827	1,204	8,929	3,583
		7:00~ 9:00	498	187	46	5	238	42	34	76	812	314
	Total	6:00~22:00	12,034	4,190	828	66	5,084	618	1,914	2,532	19,650	7,616
		7:00~ 9:00	2,702	820	170	29	1,019	108	248	356	4,077	1,375
Total	In	6:00~22:00 (18:00)	11,545	3,814	994	61	4,869	596	3,531	4,127	20,391	8,996
		7:00~ 9:00	3,237	947	206	31	1,184	122	771	893	5,314	2,077
	Out	6:00~22:00 (18:00)	10,788	3,614	840	60	4,514	629	3,338	3,967	19,269	8,481
		7:00~ 9:00	871	326	87	6	419	59	145	204	1,494	623
	Total	6:00~22:00 (18:00)	22,333	7,428	1,834	121	9,383	1,121	6,973	8,094	39,810	17,477
		7:00~ 9:00	4,108	1,273	293	37	1,003	181	916	1,097	6,808	2,700

Table 3-32 Results of Traffic Counting Survey at Pulo Gadung

Gate C	In	6:00~22:00	2,975	2,044	496	110	1,650	479	209	688	5,313	2,336
		7:00~ 9:00	1,051	329	111	40	480	69	30	99	1,630	579
	Out	6:00~22:00	2,642	1,210	638	58	1,906	416	187	603	5,151	2,509
		7:00~ 9:00	537	145	66	14	225	61	31	92	854	317
	Total	6:00~22:00	5,617	2,254	1,134	168	3,556	895	396	1,291	10,464	4,845
		7:00~ 9:00	1,588	474	177	54	705	130	61	191	2,484	896
Total	In	6:00~22:00	6,727	3,512	1,380	424	5,316	1,732	1,079	2,811	14,854	8,121
		7:00~ 9:00	2,067	904	289	115	1,308	272	190	462	3,837	1,770
	Out	6:00~22:00	6,193	3,754	1,479	386	5,619	1,465	1,080	2,545	14,357	8,164
		7:00~ 9:00	1,427	694	217	101	1,012	242	171	413	2,852	1,425
	Total	6:00~22:00	12,920	7,266	2,859	810	10,935	3,197	2,159	5,359	29,211	16,29
		7:00~ 9:00	3,494	1,598	506	216	2,320	514	361	875	6,689	3,195
Gate A	In	6:00~22:00	2,206	1,395	472	132	1,999	665	521	1,186	5,391	3,185
		7:00~ 9:00	512	214	78	19	311	84	86	170	993	481
	Out	6:00~22:00	2,133	1,505	511	190	2,206	629	614	1,243	5,582	3,449
		7:00~ 9:00	663	441	108	43	592	121	99	220	1,475	811
	Total	6:00~22:00	4,339	2,900	983	322	4,205	1,294	1,135	2,429	10,973	6,634
		7:00~ 9:00	1,175	655	186	62	903	205	185	390	2,468	1,292
Gate B	In	6:00~22:00	1,546	1,073	412	182	1,667	588	349	937	4,150	2,603
		7:00~ 9:00	504	361	100	56	517	119	74	193	1,214	710
	Out	6:00~22:00	1,418	1,039	330	138	1,507	420	279	699	3,624	2,204
		7:00~ 9:00	227	108	43	44	195	60	41	101	523	296
	Total	6:00~22:00	2,964	2,112	742	320	3,174	1,008	628	1,636	7,774	4,810
		7:00~ 9:00	731	469	143	100	712	179	115	294	1,737	1,006

3.2.5 Running Speed Survey

(1) Purpose and Method

A Running Speed and Delay Survey was undertaken to obtain precise information on the travel speeds and impediments to traffic stream flow within major sections of the road network in Jakarta.
This survey was needed to evaluate the existing levels of sevice of the road network and to make clear the causes of impediments to traffic stream flow.

This Running Speed and Delay Surveys were carried out from Wednesday 21st to Tuesday 27th January 1981 in two hour bands, 7:00 - 9:00 and 12:00 - 14:00.

A survey team was composed of one driver and two surveyors, whose jobs to be fulfilled were as follows;

- At each checking point, measure the distance and the arrival time from the starting point.
- When the testing vehicle is forced to stop, measure the duration of the stop and note the reason for it.
- The drivers were instructed to travel at an average speed of all traffic at that point and time.

(2) Survey Results

The survey results are summerized in Table 3-33 and 3-34.
In the morning peak, average running speed is 31.6 km/hour and overall travel speed is 27.0 Km/hour. The stopping time/travel time ratio is 14.6 per cent. For the causes of delay, " traffic signal" is far above any other cause, but if compared with results from the 12:00 - 14:00 period, " public transport stopping ", " right turning vehicles " and " general traffic congestion " shows longer duration and higher frequency.

In the 12:00 - 14:00 period, average running speed is 35.0 Km/Hour and overal travel speed is 30.8 Km/Hour, both of which are higher than those of the morning peak. The stoping time/travel time ratio is 12.2%, which is less than that of morning peak. For the causes of delay, " traffic signal " is the most influential factor and accounts for 75.3%. If compared with morning peak, " traffic signal " and " vehicles loading/unloading " contribute more to the delay.

The running speed and the travel speed at each section of road is shown in Fig.3-3 and 3-32.
As seen in the Figure, both speeds are lower on the roads leading to the center of the city in morning peak, and they are also lower on the roads in the center of the city during the 12.00 - 14.00 period.

Table : 3-33-1

SUMMARY OF RESULT OF RUNNING SPEED AND DELAY

(7°° – 9°°)

JANUARY, 1981

TOTAL DISTANCE	272.4 KM		
TOTAL TRAVEL TIME	10 HRS	5 MIN	22 SEC
TOTAL STOPPED TIME	1 HRS	28 MIN	27 SEC
TOTAL RUNNING TIME	8 HRS	36 MIN	55 SEC
OVERALL TRAVEL SPEED	27 Km / Hour		
AVERAGE RUNNING SPEED	31.6 Km / Hour		

NO.	CAUSES OF DELAY	DURATION (Second)	% OF TOTAL DURATION	FREQUENCY
1	TRAFFIC SIGNAL	3112	58.6	94
2	RAILWAY CROSSING	40	0.8	1
3	RIGHT TURNING VEHICLES	436	8.2	22
4	PUBLIC TRANSPORT STOPPING	593	11.2	28
5	VEHICLES LOADING / UNLOADING	0	0	0
6	OTHER OBSTRUCTIONS	403	7.6	4
7	GENERAL TRAFFIC CONGESTION	723	13.6	27
		5307	100	127

Table : 3-33-3

SUMMARY OF RESULT OF RUNNING SPEED AND DELAY

(7°° – 9°° & 12°° – 14°°) JANUARY, 1981

TOTAL DISTANCE	546.6 KM		
TOTAL TRAVEL TIME	19 HRS	0 MIN	15 SEC
TOTAL STOPPED TIME	2 HRS	33 MIN	28 SEC
TOTAL RUNNING TIME	16 HRS	26 MIN	47 SEC
OVERALL TRAVEL SPEED	28.8 Km / Hour		
AVERAGE RUNNING SPEED	33.2 Km / Hour		

NO.	CAUSES OF DELAY	DURATION (Second)	% OF TOTAL DURATION	FREQUENCY
1	TRAFFIC SIGNAL	6049	65.7	194
2	RAILWAY CROSSING	57	0.6	3
3	RIGHT TURNING VEHICLES	541	5.9	31
4	PUBLIC TRANSPORT STOPPING	794	8.6	45
5	VEHICLES LOADING / UNLOADING	186	2.0	3
6	OTHER OBSTRUCTIONS	403	4.4	4
7	GENERAL TRAFFIC CONGESTION	1178	12.8	45
	TOTAL CAUSES OF DELAY	9208	100	325

Table : 3-33-2

SUMMARY OF RESULT OF RUNNING SPEED AND DELAY

(12°° - 14°°)

JANUARY, 1981

TOTAL DISTANCE	274.2 KM		
TOTAL TRAVEL TIME	8 HRS	54 MIN	53 SEC
TOTAL STOPPED TIME	1 HRS	5 MIN	1 SEC
TOTAL RUNNING TIME	7 HRS	49 MIN	52 SEC
OVERALL TRAVEL SPEED	30.8 Km / Hour		
AVERAGE RUNNING SPEED	35.0 Km / Hour		

NO.	CAUSES OF DELAY	DURATION (Second)	% OF TOTAL DURATION	FREQUENCY
1	TRAFFIC SIGNAL	2937	75.3	100
2	RAILWAY CROSSING	17	0.4	2
3	RIGHT TURNING VEHICLES	105	2.7	9
4	PUBLIC TRANSPORT STOPPING	201	5.1	17
5	VEHICLES LOADING / UNLOADING	186	4.8	3
6	OTHER OBSTRUCTIONS	0	0	0
7	GENERAL TRAFFIC CONGESTION	455	11.7	18
		3901	100	149

Table : 3-34

RESULT OF RUNNING SPEED AND DELAY

DATE	HOUR BAND	TIME	DISTANCE	Reason for Stopping							TOTAL STOPPING TIME
				1	2	3	4	5	6	7	
I	7-9	12402"	96.8	315"/12x	0	24"/2x	167"/14x	0	390"/3x	176"/13x	1072"
	12-14	10775"	96.5	385"/12x	0	17"/1x	52"/6x	169"/2x	0	415"/13x	1038"
II	7-9	8703"	59.1	495"/18x	0	310"/13x	359/9x	0	0	348"/8x	1512"
	12-14	7325"	59.1	514"/21x	0	6"/1x	52"/3x	0	0	24"/4x	596"
III	7-9	9174"	77.5	1430"/36x	40"/1x	95"/6x	61"/4x	0	13"/1x	51"/2x	1690"
	12-14	8409"	77.5	1240"/39x	14"/1x	10"/2x	47"/4x	0	0	0	1311"
IV	7-9	6070"	39	872"/28x	0	7"/1x	6"/1x	0	0	148"/4x	1033"
	12-14	5586"	41.1	798"/28	3"/1x	72"/5x	50"/4x	17"/1x	0	16"/1x	956"
TOTAL		68415"	546.6	6049"/194x	57"/3x	541"/31x	794"/45x	186"/3x	403"/4x	1178"/45x	9208"
TOTAL	7-9	36322"	272.4	3112/94x	40/1x	436/22x	593/28x	0	403"/4x	723/27x	5307"
	12-14	32093"	274.2	2937/100x	17/2x	105/9x	201/17x	186/3x	0	455/18x	3901"

Fig.3-30

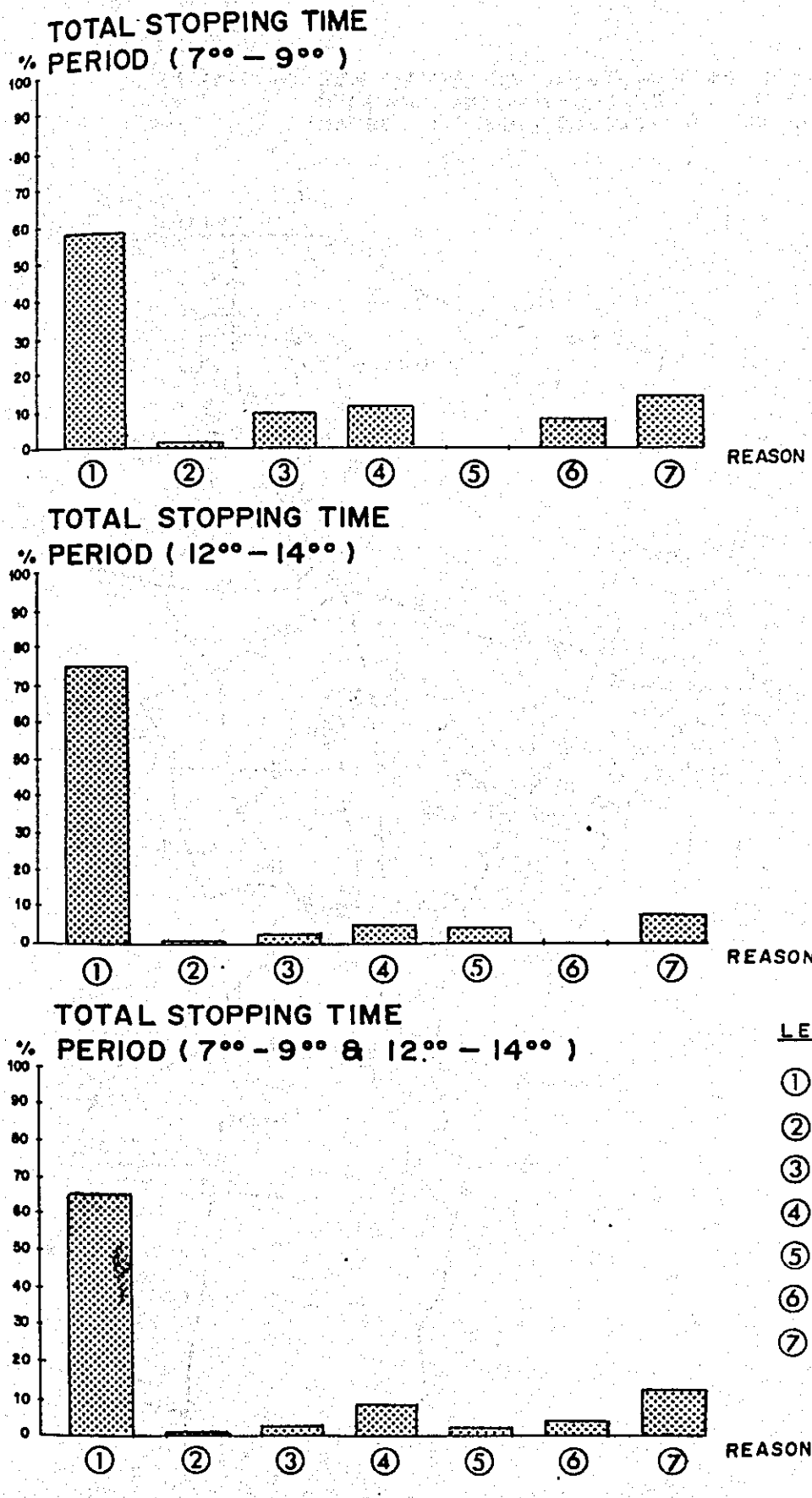

TOTAL STOPPING TIME
% PERIOD (7°° – 9°°)
100
90
80
70
60
50
40
30
20
10
0
① ② ③ ④ ⑤ ⑥ ⑦
REASON
TOTAL STOPPING TIME
% PERIOD (12°° – 14°°)
100
90
80
70
60
50
40
30
20
10
0
① ② ③ ④ ⑤ ⑥ ⑦
REASON
TOTAL STOPPING TIME
% PERIOD (7°° - 9°° & 12.°° – 14°°)
100
90
80
70
60
50
40
30
20
10
0
① ② ③ ④ ⑤ ⑥ ⑦
REASON
LEGEND
① TRAFFIC SIGNAL
② RAILWAY CROSSING.
③ RIGHT TURNING VEHICLES.
④ PUBLIC TRANSPORT – STOPPING.
⑤ VEHICLES LOADING / – UNLOADING.
⑥ OTHER OBSTRUCTIONS
⑦ GENERAL TRAFFIC – CONGESTION

Fig.3-31-1 RUNNING SPEED ON PEAK PERIOD (7** — 9**)
BY SECTION AND DIRECTION (Km / Hour)
HARBOUR ROAD PROJECT 1981

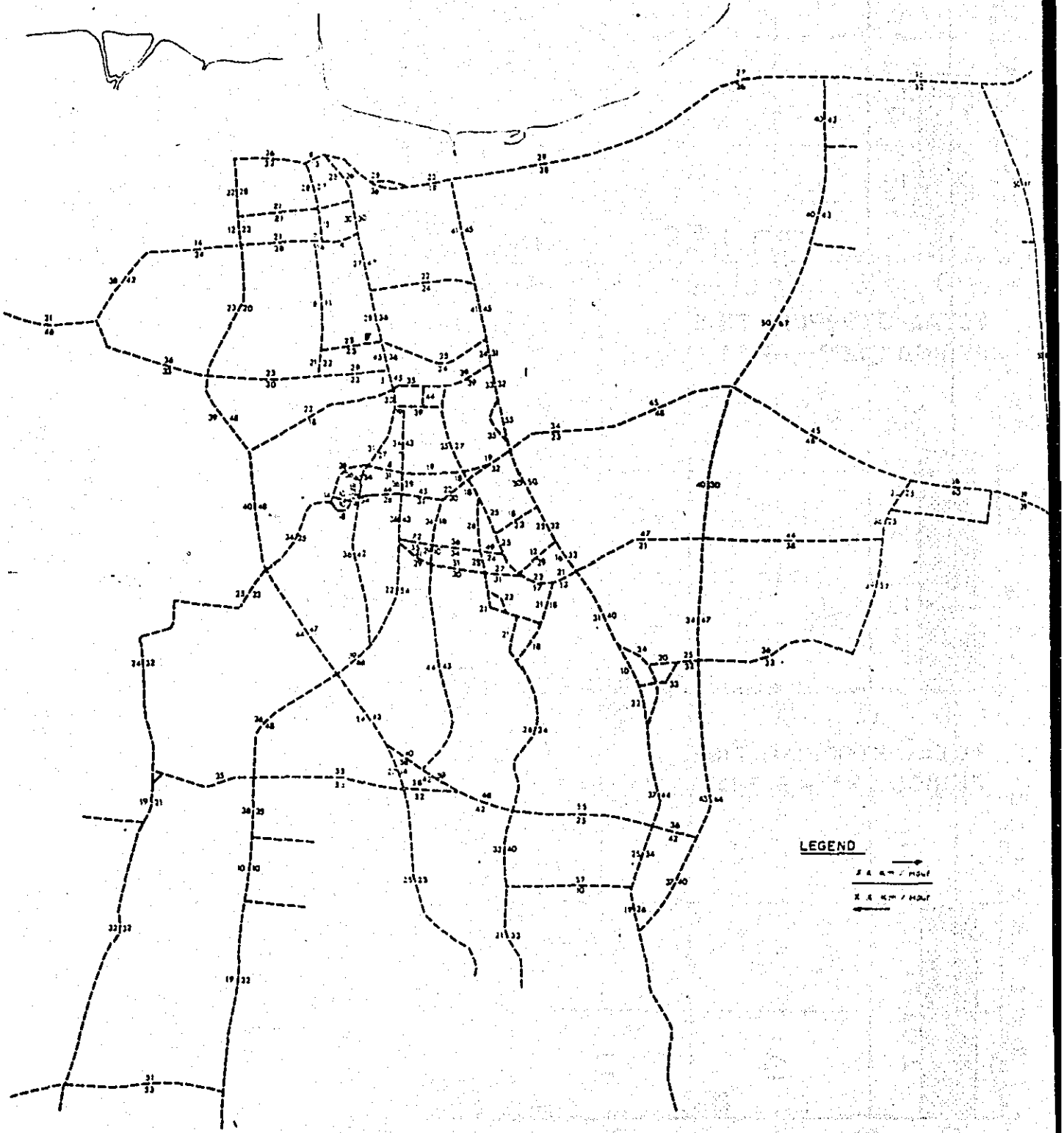


Fig.3-31-2 RUNNING SPEED OFF PEAK PERIOD (12** - 14**)
BY SECTION AND DIRECTION (Km / Hour)
HARBOUR ROAD PROJECT 1981

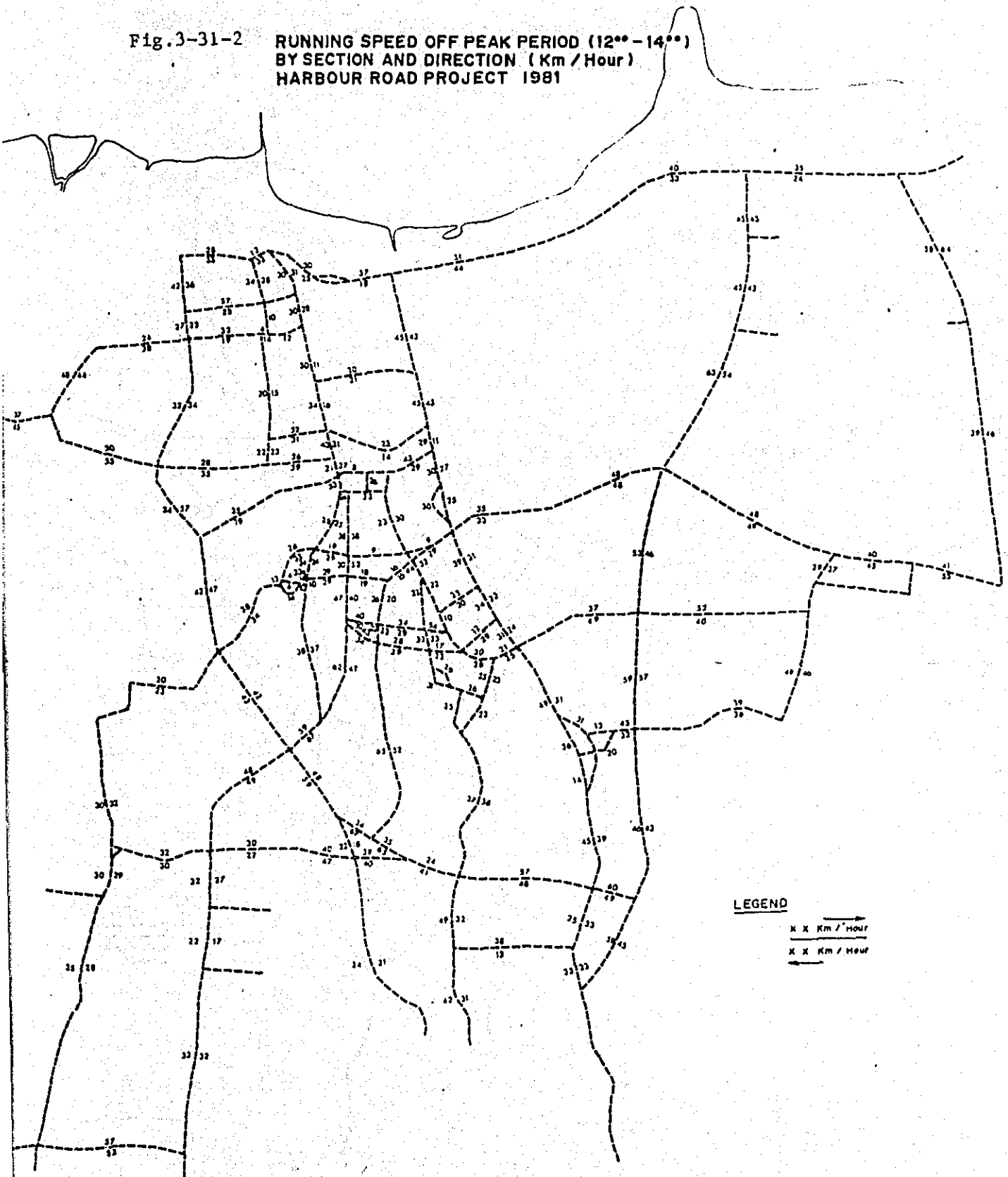


Fig.3-32-1 TRAVEL SPEED IN ON PEAK PERIOD (7** - 9**)
BY SECTION AND DIRECTION (Km/Hour)
HARBOUR ROAD PROJECT 1981

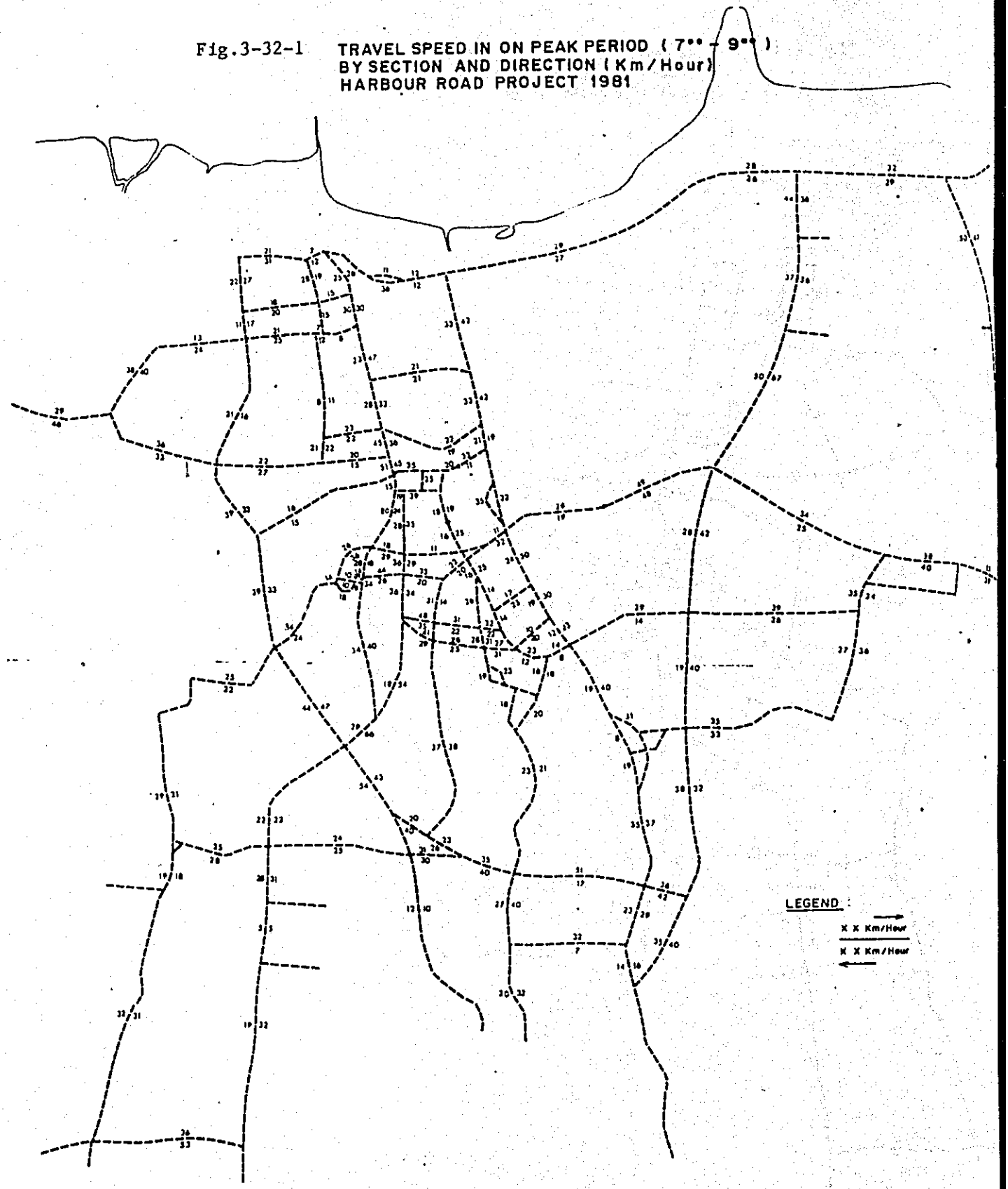
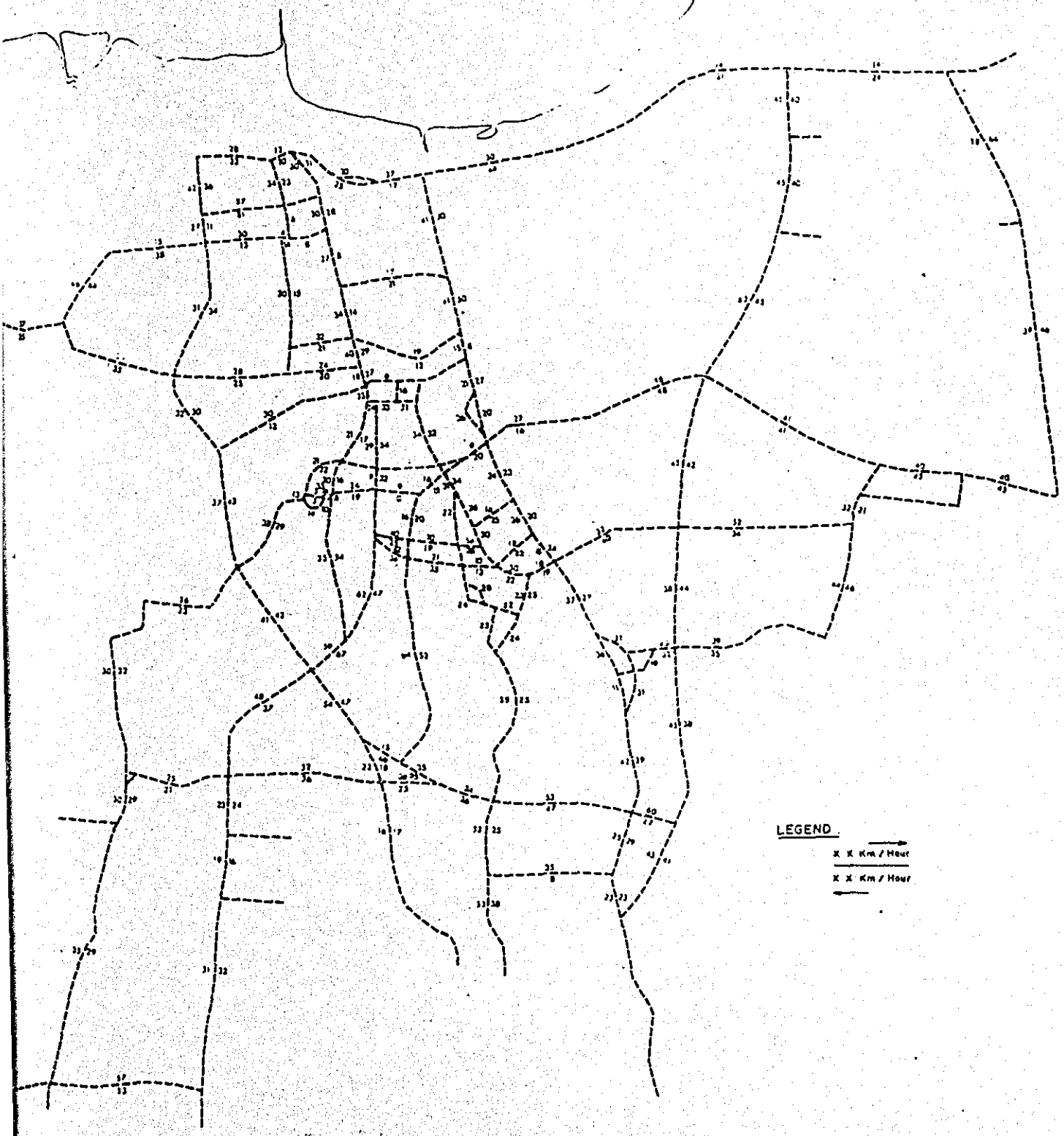


Table.3-2-2 TRAVEL SPEED IN OFF PEAK PERIOD (12**-14**)
BY SECTION AND DIRECTION (Km / Hour)
HARBOUR ROAD PROJECT 1981



IV. TRAFFIC DEMAND FORECAST

4.1. Transportation Facilities Development Plan

4.1.1. Tanjung Priok Port Improvement Plan

Tanjung Priok Port Master Plan, Swan Wooster Engineering 1975, is now being reviewed by the same consulting firm. Until completion of the above study the Tanjung Priok Port Authority intends to respect the sbort term improvement scheme proposed by the master plan.
The access road network plan which has a very strong effect upon this study is shown in the figure.

4.1.2. Other Ports Development Plan

(1) Kali Baru

Kali Baru is located east of Tanjung Priok and has a role of a fishery port. According to the port master plan, it is planned to become a part of the Tanjung Priok Complex.

(2) Marunda

Marunda is in the further east of Kali Baru, and will serve for the timber industry in the hinterland.

(3) Sunda Kelapa

Sunda Kelapa which is one on the oldest sea port in the Republic serves for domestic sea transport of timber, fertilizer and cement.

Table 4-1 CARGO TRANSPORT AT SUNDA KELAPA (Excluding Logs)

(Unit: ton)

	1975	1976	1977	1978	1979
Arrival	465,152	425,939	285,436	425,436	437,371
Departure	232,559	254,459	227,527	365,705	465,751
T o t a l	697,711	680,398	512,963	791,498	903,122

LOG TRANSPORT

(Unit: M^3)

Arrival	345,248	320,789	208,816	310,702	302,103

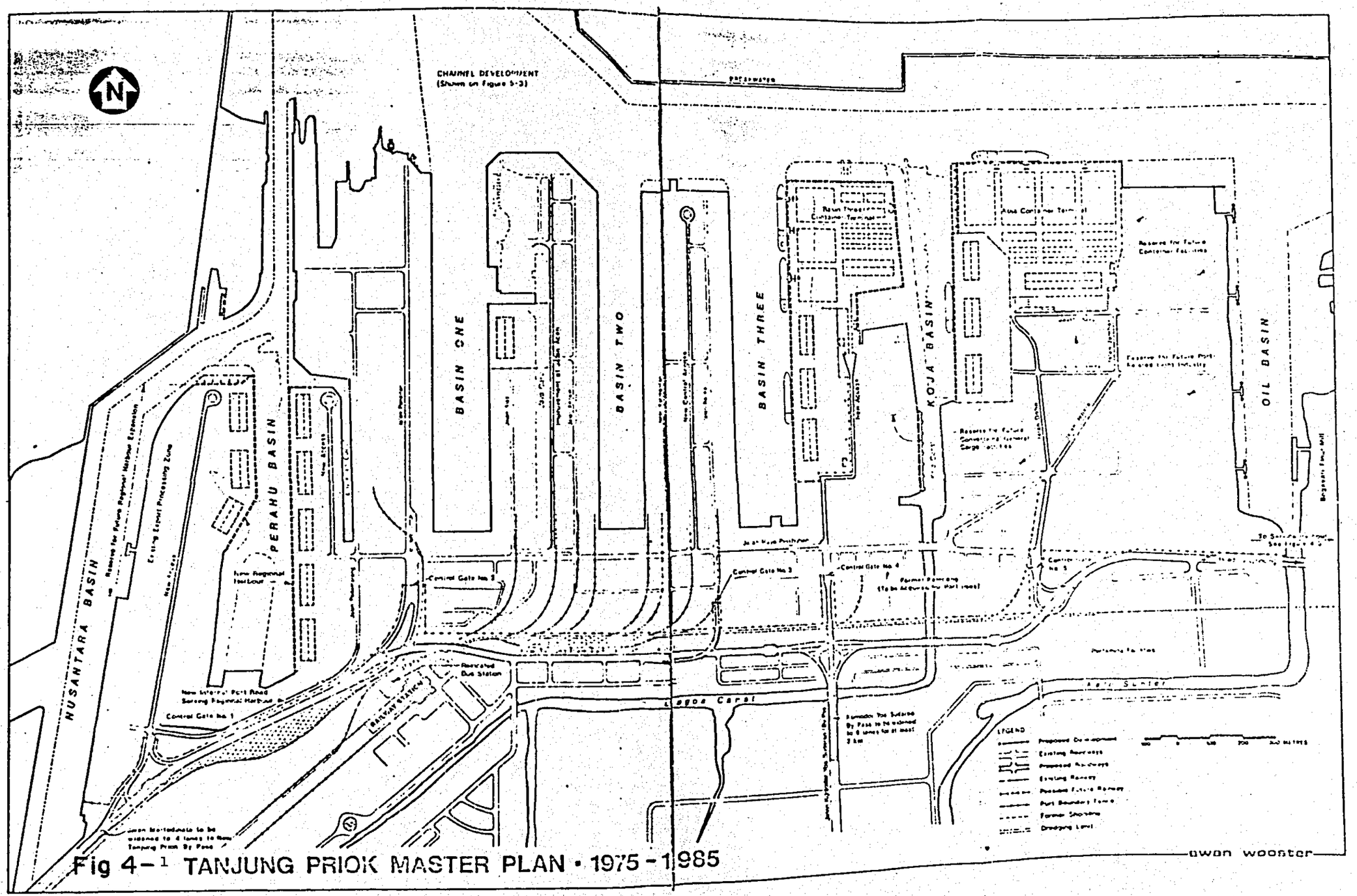


Fig 4-1 TANJUNG PRIOK MASTER PLAN • 1975 - 1985

Table 4- 1 CARGO HANDLING AT TANJUNG PRIOK

(Tons/yr)

YEAR	INTERNATIONAL TRADE				INTER ISLAND TRADE				TOTAL OF CARGO HANDLING	%
	Import	%	Export	%	UNLOADING	%	LOADING	%		
1970	2,371,815	79	291,113	7	202,156	7	197,365	7	2,990,450	100
1971	2,542,541	80	196,657	6	224,513	7	205,317	7	3,169,030	100
1972	3,058,927	79	236,140	6	229,502	8	277,627	7	3,872,196	100
1973	4,464,393	83	166,584	3	330,444	6	434,165	8	5,395,586	100
1974	4,477,250	81	155,313	3	419,430	8	440,887	8	5,492,880	100
1975	4,282,126	80	124,337	2	507,621	10	403,180	8	5,317,264	100
1976	4,283,939	78	202,668	4	558,704	10	436,427	8	5,481,738	100
1977	4,248,152	76	227,491	4	558,157	11	529,843	9	5,593,643	100
1978	5,016,037	73	356,440	5	782,323	11	703,989	11	6,858,789	100
1979	4,846,349	65	933,897	12	660,104	9	983,895	14	7,424,245	100
1980*)	3,837,369	68	542,781	10	527,781	9	717,279	13	5,624,538	100

*) January - August.

(4) Pasar Ikan

Pasar Ikan is next to Sunda Kelapa and redevelopment project is in process.

- Wholesale Market;
- Rest House;
- Dormitory;
- Reffrigerating Facilities; and
- Parking Area.

are planned.

Fig. 4 – 2 PASAR IKAN DEVELOPMENT PLAN

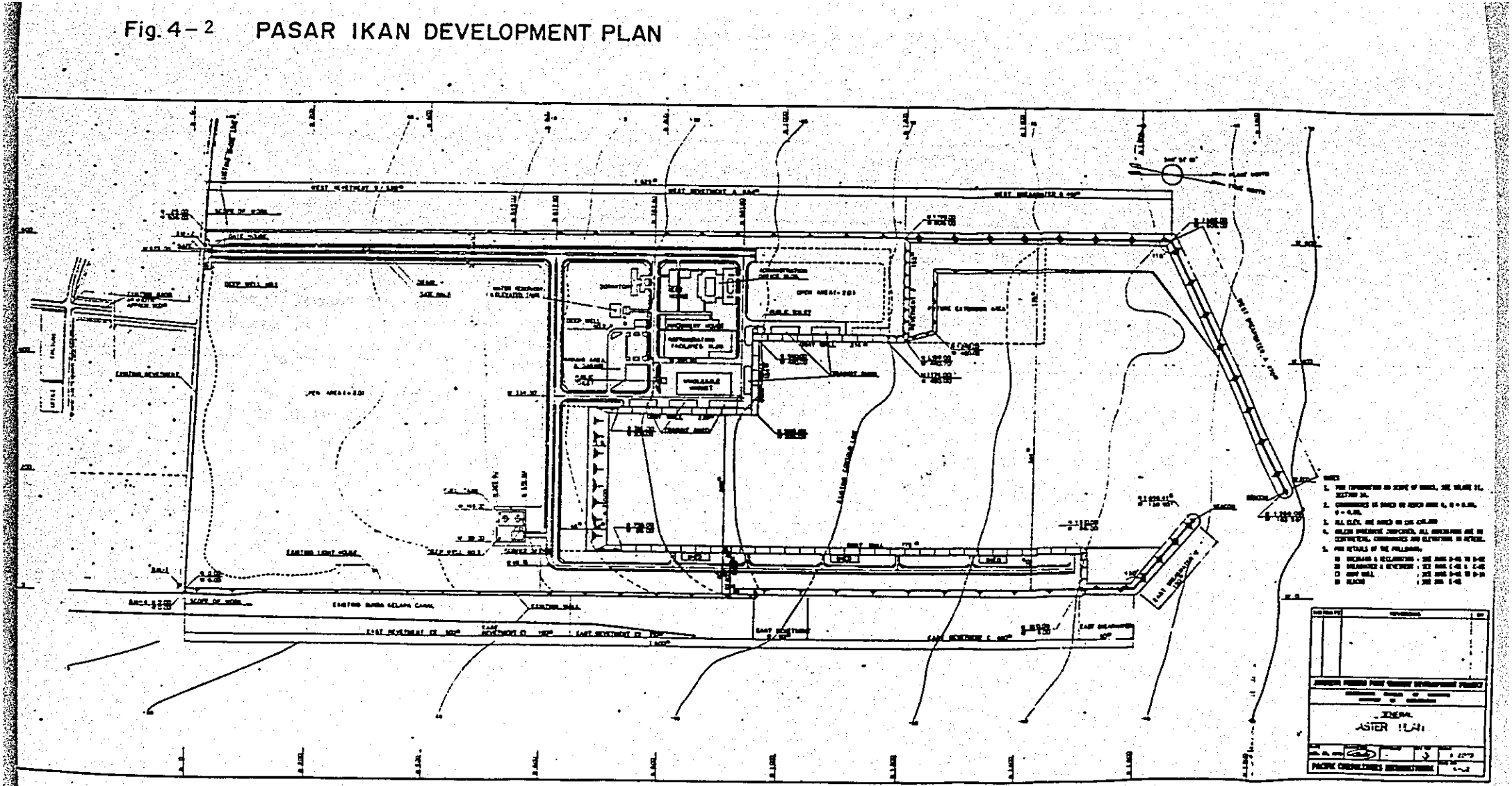


Table 4-3 FISH TRANSPORTATION AT PASAR IKAN BY CATEGORY

(ton)

ITEMS	URGENT DEVELOPMENT PLAN 1983		SHORT TERM DEVELOPMENT PLAN 1993		LONG TERM DEVELOPMENT PLAN 2003	
	YEARLY	DAILY	YEARLY	DAILY	YEARLY	DAILY
a. Total Demand in Terms of Fresh Fish	180,000	493	290,000	795	360,000	986
b. Total Demand in Terms of Fish Category	120,000	328	193,000	528	240,000	657
1. Salted & Dried Fish	30,000	82	48,000	132	60,000	164
2. Fresh Fish	90,000	246	145,000	396	180,000	493
c. Fish Transportation	120,000	328	193,000	528	240,000	657
c-1 : By Ship	103,200	282	167,700	459	209,300	574
1. Salted & Dried Fish by Carrier	30,000	82	48,000	132	60,000	164
2. Fresh Fish by Fishing Boat	53,200	146	75,000	205	75,000	205
3. Fresh Fish by Carrier	20,000	55	44,700	122	74,300	204
c-2 : By Truck	16,800	46	25,300	132	30,700	493
1. Sea Fish	13,300	37	21,800	60	27,200	75
2. Fresh Water Fish	3,500	9	3,500	9	3,500	9

4.1.3. Jakarta Airport Cengkareng

(1) Traffic Forecast

The assessment report of "Jakarta Airport Cengkareng" was prepared in 1977 in order to update previous traffic forecasts. According to this report the future airport related traffic is forecast as follows:

(a) Passenger Traffic

Table 4-4 FORECASTS OF OVERALL PASSENGER TRAFFIC

(in thousands of passengers, arrival + departure)

	1976	1980	1985	1990	2000
International traffic	964.5	1,548	2,488	3,742	7,780
Average annual growth rate		12.6%	10.0%	8.5%	7.6%
Domestic traffic	2,067.0	3,690	6,480	10,400	23,500
Average annual growth rate		15.6%	11.9%	9.9%	8.5%
T o t a l	3,031.5	5,238	8,968	14,142	31,380
Average annual growth rate		14.7%	11.4%	9.5%	8.3%

(b) Freight Traffic

International and domestic freight traffic are estimated as shown below:

Table 4-5 FORECASTS OF FREIGHT TRAFFIC AT JAKARTA

(Unit: ton)

YEAR	INTERNATIONAL TRAFFIC			DOMESTIC TRAFFIC			TOTAL ARR. + DEP.
	ARRIVAL	DEPARTURE	TOTAL	ARRIVAL	DEPARTURE	TOTAL	
1976	12,846	3,265	16,113	4,855	16,676	21,531	37,644
1980	18,800	4,700	23,500	10,900	34,800	45,700	71,200
1985	30,000	8,700	38,700	25,700	69,400	95,100	133,800
1990	47,000	15,300	62,300	47,300	127,900	175,200	237,500
2000	104,000	43,500	147,500	178,800	332,000	510,800	658,300

(c) Mail Traffic

International and domestic mail traffic are estimated as shown below:

Table 4-6 FORECASTS OF MAIL TRAFFIC AT JAKARTA

(Unit: ton)

YEAR	INTERNATIONAL TRAFFIC			DOMESTIC TRAFFIC			TOTAL ARR. + DEP.
	ARRIVAL	DEPARTURE	TOTAL	ARRIVAL	DEPARTURE	TOTAL	
1976	n.a.	n.a.	1,667	495	1,309	1,973	3,640
1980	1,500	1,000	2,500	1,100	2,600	3,700	6,200
1985	2,600	1,800	4,400	2,300	5,100	7,400	11,800
1990	4,400	3,000	7,400	4,400	9,300	13,700	21,100
2000	11,400	7,600	19,000	13,600	25,200	38,800	57,800

(d) Airport Employer Population

Number of employees required for the Jakarta Airport Cengkareng has been estimated based on the estimated future air passengers and freight volume. These are:

Year 1990	26,000 employees
Year 2000	54,000 employees

Among the above employees, the following are considered to work during a typical day:

Year 1990	19,000 employees
Year 2000	40,000 employees

(2) Peak Traffic

(a) Peak Hour Passenger Traffic

Peak passenger traffic for both international and domestic passengers are estimated eventually as shown below:

Table 4-7 40TH PEAK HOUR OF PASSENGER TRAFFIC

	1976	1980	1985	1990	2000
International Passenger Traffic					
Arrival + Departure	900	1,200	1,500	1,900	2,900
Arrival	650	850	1,100	1,300	1,900
Departure	450	600	850	1,100	1,700
Domestic Passengers Traffic					
Arrival + Departure	1,300	2,000	2,900	4,100	7,300
Arrival	800	1,200	1,700	2,400	4,100
Departure	1,000	1,500	2,100	2,900	5,000
International and Domestic Passengers Traffic					
Arrival + Departure	1,700	2,500	3,600	5,000	8,700

(3) Ground Traffic

(a) Air Passengers

Based on the analyses of future transport choice by air passengers and average vehicle occupancy, vehicle flow (p.c.u.) of a peak hour and also daily average flow are estimated as shown in the below tables:

Table 4-8 HOURLY PEAK FLOW (DIRECTION CITY - AIRPORT)

TYPE OF TRAFFIC	TRAFFIC VOLUME (PASSENGERS)	MEANS OF TRANSPORT	USE RATE	PASS/ VEHICLE	P.C.U./ VEHICLE	FLOW (P.C.U.)
DOMESTIC PASSENGERS						
- Departure	5,000	Taxi	25%	1.5	1	833
		Private Car Short Term	35%	1.5	1	1.167
		Private Car Long Term	10%	1.1	1	455
		Bus	25%	45	3.5	97
		Others	5%	30	3	25
- Arrival	2,300	Taxi) Bus) Others)				
		Private Car short Term	35%	1.5	3	537
INTERNATIONAL PASSENGERS						
- Departure	600	Taxi	25%	1.5	1	100
		Private Car Short Term	20%	1.5	1	80
		Private Car Short Term	5%	1.1	1	27
		Bus	35%	45	3.5	16
		Others	15%	30	3	9
- Arrival	600	Private Car Short Term	20%	1.5	1	80
TOTAL (P.C.U.)						3,426

Table 4-9 DAILY AVERAGE FLOW (DIRECTION CITY - AIRPORT)

TYPE OF TRAFFIC	TRAFFIC VOLUME (PASSENGERS)	MEANS OF TRANSPORT	USE RATE	PASS/ VEHICLE	P.C.U./ VEHICLE	FLOW (P.C.U.)
DOMESTIC PASSENGERS						
- Departure	32,329	Taxi	25%	1.5	1	5,388
		Private Car Short Term	35%	1.5	1	7,543
		Private Car Long Term	10%	1.1	1	2,939
		Bus	25%	45	3.5	629
		Others	5%	30	3	162
- Arrival	32,329	Taxi	25%/2	1.5	1	2,694
		Private Car Short Term	35%	1.5	1	7,543
INTERNATIONAL PASSENGERS						
- Departure	10,658	Taxi	25%	1.5	1	1,776
		Private Car Short Term	20%	1.5	1	1,421
		Private Car Long Term	5%	1.1	1	484
		Bus	35%	45	3.5	290
		Others	15%	30	3	160
- Arrival	10,658	Taxi	25%/2	1.5	1	888
		Private Car Short Term	20%	1.5	1	1,421
TOTAL (U.V.P.)						33,338

(b) Other Ground Traffic

Other ground traffic are categorized by "freight and mail", "ground personnel", "flight personnel" and "miscellaneous".

For each of these categories, traffic volume in both peak and all day traffic is estimated to be 2774 p.c.u. and 17,662 p.c.u. respectively. The breakdown of these traffic are shown in the summary table.

(c) Summary of Ground Traffic

To summarize, the following table shows the future road traffic generated by Jakarta Airport Cengkareng in the year 2000.

Table 4-10 AVERAGE DAILY FLOW OF ROAD TRAFFIC PER DIRECTION

(Year 2,000)

Air passengers		33,338
- Domestic	26,898	
- International	6,440	
Freight and mail		7,172
Ground personnel		7,178
Flight personnel		1,221
Misc. (visitors, general avaiation, concessionaires) etc... estimate		2,091
T O T A L :		51,000 p.c.u.

Table 4-10 PEAK HOUR ROAD TRAFFIC FLOW PER DIRECTION

Air passengers		3,426
- Domestic	3,114	
- International	312	
Freight and mail		717
Ground personnel		1,722
Flight personnel		123
Misc. Estimate		212
T O T A L :		6,200 p.c.u.

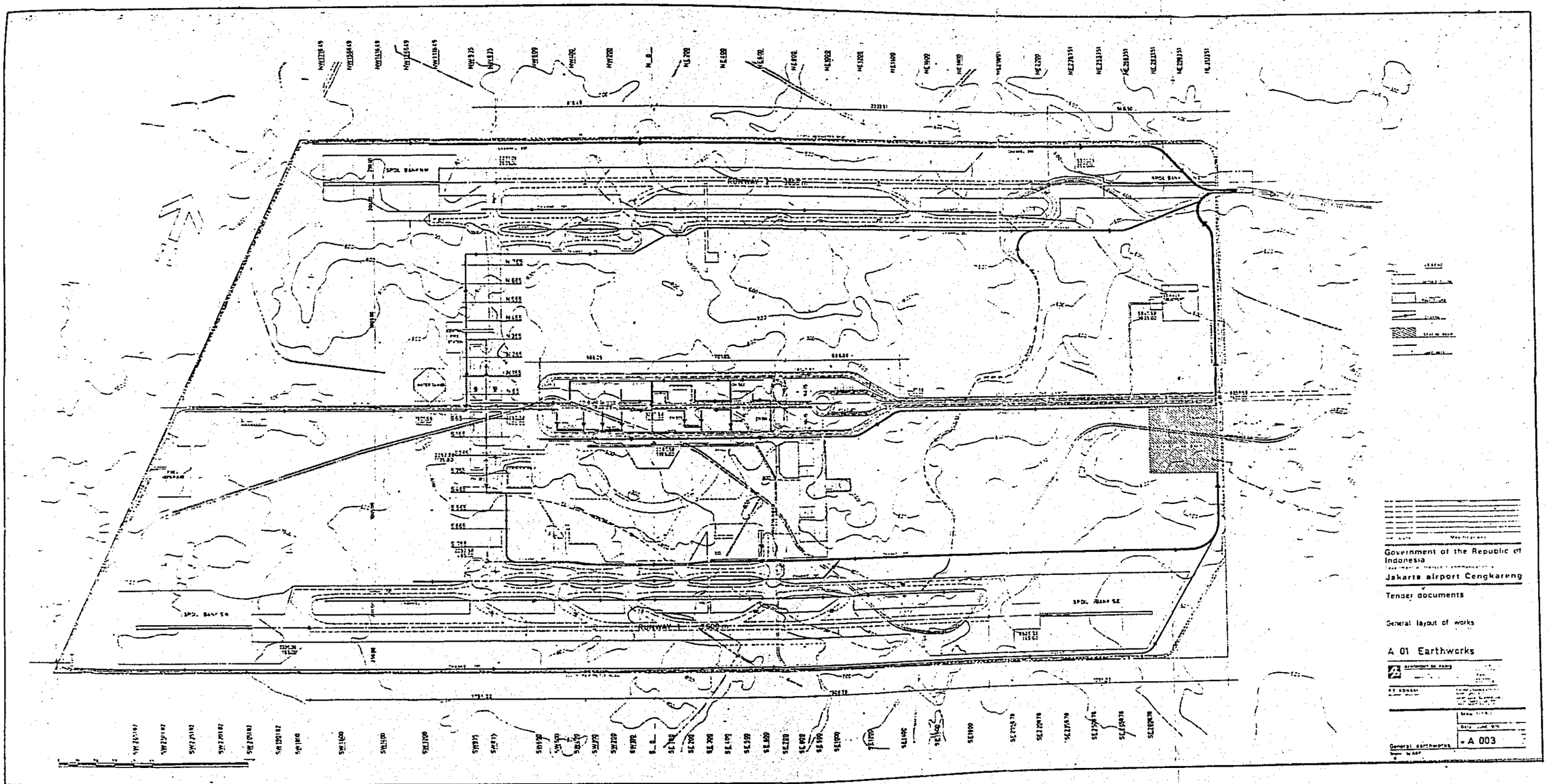
(4) Construction Schedule

Construction schedule of the Airport is to be as follows:

Year 1983 Open to international air traffic
Year 1987 Open to domestic air traffic

General layout plan of the Airport is attached hereto.

Fig. 4-3 GENERAL PLAN OF JAKARTA AIRPORT CENGKARENG



4.1.4 Railway Improvement Plan.

The railway in Jakarta has a history of over 100 years, being unable to give full justice to its advantage of holding a substantially circular route within the city and it does not contribute to mitigation of traffic congestion.

Grapling with the difficulties the metropolitan Jakarta faces, the Indonesian Government is pushing an overall development program covering "JABOTABEK" area. Pertaining to the railway improvement, the Intermediate Program has been laid down and is already underway aiming at the urgent and intermediate improvement, while the Urban/Suburban Railway Transportation Study is now in progress for the preparation of the master plan in the "JABOTABEK" area with the target year 2000 A.D.

(1) Intermediate Program

The Intermediate Program having been started since 1976 consists of four Phases and is implemented step by step with each Phase as mentioned below :

(a) Present Condition :

i) 20 nos of electric railcars and 24 nos of diesel railcars have been in operation since 1976.

ii) For improvement of power supply, 6 units of sub-stations were purchased in 1976 and now under installation on the Eastern and Central Lines.

iii) To secure the operation, track maintenance and installation of fence, etc. have been partly carried out.

(b) Phase I:

i) A procurement of planned material for thr Phase I was executed by the Japanese EXIM bank Export Credit: 20 nos of electric railcars (Eastern Line), 16 nos of diesel railcars and 4 units of sub-stations.

ii) To prepare for the operation of the above railcars, track maintenance, installation of fence and clear-off of illegal dwellers have been under execution on the Eastern and Central Lines.

iii) Also the reinforcement of workshop and depot facilities have been under execution.

(c) Phase II:

i) The crossing facilities, signalling and telecommunication system and the sub-stations on the Eastern and Central Lines and track maintenance on the Western Line are reinforced to secure the safe and speedy operation.

ii) Additional diesel railcars are introduced in the Western Line to reinforce and establish frequent service of transportation in the area.

and/or

iii) For the purpose of electrification of Western Lines as the next step as well as problems in Phase III and Phase IV the consulting engineering services are carried out to make detailed implementation program

However, the execution of the above consulting engineering services was shifted in Phase III and it is to be finalized by the early 1981.

(d) Phase III :

i) Based upon the implementation program derived from a result of engineering services, the purchase of the necessary materials and equipment for electrification of the Western Line is to be executed.

ii) Electric railcars for the Eastern and Central Lines as well as diesel railcars for Western and collector lines are additionally introduced to improve frequent service.

iii) Installation of fence and lifting up of platform height are continuously carried out.

(e) Phase IV :

i) Construction work for the electrification on the Western Line is executed.

ii) The operation of electric railcars is started on the Western Line replacing diesel railcars with electric railcars.

iii) Installation of fence, lighting-up platform height and improvement of workshop and depot facilities are continued.

iv) Engineering services are carried out to study feasibility of extention of electrification to the suburban area, improvement of frequent train operation, necessity of fly-overc, etc.

The program in Phase IV is scheduled to start in 1980 but it seems to be delayed.

(2) Urban/Suburban Railway Transportation in "JABOTABEK" Area

The captioned study has already started from May, 1980 and is to be finalized in March, 1981. The objective of the study is to formulate a railway master plan with the target year 2000 A.D. The study also includes the feasibility study of high priority within the framework of the above long-term master plan. Therefore, a railway improvement program which follows the previously mentioned Intermediate Program will be introduced in the early 1981.

Although the above study is still underway it was disclosed through the meetings that PJKA had several intention for the future program such as :

i) Construction of new railway lines, that is a Cengkareng Jakarta Airport line and a Cibinong-Cakung-Tanjung Priok freight line. The former new line, however, seems to be so difficult to realize.

ii) Elevation of Central Line and Eastern Line.

4.1.5 Ancol Project

P.T. Jaya Ancol has its own future development Plan. Reclamation is planned to start after 1984 and the total area will increase from 550 Ha to 720 Ha. (Refer to Fig. A5-13).

(1) Jakarta Fair

According to the latest information the zone between the coastal line and Ancol Canal is devided into five parcels of land. The most eastern part (46 Ha) is planned to become a site for the exibition (the Jakarta Fair) which is now situated around the Monas Tower.

(2) Ancol Timur Housing

On the west of the Jakarta Fair site, a housing complex is planned (Approximately 73 Ha).

(3) Amusement Park and Hotels

The present golf couse is planned to be tranformed to a Desney Land Type amusement park with four new hotels (approximately 400 rooms each) in addition to the presint one. A large parking lot is also planned along the canal.

(4) Ancol Barat Housing

On the west of the amusement park another housing complex is planned.

(5) Industrial Estate

On the further west of the site an industrial estate with 71 lots is planned.

4.2. AREA GROWTH ANALYSES

4.2.1. Methodology

There are two main objectives for the Area Growth Study, and they are:

- To obtain the future prospect of statistical and physical conditions in DKI Jakarta and its surroundings; and

- To prepare a statiscal base for the Transportation Study.

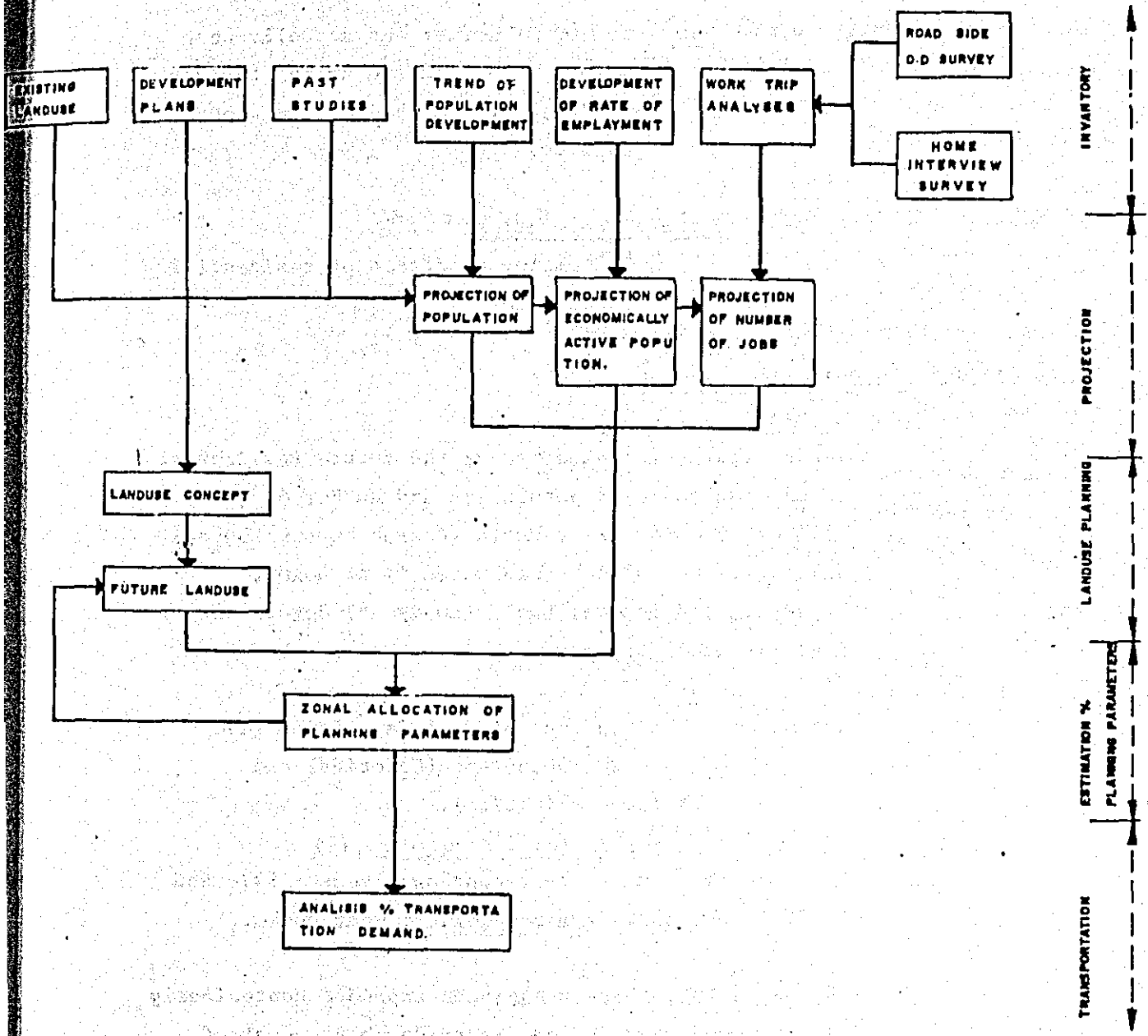
The Area Growth Study was done through four steps as shown in Fig. 4-4, and they are:

- Inventory;
- Projection of Basic Statistics;
- Landuse Planning; and
- Estimation of Planning Parameters by zone.

The past development of basic statistics such as the residential population and emplyment rate were analysed and projected referring to studies which has been issued in the past.
Projection was made through a fairly demographic procedure with a very limited amount of planning measures formulated in the process of area growth study.

The basic figures were allocated to zones following guide-line established in the area growth study.

Table 4-4 METHODOLOGICAL FLOW CHART OF LANDUSE STUDY



The number of jobs *)-1 and employed population *)-2 in each zone at present was figured out from the results of road-side O-D Survey and Home Interview survey carried out by the Study Team in October and November 1980 respectively.

Notes: *)-1 Jobs: Number of worker who actually work within a certain are during the day including those who commute from outside.

*)-2 Employed Population:
The employed portion of residential population

4.2.2. Statistical Framework

(1) General

The statistical framework for the future residential population employed population and number of jobs will be made for DKI Jakarta (Daerah Khusus Ibukota Jakarta), and BoTaBek (Kabupaten *) of Bogor, Tangerang and Bekasi, and Kotamadya *) Bogor) for Transportation Studyes.

Notes: *) The Province of West Java is divided into 20 Kabupatens (Counties) and Kotamadya (Cities).

The population data for recent past years, 1976 and 1978, is obtained from statistical year books.

The DKI Jakarta border has been expanded conteniously almost every year adding a considerable amount of sparsely inhabited fringe areas which used to be a part of BoTaBek.

Also, observing the area of each Kecamatan *) in the statistical year boods, the administrative units division for DKI Jakarta seems to be changing rather frequently.
The map of administrative units division by DKI Jakarta, ADMINISTRATIVE DIVISION of DKI Jakarta, scale 1:50,000 is utilized for zone division in this study.

Notes: *) The administrative units of DKI Jakarta are as follows:

- Kelurahan: The smallest administrative units, and DKI Jakarta is divided into 225 Kelurahans.
- Kecamatan: Sets of Kelurahans, and DKI Jakatta is divided into 30 Kecamatans.
- Wilayahs: Sets of Kecamatans, and DKI Jakatta is divided into 5 Wilayahs, the Central, North, West, South and East Wilayahs.

(2) Residential Population

(a) Preparatory Work

The population added to DKI Jakarta by the change of its boundary is figured out to be 121 thousands in 1976 from the data provided by the DKI Offce. The population density of this added portion of DKI Jakarta is applied to the rural area added in each year of boundary expansion in figuring out the added population in each year.

Table 4-11 POPULATION DEVELOPMENT ADJUSTED BY BORDER CHANGES

(Unit: 1,000 persons)

YEAR	AREA *)-1 (Km2)	AREA ADDED (Km2)	POPULATION ADDED						POPU-LATION SENSUS *)-2	ADJUSTED POPULATION	GROWTH RATE - (%/yr)
			1	2	3	4	5	TOTAL			
1973	576.41	7.92	11	20	114	5	19	169	4,973	5,142	-
1974	578.41	2.00	11	21	116	5	-	153	5,183	5,336	3.8
1975	578.41	-	11	21	118	-	-	150	5,404	5,554	4.1
1976	682.23	49.82	11	22	121	-	-	154	5,702	5,856	5.4
1977	637.10	8.87	12	22	-	-	-	34	5,925	5,959	1.8
1978	642.06	4.96	12	-	-	-	-	12	6,082	6,094	2.3

Source: *)-1 STATISTICAL YEARBOOK OF DKI JAKARTA, 1979

*)-2 STATISTICAL YEARBOOK OF DKI JAKARTA, 1979

There are two main objectives for the future population forecast, and they are to provide basis for the transportation study and the area growth study. For the transportation study purpose the most important issue is to figure out the Flow-in and Flow-out work trip situation about DKI Jakarta, and in order to do so the surrounding conditions of DKI Jakarta have to be studied in a considerable depth.

The study team has obtained "JABOTABEK METROPOLITAN DEVELOPMENT PLANNING". June 1980, which is a complete revision of "1973 JABOTABEK" and "1976 JABOTABEK". This report, therefore, is reflected in this study from the viewpoint of regional development suty. The study referred as "JMDP" in this study indicates the latest one, unless otherwise mentioned as "JABOTABEK" for both 1973 and 1976 Reports.

The future DKI Jakarta population is projected through two steps. Firstly, a relatively unartificial curve of the migrating population into DKI Jakarta which requires no strong population dispersion measure is adopted through a rather strictly demographic procedure. This framework is named the "Potential Population Framework". Secondly, the maximum capacity of population absorption by DKI Jakarta is fixed by setting an optimum gross population density of DKI Jakarta, and then, a part of the migrating population into DKI Jakarta estimated in the "Potential Population Framework" is assumed to overspill, or actually shift, to outside DKI Jakarta as a result of the future development of the BoTaBek region along the DKI Jakarta border. This projection is called the "Adjusted Population Framework".

These two steps are taken to identify a portion of the BoTaBek population which can be considered to be overspilled from the future DKI Jakarta population Projection", and which would have settled in DKI Jakarta if there had been any further available capacity of absorption.

This portion of BoTaBek population would be, therefore, most likely to settle in the area outside and along the DKI Jakarta. For example, the persentage of the commuting population to DKI Jakarta would be much higher than in the rest of the BoTaBek population.

(b) Potential Population Framework

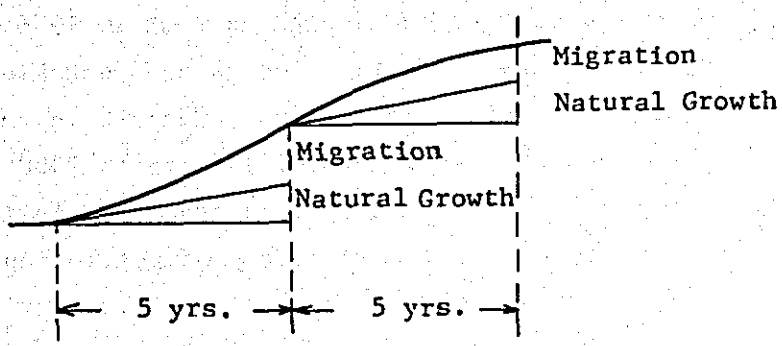
The average growth rate of DKI Jakarta population during 1973 to 1978 was 3.5% yr., and according to "JABOTABEK", 1973, the growth rate of its natural increase was around 2.0% yr., and the rest was that of the migration. During the same period BoTaBek and JaBoTaBek, the whole metropolitan are including Jakarta and BoTaBek, recorded respectively population growth rates of 2.2% yr. and 3.2% yr.

Assuming that the growth rate of the natural increase in 1971 in BoTaBek was equal to that of the whole Java - Madura region (2.2% yr.) there was no migration increase into BoTaBek.

The natural growth rates in DKI Jakarta, BoTaBek and JaBoTaBek are assumed to decrease continously to around 1.5 % by the year 2000. *).

Notes: *) "STATISTICAL YEARBOOK OF INDONESIA, 1978" forecast that the natural growth rate will decline down to around 1.5 %yr due to the effect of Family planning campaign.

The future population of JaBoTaBek is projected by referring to other studies. For intermediate stages, the population growth by migration is forecasted for each 5 year period assuming the largest migration volume would be recorded during the period of 1985 to 1990. Attention should be paid to the fact that an increase by migration during a five years period will start producing the natural growth during the next 5 years period.



The population increase in JaBoTaBek by migration in each five years period is divided into those into DKI Jakarta and BoTaBek assuming the pattern of migration into the both region in the future as drawn in Fig. 4-5

Table 4-12 POPULATION PROJECTION FOR JABOTABEK BY REPORTS ISSUED

(Unit: 1,000 persons)

Year \ Report	"JMDP"	"JABOTABEK"	OUTER RING ROAD	JMATS
1971	10.5 ('78)	7.0	8.3	8.45 ('72)
1985	17.4 ('93)	12.1	13.2	12.95
2000	20.8 ('03)	18.3	19.1	17.75

Note: The area dealt with by "JABOTABEK" is smaller than the JaBoTaBek region in this study (Kabupaten Bogorm Kabupaten Tangerang, Kabupaten Bekasi, Kotamadya Bogor and DKI Jakarta).

(c) Adjusted Population Framework

According to the "Potential Population Framework" the gross DKI Jakarta population density in 2000 will be 163 persons/Ha which is almost twice as high as that in 1976, 89 persons/Ha, and this figure seems to be quite unacceptable.
So, the "Potential Population Framework" is revised setting the maximum population of DKI Jakarta in 2000. Assuming 150 person/Ha to be the optimum gross population density in DKI Jakarta the maximum capacity of population absorption by DKI Jakarta would be about 9.8 millions at that time. *)

Note: *) Adjustment of a demographic population forecast from a planning point of view has to be done with a reasonable range. Reference was made to past studies including "Jakarta Master Plan 1965 - 1985", "JMATS", "JABOTABEK" and "JMDP".

Table 4-13 GROSS POPULATION DENSITY OF DKI JAKARTA IN FUTURE BY REPORTS ISSUED

"JAKARTA MASTER PLAN 1965 - 1985"	"JMDP"	JMATS	"JABOTABEK"
(1985) 107 persons/Ha	(2003) 186 persons/Ha	(2000) 160 persons/Ha	(2000) 91 persons/Ha

Under such conditions mentioned above, a portion of the future DKI Jakarta population in the "Potential Population Framework" is moved out of DKI Jakarta into the surrounding regions in BoTaBek. There is no change for the population framework for JaBoTaBek as a whole.

Fig. 4-4 POTENTIAL POPULATION FRAMEWORK

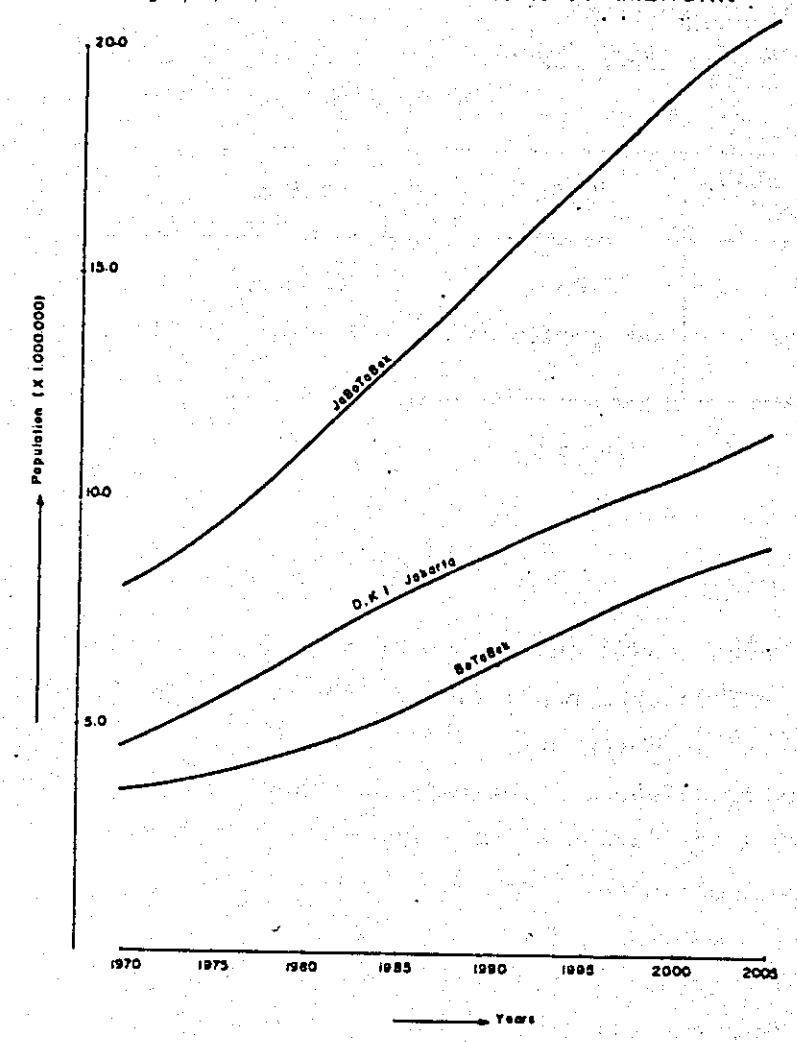


Fig. 4-5 MIGRATION IN POTENTIAL POPULATION FRAMEWORK

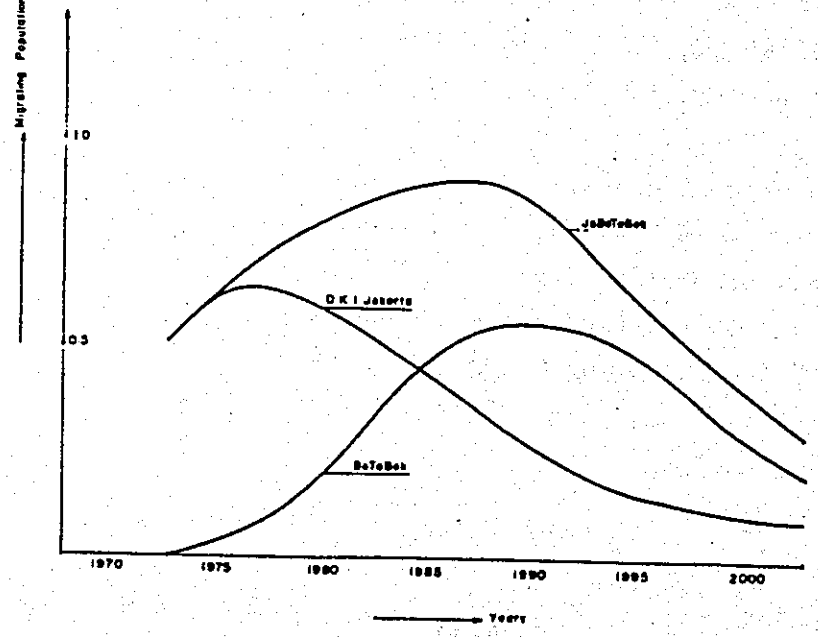


Fig. 4-6 ADJUSTED POPULATION FRAMEWORK

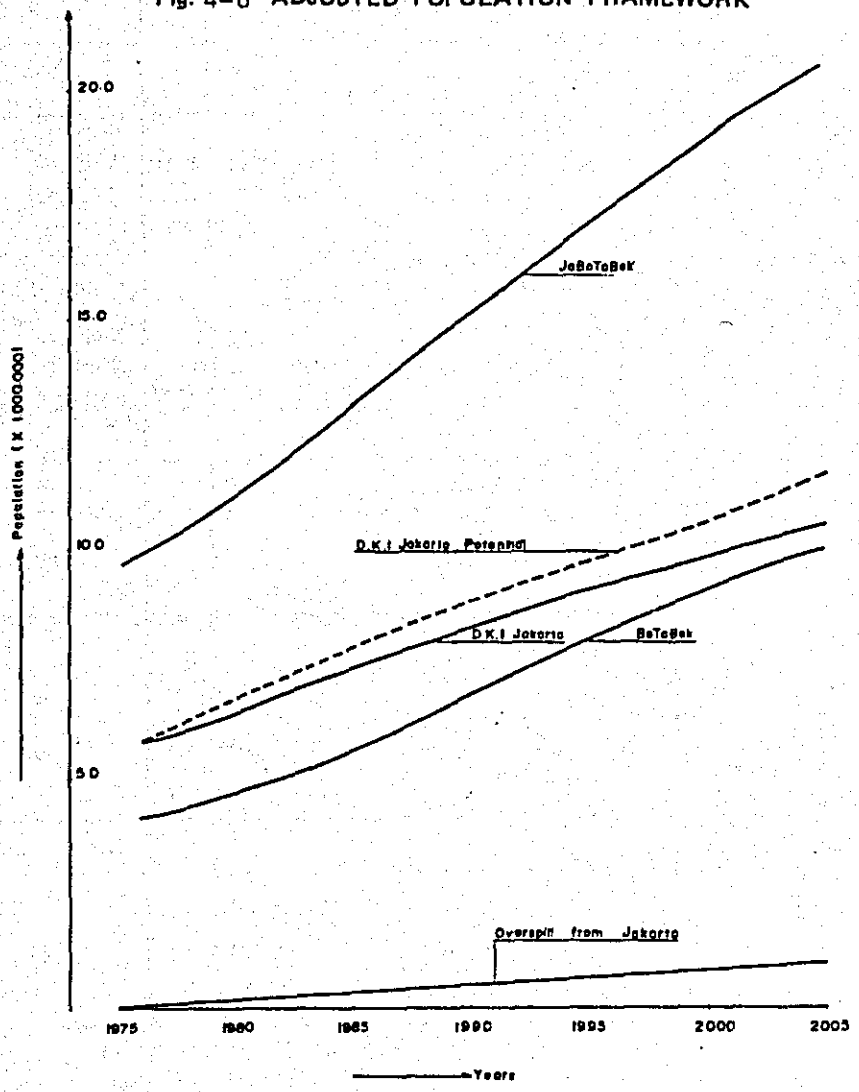


Fig. 4-7 MIGRATION IN ADJUSTED POPULATION FRAMEWORK

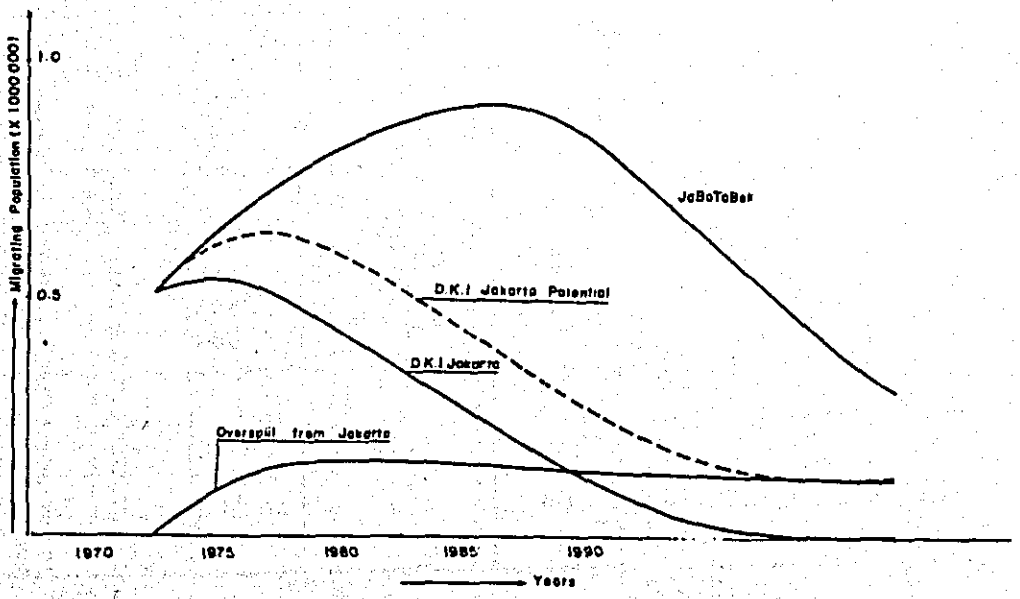


Table 4-14 POTENTIAL POPULATION FRAMEWORK

Year	Jakarta		BoTaBek		JaBoTaBek	
	Total		Total		Total	
	Average Annual Growth Rates (%) For next years	Increase in next 5 years ('000 persons)	Average Annual Growth Rates For next 5 years (%)	Increase in next 5years ('000 persons)	Average Annual Growth Rates For next 5 years (%)	Increase in next 5 years ('000 persons)
	Natural Growth Rates (%)	Natural; Migration ('000 persons)	Natural Growth Rates (%)	Natural; Migration ('000 persons)	Natural Growth Rates (%)	Natural; Migration ('000 persons)
1975	5,570		4,150		9,720	
	3.8	1,130	3.0	660	3.4	1,740
	1.9	570 560	2.1	450 210	2.0	1.020 770
1980	6,700		4,810		11,510	
	3.2	1,140	3.3	850	3.2	1,990
	1.8	630 510	1.9	470 380	1.8	1,100 890
1985	7,840		5,660		13,500	
	2.5	1,030	3.6	1,090	3.0	2,120
	1.7	690 0,340	1.8	530 560	1.7	1,220 900
1990	8,870		6,750		15,620	
	2.0	920	3.1	1,110	2.5	2,030
	1.6	730 190	1.6	560 550	1.6	1.290 740
1995	9,970		7,860		17,650	
	1.8	890	2.4	990	2.0	1,880
	1.5	760 130	1.5	610 380	1.5	1,370 510
2000	10,680		8,850		19,530	
	1.6	870	1.7	780	1.6	1,650
	1.4	770 130	1.4	640 380	1.4	1,410 510
2005	11,550		9,630		21,180	
	1.6	950	1.7	850	1.6	1,800
	1.4	830 120	1.4	690 210	1.4	1,520 280
2010	12,500		10,480		22,980	

Year	Jakarta Potential		Overspill From Jakarta		Jakarta		Botabek		Jabotabek
	Total		Total		Total		Total		Total
	Average Annual Growth Rates (%)	Increase in 5 years ('000 persons)	Average Annual Growth Rates (%)	Increase in 5 years ('000 persons)	Average Annual Growth Rates (%)	Increase in 5 years ('000 persons)	Average Annual Growth Rates (%)	Increase in 5 years ('000 persons)	
	Natural (%)	Natural Migration	Natural (%)	Natural Migration	Natural (%)	Natural Migration	Natural (%)	Natural Migration	
1975	5.57		-		5.57		4.15		9.72
	3.8	1.13	-	0.14	3.3%	0.99	3.6	0.80	
	1.9	0.57	-	-	1.9	0.57	2.1	0.45	
		0.56	-	0.14		0.42		0.35	
1980	6.70		0.14		6.56		4.95		11.51
	3.2	1.14	17.2	0.17	2.8	0.97	3.8	1.02	
	1.8	0.63	1.8	0.01	1.8	0.62	1.9	0.49	
		0.51		0.16		0.35		0.53	
1985	7.84		0.31		7.53		5.97		13.50
	2.5	1.03	9.1	0.17	2.2	0.86	3.9	1.26	
	1.7	0.69	1.7	0.03	1.7	0.66	1.8	0.56	
		0.34		0.14		0.20		0.70	
1990	8.87		0.48		8.19		7.23		15.62
	2.0	0.92	6.3	0.17	1.7	0.75	3.3	1.28	
	1.6	0.73	1.6	0.04	1.6	0.69	1.6	0.60	
		0.19		0.06		0.06		0.68	
1995	9.79		0.65		9.14		8.51		17.65
	1.8	0.89	4.3	0.17	1.5	0.72	2.6	1.16	
	1.5	0.76	1.5	0.05	1.5	0.72	1.5	0.66	
		0.13		0.12				0.50	
2000	10.68		0.82		9.86		9.67		1953
	1.6	0.87	4.0	0.18	1.4	0.69	1.9	0.96	
	1.4	0.77	1.4	0.08	1.4	0.69	1.4	0.70	
		0.10		0.10		-		0.26	
2005	10.55		1.00		10.55		10.66		21.18
	1.6	0.95	3.5	0.19	1.4	0.76	1.9	1.04	
	1.4	0.83	1.4	0.07	1.4	0.76	1.4	0.77	
		0.12		0.12		-		0.27	
2010	12.50		1.19		11.31		11.67		22.98

(3) Employment Situation

(a) Existing Employment Situation

The existing employment rate *)-1 and the sectoral composition *)-2 of the employed population *)-3 was estimated based on figures adopted by "JMDP" - "EXISTING EMPLOYMENT AT THE KECAMATAN (ZONE) LEVEL IN BOTABEK, 1978".
Because, the analysis of Home Interview survey conducted, by the the Study Team in November, 1980 showed a very similar rate of employment, 32.09%, in comparison with 31.11% of "JMDP" in 1978.

Notes: *)-1 Employment Rate:
The rate between the employed population and residential population.

*)-2 Sectoral Composition:
In the "SENSUS PENDUDUK, 1971" occupations are classified into nine categories and they are grouped into three sectors as in the following table.

SECTORAL CLASSIFICATION OF ACCUPATIONS

Classification of Occuptions in "SENSUS PENDUDUK, 1971"	Classification
Agriculture	I
Mining and Quarrying	II
Manufacturing	II
Electricity, Gas and Water	III
Construction	II
Trade, Restourant and Hotels	III
Transport, Storage and Communication	III
Financing, Insurance, etc.	III
Activity not adequately defined	III

*)-3 Employed Population:

In "Sensus Penduduk, 1971" the economically active population is defined as the portion of population of 10 years of age and over excluding students, homemakers, income recepients, etc. And it is further classified into the employed and unemployed population.

Table 4-16
RATE OF EMPLOYMENT & SECTORAL COMPOSITION IN RECENT YEARS

	"EXISTING EMPLOYMENT AT THE KECAMATAN LEVEL IN BOTABEK, 1978" ("JMDP")			"LABOUR FORCE SITUATION IN INDONESIA, 1977"		
	DKI JAKARTA	BOTABEK	JABOTABEK	DKI JAKARTA	BOTABEK	JABOTABEK
Rate of Employment 1)	31.1	29.4	27.4	25.9	32.0	28.5
Sector I 2)	3.0	61.4	28.9	1.3	67.0	32.7
Sector II. 3)	97.0	38.6	76.4	22.3	25.8	24.0
Sector III 4)				76.4	7.2	43.3

Note: 1) Employed population/Residential population

2) In "JMDP", refered as Agriculture and Mining

3) In "JMDP", as refered as Large & Medium/Small & cottage Manufacturing Industry

4) In "JMDP", refered as Government/Trade, Services others.

(b) Future Employement Structure

1) Rate of Employment

The estimates of future employment rates in DKI Jakarta and BoTaBek in 1980, 1990 and 2000 are based on the "JMDP" study.

However, the employment rate applied for the year 2003 in the "JMDP", 41.07%, was assumed to be attained by the year 2010 in his study.

(c) Sectoral Composition of Employment

For the determination of future sectoral composition of employed population, the employment rate applied for each industrial sector are used from "JMDP" for a whole JABOTABEK region.

Table 4-17 RATE OF EMPLOYMENT AND SECTORAL COMPOSATION IN 2000 BY REPORTS ISSUED

(Unit: %)

Names of Reports		"JMDP" (2003)			"JMATS"		"JABOTABEK"	"OUTER RING ROAD"		
Regions		(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Rate of Employment		41.1	41.1	41.1	31	31	-	31.0	28.0	29.6
Sectoral Composition	I	1.0	43.0	20.1	2	35	5	0.5	19.0	8.4
	II	99.0	57.0	79.9	28	25	35	32.5	32.0	32.3
	III	(II+III)	(II+III)	(II+III)	70	40	60	67.0	49.0	59.3

Note: (1) Jakarta
(2) BoTaBek
(3) JaBoTaBek

Table: 4-18 FUTURE EMPLOYMENT STRUCTURE IN DKI JAKARTA & BOTABEK

(Unit: 1,000 persons)

			1980	1990	2000	2010
DKI JAKARTA	Residential Population		6,560.0	8,390.0	9,860.0	11,310.0
	Rate of Employment (%)		32.09	35.42	38.78	41.07
	Employed Population		2,105.1	2.972.0	3.823.7	4,645.0
	Sectoral Composition (%)	I	2.7	1.2	0.4	0.2
		II+III	97.3	98.8	99.6	97.8
	Employed Population by a Sector	I	57.1	36.0	15.0	7.0
		II+III	2,048.0	2,936.0	3,808.7	4.638.0
BOTABEK	Residential Population		4,950.0	7,230.0	9,670.0	11,670.0
	Rate of Employment (%)		32.35	35.57	38.78	41,07
	Employed Population		1,601.1	2,571.5	3,750.0	4,792.9
	Sectoral Composition (%)	I	59.6	50.0	42.0	39.5
		II+III	40.4	50.0	58.0	60.5
	Employed Population by Sector	I	953.7	1,287.0	1.576.7	1.891.1
		II+III	647.4	1,284.5	2.173.3	1.898.1
JABOTABEK	Residential Population		11,510.0	15,620.0	19,530.0	22,980.0
	Rate of Employment (%)		32.20	35,49	38.78	41.07
	Employed Population		3,706.2	5,543.5	7,573.7	9,437.9
	Sectoral Composition (%)	I	27.3	23.9	21.0	20.1
		II+III	72.7	76.1	79.0	79.9
	Employed Population by Sector	I	1,010.8	1,323.0	1.581.7	1.898.1
		II+III	2,695.4	4,220.5	5,982.0	7,539.8

(4) Number of Jobs in Jakarta and BoTaBek in 1980

(a) Balance of Jobs and Employed Population

The employment situation (number of employed population) in a region implicits the work trip generation on one hand and number of jobs in a region indicates the work trip attraction on the other hand. The regional balance of the work trips between Jakarta and its surrounding area was derived from the existing O-D matrix of the work trip.

According to this survey excess flow in work trips was estimated to be 59,700 persons trips per day as shown below:

Table 4-19 ALL DAY WORK TRIP GENERATION AND ATTRACTION IN 1980

(Unit: 1,000 persons/day)

O \ D	JAKARTA	BOTABEK	OTHER	TOTAL
JAKARTA	873,3	80.9	5.1	959.3
BOTABEK	140,3	4.8	0.5	148.5
OTHER	5,4	0.5	0	5.9
Total	1,019,0	89.0	5,7	1.113.7

From the above O-D matrix trips attracted to Jakarta exceeds those generated from Jakarta. It is, therefore, considered that the number of jobs in Jakarta is larger than the employed population and the balance supplemented by other region. The break-down of excess in-flow work trips to Jakarta is presented below:

Table 4-20
DISTRIBUTION OF EXCESS IN-FLOW WORK TRIPS BY ORIGIN OF TRIPS

(Unit: 1,000 person trips)

	TANGE-RANG	BOGOR	BEKASI	BOTABEK	OTHER	TOTAL
Excess In-Flow Work Trips to Jakarta	24.0	22.2	13.2	59.4	0.3	59.7
	(40.2)	(37.2)	(22.1)	(99.5)	(0.5)	(100%)
	(40.4)	(37.4)	(22.2)	(100.0%)	(0.5)	(100.5%)

(b) Work Places and Rate of Effective Working Days

According to the Home Interview Survey, those who have their work places outside their zone (traffic analysis zone) and those who have their work places inside their zone account for 47.65% and 52.35% respectively of a total sampling workers. Taking this into consideration, a total potential work trips (including intra-zonal trips) generated in Jakarta is estimated based on the total employed population in the region as shown below.

ESTIMATED POTENTIAL WORK TRIPS IN JAKARTA, 1980

(Unit: 1000 persons)

Employed Population	Potential Intra-zonal Work Trips	Potential Inter-zonal Work Trips (Generated)	(Attracted)
2,105.1	1,102.0	1,003.1	1,065.5

A rate of effective working days per annum, therefore, will be calculated as follows:

Inter-zonal Work Trip Generation = Potential Inter-zonal Works Trips

= 959,3 / 1,003.1 = 0,956

This figure, derived from the Home Interview survey and the estimated O-D matrix, is quite reasonable compared with the following rate of estimation.

Sunday	52 days/year
National Holiday	15 days/year
Total Holidays	67 days/year
Potential workdays	365 - 67 = 298 days/year
Paid leave	15 days/year
Leave ration	15/298 = 0.05
Effective workday ratio	1 - 0.05 = 0.95

(c) Estimation of Jobs in Jakarta, 1980

Taking the effective rate of working days, 95.6%, a total number of jobs in Jakarta is estimated as follows:

Attracted Work Trips to Jakarta	1,019.0 Thousand persons
Rate of effective Working Days	95 %
Potential No. of Workers Attracted to Jakarta	1,065.5 Thousand persons
Potential Intra-Zonal Work Trips	1,102.0 Thousand Persons
Estimated No. of Jobs in Jakarta	2,167.5 Jobs

(d) Estimation of Jobs in BOTABEK, 1980

Based on the excess flow in work trips to Jakarta and the employed population in BOTABEK, the number of Jobs in BOTABEK is estimated as follows:

POTENTIAL IN-FLOW WORK TRIPS TO JAKARTA, 1980

(Unit: 1000 persons)

	Tangerang	Bogor	Bekasi	BOTABEK	OTHER	TOTAL
Actual	24.0	22.2	13.2	59.4	0,3	59,7
Potential	25.1	23.2	13.8	62.1	0.3	62,4

Table 4-21
ESTIMATED NUMBER OF JOBS IN JABOTABEK, 1980

(Unit: 1000 persons)

	Employed Population	Excess in-flow to JKT (Potential)	JOBS
J a k a r t a	2,105.1	+62.4	2,167.5
BOTABEK	1,601.1	-62.1	1,539.0
Tangerang	445.8	-25.1	420.7
Bogor	813.8	-23.2	790.6
Bekasi	341.5	-13.8	327.7
JABOTABEK Total	3.706.2	+0,3	3,706.5
OTHER	A	-0,3	A-0,3
T O T A L	3,706.2+A	0	3,706.2+A

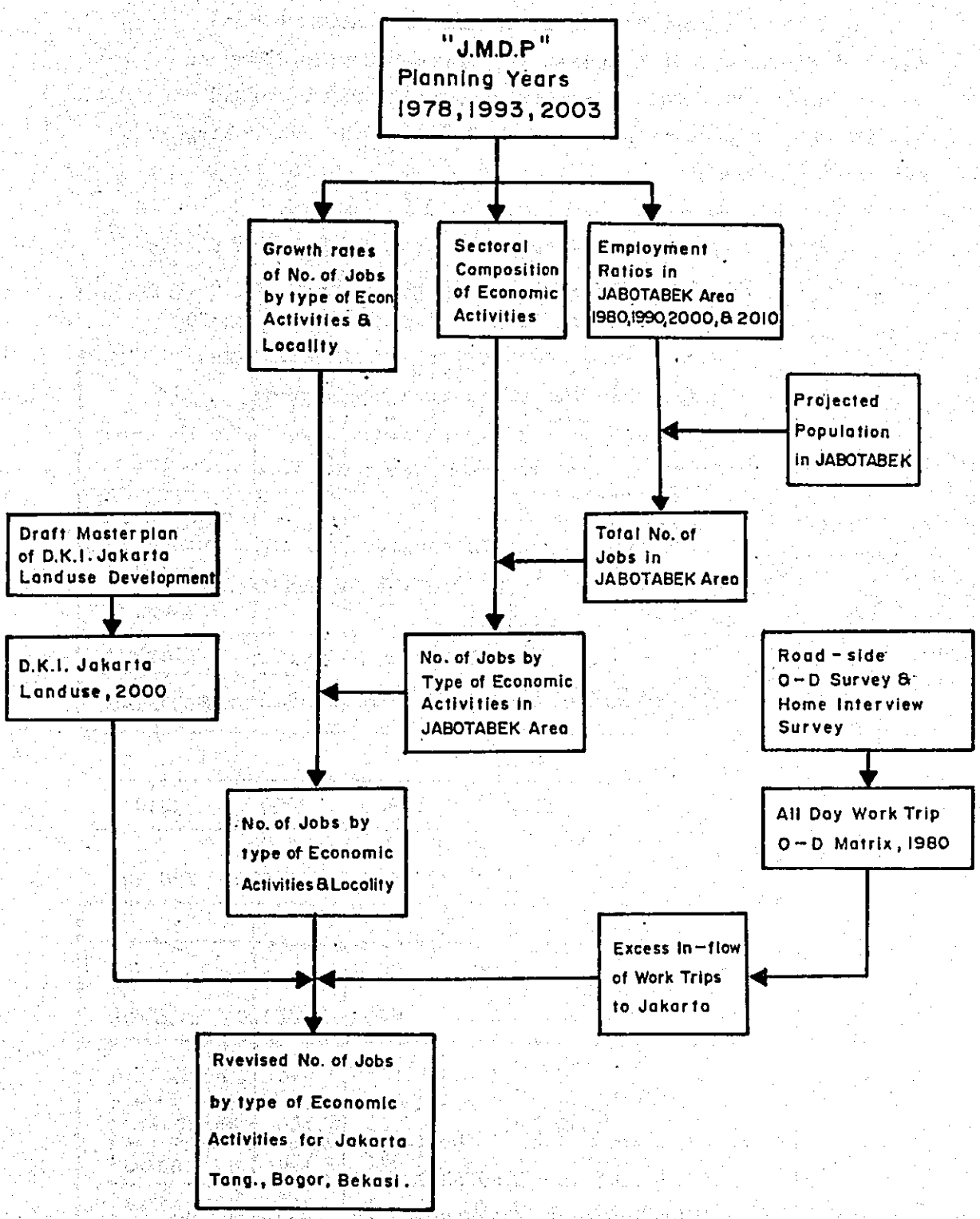
(e) Estimation of Future Jobs in Jakarta and BOTABEK (Refer to Fig.).

The potential excess in-flow of work trips to Jakarta was estimated at 62,400 thousand persons per day. This accounts for 9.64% of the total BOTABEK population employed in secondary and tertiary sectors.

Future excess in-flow of work Trips are estimated assuming 10% of the total BOTABEK population employed in secondary and tertiary sectors. Eventually, the future growth of excess in-flow in 2000 was calculated 217,300 thousand persons or 3.48 times larger than 1980.

Fig. 4-8

FLOW CHART FOR ESTIMATIONS OF FUTURE JOBS IN JABOTABEK



The "JMDP" also estimates the employment balance between Jakarta and BOTABEK. According to this report, the ecess work trips flowing to Jakarta is estimated at 43,700 thousand persons per day in 1978 and is expected to grow upto 138,300 thousand persons per day in 2003, or 3.16 times larger than 1978.

As recognized from the above the growth ratios of the excess of work trips (or balance of employment) to Jakarta during the coming 20 years future are 3.16 times and 3.48 times larger than the respective study years in "JMDP" and this study respectively, and figures are very close each other.

Taking the above into consideration the future excess of work trips flowing to Jakarta are estimated as follows:

Table 4-22
FUTURE EXCESS IN-FLOW OF WORK TRIPS

	1980	1990	2000	2010
Excess In-Flow of Work Trips to JKT (persons/day)	62,400	128,500	217,300	290,200
From BOTABEK	62,100	127,900	216,200	288,700
From OTHER REG.*	300	600	1,100	,500

Note: * Among the excess in-flow of work trips to Jakarta, 0.5% of the total excess derives from outside JABOTABEK in 1980. This portion was assumed to remain in the future.

Regarding the future agricultural jobs in Jakarta, it was based on the "DKI Jakarta Landuse, 2000".

The previous estimation of future excess in-flow of work trips to Jakarta is to be reflected to the balance of employment level in Jakarta, Tangerang, Bogor and Bekasi. Taking this into consideration the preliminary estimation of jobs are so adjusted as shown in the Tables 4-23. To summarize the future employed population and the number of jobs in JABOTABEK Area, these are presented in Table 4-24.

Table 4-23 FUTURE JOBS IN JABOTABEK AREA (1)

(Unit : 1000 Persons)

	1980				1990			
	I	II	III	Total	I	II	III	Total
Jakarta	57.1	228.0	1.887.4	2.167.5	36.0	310.7	2.753.8	3.100.5
BOTABEK	953.7	147.1	438.2	1.539.0	1.287.0	304.1	942.5	2.443.6
TANGERANG	231.1	59.8	129.8	420.7	299.5	119.3	227.9	646.7
BOGOR	510.0	57.3	223.3	780.6	696.1	114.7	453.1	1.263.9
BEKASI	212.6	30.0	85.1	327.7	291.4	70.1	171.5	533.0
JABOTABEK	1.010.8	375.1	2.320.6	3.706.5	1.323.0	614.8	3.606.3	5.544.1

FUTURE JOBS IN JABOTABEK AREA (2)

(Unit : 1000 Persons)

	2000				2010			
	I	II	III	Total	I	II	III	Total
Jakarta	15.0	369.6	3.656.4	4,041,0	7.0	426.2	4.502.0	4.935.2
BOTABEK	1.576.7	545.5	1.411.6	3.533.8	1.831.4	763.2	1.909.6	4.504.2
TANGERANG	358.4	210.4	411.6	1.010.4	.412.3	309.6	679.5	1.401.4
BOGOR	857.4	190.0	665.4	1.712.8	998.2	238.0	796.3	2.032.5
BEKASI	360.9	145.1	304.6	810.6	420.9	215.6	433.8	1.070.3
JABOTABEK	1.591.7	915.1	5.068.0	7.574.8	1.838.4	1.189.4	6.411.6	9.439.4

Table 4-24 ESTIMATED FUTURE EMPLOYED POPULATION AND JOBS IN JABOTABEK

Year		Employed Population.		Potential Excess in-flow of Work Trips to Jakarta		Number of Jobs		Year	Employed Population.		Potential Excess in-flow of Work Trips to Jakarta		Number of Jobs	
		Agriculture.	II + III	From BOTABEK	From OTHER Reg	Agriculture.	II + III		Agriculture.	II + III	From BOTABEK	From Other Reg.	Agriculture.	II + III
1980	JAKARTA	2,105.1		From BOTABEK	From OTHER Reg	2,167.5		2000	3,823.7		From BOTABEK	From Other Reg.	4,041.0	
		57.1	2,048.0	+ 62.1	+ 0.3	57.1	2,110.4		15.0	3,808.7	+216.2	+ 1.1	15.0	4,026.0
	BOTABEK	1,601.1		- 62.1		1,539.0			3,750.0		- 216.2		3,533.8	
		953.7	647.4			953.7	585.3		1,576.7	2.173.3			1,576.7	1,957.1
	Tangerang	445.8		- 25.1		420.7			1,080.6		- 70.2		1,010.4	
		231.1	214.7			231.1	188.9		358.4	722.2			358.4	652.0
	B o g o r	813.8		- 23.2		790.6			1,791.7		- 78.9		1,712.8	
		510.0	303.8			510.0	280.6		857.4	934.3			857.4	855.4
	Bekasi	341.5		- 13.8		327.7			877.7		- 67.1		810.6	
		212.6	128.9			212.6	115.1		360.9				360.9	449.7
	JABOTABEK	3,706.2		+ 0.3		3,706.5			7,573.7		+ 1.1		7,574.8	
	Other Region	A		- 0.3		A - 0.3			C		- 1.1		C - 1.1	
1990	JAKARTA	2,972.0		From BOTABEK	From Other Reg	3,100.5		2010	4,645.0		From BOTABEK	From Other Reg.	4,935.2	
		36.0	2,936.6	+ 127.9	+ 0.6	36.0	3,064.5		7.0	4,638.0	+ 288.7	+ 1.5	7.0	4,928.2
	BOTABEK	2,571.5		- 127.9		2,443.6			4,792.9		- 288.7		4,504.2	
		1,287.0	1,284.5			1.287.0	1,156.6		1,831.4	2,961.5			1,831.4	2,672.8
	Tangerang	692.6		- 45.9		646.7			1,495.1		- 93.7		1,401.4	
		299.5	393.1			299.5	347.2		412.3	1,082.8			412.3	989.1
	B o g o r	1,310.2		- 46.3		1,263.9			2,137.9		- 105.4		2,032.5	
		696.1	614.1			696.1	567.8		998.2	1,139.7			998.2	1,034.3
	Bekasi	568.7		- 35.7		533.0			1,159.9		- 89.6		1,070.3	
		291.4	277.3			291.4	241.6		420.9	739.0			420.9	649.4
	JABOTABEK	5,543.5		+ 0.6		5,544.1			9,437.9		+ 1.5		9,439.4	
	Other Region	B		- 0.6		B - 0.6			D		- 1.5		D - 1.5	

4.2.3. Land Use Planning

(1) General

So far, several land use concepts have been proposed by past studies and some of them have become somewhat outdated by the rapidity of actual development.

In "Jakarta Masterpaln 1965 - 1985", the sphere of city expansion is bordered by the inner edge of a green belt at a distance of 15 Km from the city center. This green belt, 3 Km wide is to be preserved as the outer most periphery of the city proper, and city expansion is allowed in all directions.

For the target year of this study, 2010, the land use plan within the 15 Km radius would not be sufficient because the gross density in DKI Jakarta is estimated to be 150 persons/Ha and this requires conversion of existing green areas to residential areas in almost every part within the DKI Jakarta city limit, except for some special low building coverage areas of green preservation, river banks, recreational areas, aquifer recharge areas, etc.

The DKI Jakarta Government has been revising the "Jakarta Masterplan 1965 - 1985" continuously. Jakarta Metropolitan Area Transportation Study (JMATS), Jabotabek Masterplan Study and other transportation sector studies, such as Jakarta Ring Road Study, Jakarta-West Java Tollway Study, Jakarta Intra Urban Tollway Study, Jakarta Urban/Suburban Railway Study and Jabotabek Bus Study have given impacts to the need for an updated masterplan.

Generally, commuting by motor vehicles within a distance of 15 Km does not necessarily limit residential developments along major highways, because an organized highway network can pick up commuters from every part of the city through regional collector roads without difficulty. Potential residential

areas can be permitted to spread all over the city on condition that there are improvements to the road network. Therefore, the population absorption capacity of DKI Jakarta in the "JABOTABEK" reports 1973 and 1976, the gross density of 91 persons/Ha in 2000, seems to be under estimated. The "JMDP" in 1980 projected about two times layer in population density in 2003, namely 186 persons/Ha, then :1973, 1976 JABOTABEK" reports.

If the area within the city is developed fully, it is not difficult to attain the gross population density of 150 persons/Ha, because as will be seen later, in this case the average density in residential areas will be about 282 persons/Ha. These figures can be considered to be acceptable.

In the recent "Jabotabek Metropolitan Development Planning" report, the area along the DKI Jakarta border is considered to be a transitional zone from semi-urban to rural. Within this sone developments would start along major directions towards growth poles of regional centers in the JaBoTaBek-region, such as Tangerang, Bogor, Cikarang, Bekasi, Serpong, Depok, etc.

Contrary to the above report, the proposed Outer Ring Road will not limit the urban growth, but rather it will encourage it, by stimulating development along the road corridor.

Especially at interchanges of the Outer Ring Road and radial arterials, impact will be given to the development of the surrounding area.

At the same time, development of the transitional zone, will occur in opposite direction from rural growth poles towards DKI Jakarta. This is due to the expansion of the rural growth poles by absorbing the migrating population from rural areas within BoTaBek.

To accelerate this dual directional development, it will be effective to locate sub-growth poles with some urban character not far from the Outer Ring Road.

In dispering these sub-growth poles, some of the urban activities should also be distributed in the form of activity centers, as will be mentioned later.

Within the DKI Jakarta city border, commercial and administrative areas will be intensively developed along major arterials such as Jalan Gatot Subroto, the Jakarta By-Pass and the Jakarta-Bekasi Highway. Regional neighbourhood centers will also be distributed in residential area to serve local communities.

Needless to say, expansion of the existing CBD will continue constantly.

As mentioned in "Jakarta Masterplan 1965 - 1985", industrial areas will be developed mainly in Pulo Gadung, along the Jakarta-Bekasi Highway, and the Jakarta-Tangerang Highway.

1) Sub-Growth Poles

In the "JABOTABEK" report the area along the Jakarta border is considered a transitional area which will be developed under the influence of the DKI Jakarta City. The area within the DKI Jakarta border will be filled up with residential areas before the year 2000, and overspilling of population from Jakarta will increase.

Along with the residential development within DKI Jakarta and major BoTaBek growth poles, the development of transitional areas should be initiated to meet the future demand. This would start in areas along major radial highways, called corridors in the "JMATS" report, in a dual directional, away from DKI Jakarta towards BoTaBek and vice versa. By locating regional urban centers or sub-growth poles with

a magnitude of more than a rural center in each corridor near the interchange of the Outer Ring Road and radial highways, the dual directional development can be connected.

The character of each sub-growth pole depends on land use conditions around it. One of the roles expected for the Outer Ring Road is to integrate the corridor developments in major directions.

Here, five major corridors are selected for alternative locations of sub-growth poles.

a) Jakarta - Tangerang Corridor

In a narrow zone between the Jakarta-Tangerang Highway and the Tangernag Railway Line, ribbon industrial dev developments are planned. When the Outer Ring Road is extended to the Harbour Road, this area will have a strong connection to Tg. Priok. When the Cengkareng International Airport is constructed, more traffic will use the Outer Ring Road and a considerable amount of this traffic will flow into the Jakarta-Tangerang Highway through the interchange. Therefore, for both passenger and cargo traffic, the interchange in this corridor will became one of the most important nodes on the Outer Ring Road.

There are several housing projects within DKI Jakarta, and they will require a regional center. Therefore, a regional city center with commercial and administrative facilities and a cargo terminal will be suitable in this corridor.

b) Jakarta - Serpong Corridor

This corridor is on the extension of good residential areas within the DKI Jakarta city border and the potential for residential developments is very high. The Jakarta-Serpong Highway and the improvement of the Parung Panjang Railway

Line, or the Jakarta-Serpong Line will add more favorable conditions. Especially, if the railway is electrified and use for commuting, continuous residential developments along the railway will become possible. Also, the Jakarta-Serpong Highway will not be a tollway and will be freely accessible from the area along it. A city center with commercial and administrative facilities around the interchange of the Outer Ring Road and the Jakarta-Serpong Highway will serve for these residential communities.

c) Jakarta - Depok Corridor

There is no major highway in this direction and the opportunity to create a sub-growth pole, will not be availeble even in the future. There are already several institutions such as a military complex, recreational facilities, university etc. It would be reasonable to encourage institutional or recreational developments in this direction while preserving sufficient green space.

d) Jakarta - Bogor Corridor

The connection between DKI Jakarta and Kotamadya Bogor has always been very strong. Bogor is the second largest city in the Jakarta metropolitan region and along the Bogor Highway there is a chain of commercial and residential developments.
When the Jagorawi Highway is extended to Bogor and the Intra Urban Tollway is open, Tanjung Priok and the DKI Jakarta city center will become more accessible from this area.

When the Outer Ring Road is open the accessibility to other parts of DKI Jakarta will also increase. At present there exists a large wholesale market of agricultural products along the Bogor Highway. A development with terminal facilities or an industrial complex for processing agricultural products would be suitable around the interchange of the Outer Ring Road and the Jagorawi-Highway.

e) Jakarta - Bekasi Corridor

In the east of Jakarta, Pulo Gadung, there will be an extensive industrial development. The cargo flow in this direction is the most massive of all directions and it will increase steadily. When the Outer Ring Road and the Jakarta-Cikampek Highway are open, they will add impetus to the amount of cargo flowing into the industrial area. Therefore, the area around the interchange of the Outer Ring Road and the Jakarta-Bekasi Highway will be a suitable location for a large scale cargo terminal.

The areas around these future terminals will be good locations for activity centers, assisting the dispersion of urban facilities.

2) Activity Centres

The definition of an activity center is "an area where higher activities than the surroundings are generated, by pasar, transportation terminals and/or public facilities of residential, religious, recreational functions etc".

Among these activities, pasar and transportation terminals are the most important.

a) Pasar

According to "KUMPULAN PERATURAN PERPASARAN, D.K.I. JAKARTA", 1975, during a period from 1971 to 1975 the total number of pasars has remained almost the same, but their distribution and size have changed to a certain extent. In Central Jakarta, the total number of pasars has decreased, especially the number of small scale pasars which deal with daily goods.

The growth rate of residential population in the same areas has been lower than the other wilayah.

In other areas a small increase in the number of pasars has been recorded, especially in South Jakarta, and this is due to the residential development in the same area. Around large scale pasars there are many smaller pasars located and these are also heloing to generate higher regional activities. Most of the large scale pasars are located around major transportation terminals.

b) Transportation Terminals

Bus terminals are attached to major railway stations and they are not only terminals for buses but also serve for mocrobuses and oplets. There are at present about 10 bus terminals in DKI Jakarta and each of them forms a core of an activity center.

The DKI Office has a plan to drive out inter-regional long distance buses from the CBD by moving the long distance bus terminals outside the CBD. In the more distant future, it is planned to construct bus terminals junctions of the Outer Ring Road and inter-regional highways, to serve not only long distance buses but also city buses within residential areas inside the Outer Ring Road.

(2) Existing Development Plans

1) Residential Developments

There are three kinds of residential development as follows:

a) Kampung Improvement Project

The Kampung Improvement Project started in 1969 and its first stage was completed in 1978. By the end of the first stage 7,838 Ha of Kampungs are planned to be improved. In the second stage after 1979, improvement

of those in the suburbs and further up-grading of Kampungs already improved become the main objective.

b) Housing Development by the Government

The Local and Central Governments have residential development plans for their employees. They have also residential development plans for low income people such as Site and Service Housing Projects or Low Cost Housing Projects in Tegal Alur, Prondok Kelapa, etc. and these will be carried out by Perumnas (National Housing Board).

c) Housing Projects by Private Developer

There are many housing projects by private developers, for example those in Plyit, Ancol, Sunter, etc.

Residential development in gree reservation areas are permitted only within a building coverage of from 5% to 15%, and also the minimum size of a lot has to be more than 2,500 m^2. For example, Desa Setu is assigned to be with less than 5% building coverage and Desa Kemang is for 15% of building coverage.

d) Industrial Developments

Following the policy of "Master Plan of DKI Jakarta 1965 - 1985" industrial areas are concentrated in the areas of Pulogadung, Gandaria and Rawa Buaya.

Other industrial areas are timber estates in Marunda, handicraft industries in Tanah Kusir and assembling industries along the Jakarta By-Pass. Small scale home industries are encouraged within residential areas. The DKI Government has been relocating warehouses in Kota or Jelambar to East Sunter or Pulogadung.

e) Other Major Development

The plan of military complex (Hankam) in Cilangkap has already progressed up to the land leveling stage. Although its further development is being pending it will resum soon or later. This military complex is expected to accommodate approximately 30,000 employees. Other military facilities are planned in fringe areas such as air force facilities around the Halim Airport in the future.

The University of Indonesia will move out of the central district in the future to the Depok Area.

P.T. Jaya Ancol, who runs Taman Impian Jaya Ancol located in the north of the Ancol Canal, has its own future development plan. Reclamation is planned to start after 1984 and the total area will increase from 550 Ha to 720 Ha. According to the latest information the coastal zone between the canal and the coastal line is divided into five parcels of land, and various kinds of land use, such as:

- Jakarta Fair, which at present is located around the Monas Tower for accommodating the exhibition fair and is planned to open in the Ancol area in 1981;
- Ancol Timur Housing;
- Ancol Barat Housing; and
- Industrial Estate.

are planned on each of parcels.

f) Restoration Districts

There are several restoration districts in DKI Jakarta such as Menteng, Kota, Condet, Tugu etc.
The Menteng District will be restored as a residential district and embassies there will be moved to the area along the Jl. Rasuna Said. Historical buildings in the Kota District and its surroundings will be preserved.

(3) Present Landuse

The landuse map by the DKI Office, "DAERAH KHUSUS IBUKOTA JAKARTA 1973, SCALA 1:20,000", is now in the process of updating based on the recent aerial photography.
An intermediate product titled "DINAS TATA KOTA, SCALA 1:5,000" is provided by the DKI Office.
A new landuse map is produced from the above two materials reclassifing the landuses for the purpose of the later study, "Estimation of Planning Parameters". The landuse at present is measured on it.

Table 4-25 DKI JAKARTA LANDUSE, 1976

(Unit: Ha)

Land use Measured on Maps of "DAERAH KHUSUS IBUKOTA JAKARTA by DINAS TATAKOTA"		LAND USE CLASSIFIED FOR ALLOCATION OF ZONAL PLANNING PARAMETERS	
LAND USE	AREA	LAND USE	AREA
Commercial Mixed Use Public Facilities	784 858 1,854	Commercial/ Administrative	3,494
Ware House Manufacturing	246 1,297	Industrial	1,543
Residential	19,899	Residential outside Kampungs Kampungs	12,061 7,838
Green Recreational Lake, Swamp	39,380 211 877	Agricultural Green	28,101 12,367
T o t a l	65,406	T o t a l	65,406

Commericial and administrative areas in 1976 amount to about 5.4% of the total DKI Jakarta area and they are concentrated in the CBD. Elsewhere, they are now beginning to appear along major arterials, Jl. Gatot Subroto, Jl. Sudirman, Jakarta By-Pass etc. along major regional highways, Jakarta-Tangerang, Jakarta-Bogor, Jakarta-Bekasi etc. and in the peripheral areas along the future Outer RIng Road.

Industrial areas, 2.4% in 1976, are concentrated mostly in Pulogadung, east of the city center. Areas for various light industries without obnoxious effect on the surroundings are planned around interchanges of the Outer Ring Road and radial highways such as Jakarta-Tangerang, Jakarta-Bogor and Jakarta-Bekasi. Residential areas, 30.4% in 1976, are penetrating

mostly into the underdeveloped rural areas in the west and the south-west direcitons. They are also being developed massively in the east around the future industrial complexes. But still, for a moment green or agricultural areas are predominant outside of the 10 Km radius from the city center.

(4) Future Landuse

The D.K.I. Office has been revising "Jakarta Master Plan 1965 - 1985" contnuously, and a future landuse map, conventionally c called the "DRAFT MASTER PLAN", as one of the products of this revision is provided. The "DRAFT MASTER PLAN" in this report is used as a base of the future landuse planning, and the landuse in it is classified into:

- Industrial Areas;
- Commercial/Administrative Areas;
- Residential Areas;
- Low Building Coverage Areas; and
- Green Areas.

For the purpose of this study the above classification is re-classified into:

- Industrial Areas;
- Commercial/Administrative Areas;
- Residential Areas outside Kampungs;
- Kampungs;
- Agricultural Areas; and
- Green Areas.

Table 4-26 DKI JAKARTA LAND USE, 2000

LAND USE	AREA (HA)	%
Commercial/Administrative Area	5,495	8.4
Manufacturing Industry	8,522	13.0
Residential excluding Kampungs	25,767	39.4
Kampungs	7,838	12.0
Agricultural	4,600	7.0
Green, etc.	13,184	20.0
T o t a l	65,406	100.0

Table 4-27 DKI JAKARTA LANDUSE, 1976

(Unit : Ha)

ZONE NO. NEW	NAME OF ZONE	COMMERCIAL/ ADMINISTRA-TIVE AREA	INDUSTRIAL AREA	RESIDENTIAL AREA			AGRICULTU-RAL AREA	GREEN AREA	TOTAL
				KAMPUNGS	OUTSIDE KAMPUNGS	TOTAL			
1.	GAMBIR	256	9	147	268	415	-	89	
2.	SAWAH BESAR	162	93	186	59	245	-	145	
3.	KEBAYORAN	54	15	327	137	466	-	191	
4.	SENEN	160	8	244	12	256	-	4	
5.	CEMPAKA PUTIH	50	27	351	229	580	-	63	
6.	MENTENG	149	2	121	334	455	-	34	
7.	KEBON MELATI	118	9	365	110	475	-	57	
8.	GELORA	66	-	28	32	60	-	189	
	JAKARTA PUSAT	1.015	163	1.769	1.181	2.950	-	772	4.900
9.	KANAL MUARA	-	-	-	-	-	625	141	
10.	KAPUK MUARA	-	-	-	-	-	958	216	
11.	PEJACALAN	95	99	180	333	513	-	640	
12.	MANGGA DUA UTARA	43	165	8	56	64	-	85	
13.	PADEMANGAN	25	5	163	47	210	-	363	
14.	SUNTER	9	9	-	136	136	635	264	
15.	PEPANGGO	3	11	345	441	786	188	-	
16.	TANJUNG PRIOK	67	214	-	30	30	-	164	
17.	KOJA	75	87	25	-	25	-	-	
18.	TUGU	5	16	354	122	476	300	929	
19.	PEGANGSAAN II	20	10	-	23	23	1.502	-	
20.	SEMPER	103	9	73	141	214	300	741	
21.	SUKAPURA	-	-	-	49	49	2.138	-	
	JAKARTA UTARA	445	625	1.148	1.378	2.526	6.646	3.543	13.759
22.	SEMANAN	-	81	-	303	303	628	240	
23.	PEGADUNGAN	7	-	-	712	712	1.472	562	
24.	CENGKARENG	23	-	140	264	404	938	359	
25.	JELAMBAR	23	13	147	217	364	190	31	
26.	TOMANG	37	-	187	127	314	63	21	
27.	PAL MERAH	65	6	328	249	577	35	15	
28.	TAMAN SARI	114	30	187	123	310	-	4	
29.	TAMBORA	103	3	327	92	419	-	1	
30.	KEMBANGAN	20	10	14	448	462	1.533	506	
31.	KEBON JERUK	43	7	188	250	438	900	329	
	JAKARTA BARAT	435	150	1.518	2.785	4.303	5.759	2.074	12.721
32.	TEBET	80	45	611	103	714	63	33	
33.	SETIA BUDI	81	5	235	502	737	63	14	
34.	MAMPANG PRAPATAN	180	61	312	588	900	433	136	
35.	PEJATEN	152	3	62	628	690	1.329	546	
36.	SERENGSENG SAWAH	57	2	15	267	282	1.329	500	
37.	KEBAYORAN BARU	142	9	204	706	910	127	72	
38.	CROGOL UTARA	54	27	208	446	654	697	239	
39.	KEBAYORAN LAMA	40	9	147	279	427	758	245	
40.	CILANDAK	116	3	61	633	694	697	301	
	JAKARTA SELATAN	902	164	1.855	4.153	6.008	5.506	2.086	14.664
41.	MATRAMAN	66	4	418	-	418	-	34	
42.	PULO GADUNG	129	90	361	502	863	253	133	
43.	CIPINANG BESAR	70	14	550	38	588	253	130	
44.	KELENDER	8	-	125	192	317	1.266	460	
45.	CILILITAN	130	25	70	340	410	1.076	426	
46.	HALIM PERDANA KUSUMAH	49	-	-	130	130	949	354	
47.	CEDONG	164	149	24	445	469	1.203	411	
48.	LUBANG BUAYA	62	3	-	458	458	2.532	1.012	
49.	JATINEGARA	-	-	-	274	274	1.119	-	
50.	CAKUNG	21	156	-	185	185	1.539	932	
	JAKARTA TIMUR	699	441	1.548	2.564	4.112	10.190	3.892	19.334
	JAKARTA TOTAL	3.496	1.543	7.838	12.061	19.899	28.101	12.367	65.406

Table 4-28 DKI JAKARTA LANUSE, 2000

(Unit : Ha)

ZONE NO. NEW	NAME OF ZONE	COMMERCIAL/ ADMINISTRA-TIVE AREA	INDUSTRIAL AREA	RESIDENTIAL AREA			AGRICULTU-RAL AREA	GREEN AREA	TOTAL
				KAMPUNGS	OUT SIDE KAMPUNGS	TOTAL			
1.	GAMBIR	299	-	147	233	380	-	89	770
2.	SAWAH BESAR	186	28	186	172	358	-	73	645
3.	KEMAYORAN	49	-	327	168	495	-	180	724
4.	SENEN	184	-	244	-	244	-	-	428
5.	CEMPAKA PUTIH	73	-	351	294	645	-	2	720
6.	MENTENG	176	-	121	235	456	-	8	640
7.	KEBON MELATI	150	-	365	122	487	-	22	659
8.	GELORA	61	-	28	38	66	-	188	314
	JAKARTA PUSAT	1.179	28	1.769	1.362	3.131	-	562	4.900
9.	KANAL MUARA	7	-	-	299	299	20	440	766
10.	KAPUK MUARA	2	-	-	260	260	239	674	1.174
11.	PEJAGALAN	97	110	180	898	1.078	-	62	1.347
12.	MANGGA DUA UTARA	44	50	8	-	8	-	255	357
13.	PADEMANGAN	18	239	163	-	163	-	183	603
14.	SUNTER	49	120	-	641	641	83	160	1.053
15.	PEPANGGO	47	128	345	125	470	24	319	988
16.	TANJUNG PRIOK	4	471	-	-	-	-	-	475
17.	KOJA	7	155	25	-	25	-	-	187
18.	TUGU	27	585	354	334	688	122	304	1.726
19.	PEGANGSAAN II	122	527	-	234	234	192	480	1.555
20.	SEMPER	54	463	73	589	662	54	134	1.367
21.	SUNAPURA	30	742	-	757	757	188	470	2.187
	JAKARTA PUSAT	508	3.590	1.148	4.137	5.285	921	3.481	13.785
22.	SEMANAN	14	600	-	580	580	-	58	1.752
23.	PEGADUNGAN	135	257	-	1.356	1.356	243	763	2.753
24.	CENGKARENG	110	-	140	965	1.105	204	305	1.724
25.	JELAMBAR	49	124	147	226	373	31	44	621
26.	TOMANG	62	-	187	100	287	10	82	441
27.	PAL MERAH	87	-	328	204	532	10	69	698
28.	TAMAN SARI	134	5	187	132	319	-	-	458
29.	TAMBORA	118	7	327	74	401	-	-	526
30.	KEMBANGAN	56	47	14	2.006	2.020	249	159	2.531
31.	KEBON JERUK	95	-	188	1.183	1.371	146	105	1.717
	JAKARTA BARAT	860	1.040	1.518	6.826	8.344	893	1.584	12.721
32.	TEBET	101	30	611	118	729	10	65	935
33.	SETIA BUDI	130	-	235	493	728	10	32	900
34.	MAMPANG PRAPATAN	192	41	312	561	873	83	531	1.720
35.	PEJATEN	222	-	62	1.727	1.789	240	469	2.720
36.	SERENGSENG SAWAH	108	-	15	1.498	1.513	230	319	2.170
37.	KEBAYORAN BARU	240	9	204	687	891	20	100	1.260
38.	GROGOL UTARA	281	54	208	963	1.171	114	51	1.671
39.	KEBAYORAN LAMA	121	5	147	1.016	1.163	124	66	1.479
40.	CILANDAK	161	-	61	1.091	1.152	131	367	1.811
	JAKARTA SELATAN	1.556	139	1.855	8.154	10.009	962	2.000	14.666
41.	MATRAMAN	104	-	418	-	418	-	-	522
42.	PULO GADUNG	174	127	361	637	998	42	127	1.468
43.	CIPINANG BESAR	91	-	550	143	693	42	229	1.055
44.	KELENDER	44	193	125	1.381	1.506	207	101	2.051
45.	CILILITAN	174	-	70	544	614	213	1.066	2.067
46.	HALIM PERDANA KUSUMAH	43	-	-	604	604	194	641	1.482
47.	GEDONG	289	295	24	664	688	211	913	2.396
48.	LUBANG BUAYA	221	-	-	935	935	480	2.413	4.067
49.	PENGGILINGAN	95	932	-	27	27	290	49	1.393
50.	CAKUNG	157	2.178	-	353	353	145	-	2.833
	JAKARTA TIMUR	1.392	3.725	1.548	5.288	6.836	1.824	5.557	19.334
	JAKARTA TOTAL	5.495	8.522	7.838	25.767	33.605	4.600	13.184	65.406

4.2.4 Estimation of Planning Parameters by Zones

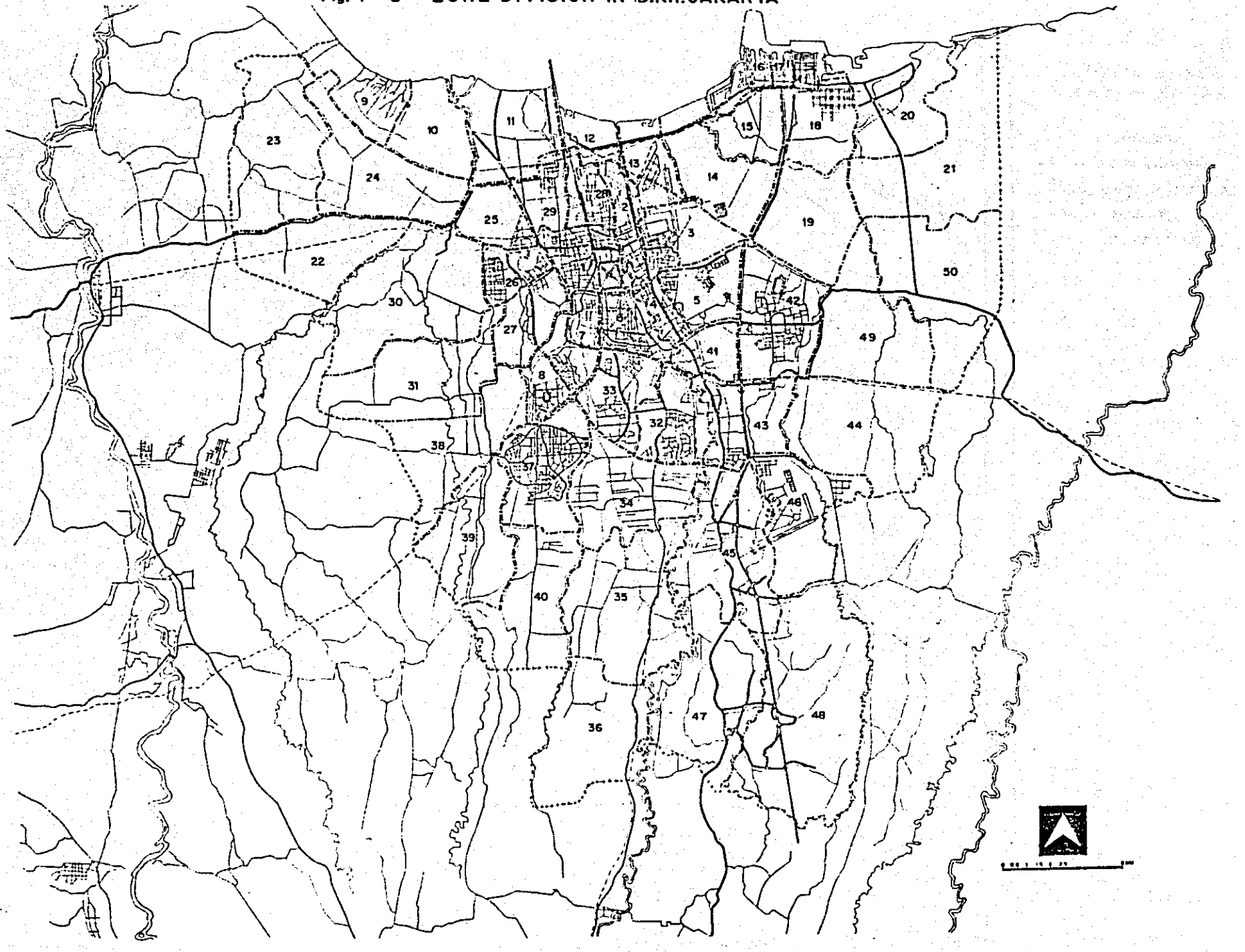
Based on the framework set upt in "4-2-2 Statistical Framework" the following zonal/parameters are estimated:

- Residential Population;
- Employed Population in Sector I;
- Employed Population in Sectors II + III, and
- Number of Jobs in Sectors II + III.

Zoning of the study area follows basically the administrative boundary and detailed consideration along the area of the projected Harbour Road as well as area characteristics.

Zone division in DKI Jakarta and BOTABEK/outside JABOTABEK are shown in Fig. 4-9 and Fig. 4-10 respectively.

Fig. 4 - 9 ZONE DIVISION IN D.K.I. JAKARTA



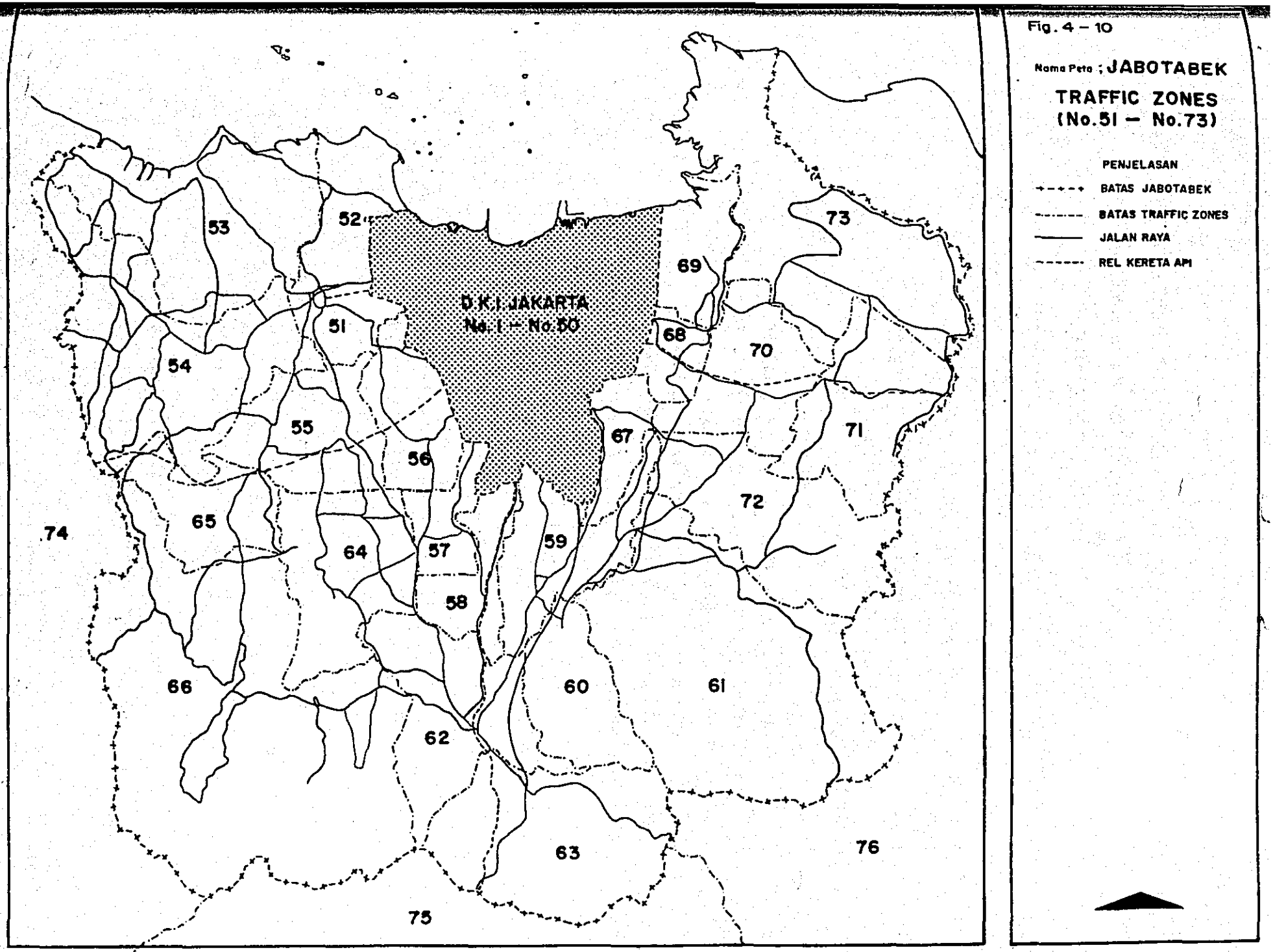


Fig. 4 – 10
Nama Peta : JABOTABEK
TRAFFIC ZONES
(No.51 – No.73)
PENJELASAN
BATAS JABOTABEK
BATAS TRAFFIC ZONES
JALAN RAYA
REL KERETA API
D.K.I JAKARTA
No. 1 – No.50
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(1) Residential Population by Zone

1) Population in Kampungs

a) Present Situation

For base of the vehicle ownership study and the trip generation study in the Transportation Study the population in Kampungs *) and in the rest of the residential areas are figures out separately.

Notes: *) Kampungs are districts where low-income people reside under very poor housing conditions with extremely high population density.

The kampungs to be dealt with in this study are limited to those listed as target areas in the first stage of the "Kampung Improvement Project". Although there are many poor communities with an extremely high population density in DKI Jakarta which are not included in those kampungs mentioned above and should be dealt with somehow differently from other residential area for the purpose of this study, there is no data available for them, and the kampung population in 1976, therefore, is set as follows:

a)	Kampung Population	3,095,700 persons
b)	Kampung Area	7,838 Ha
c)	Average kampung Population Density	395 persons Ha
d)	The maximum Zonal kampung Population Density (Zone # 18)	662 persons/Ha
e)	The minimum Zonal kampung Population Density (Zone # 20)	172 persons/Ha

Source: "DAFTAR NAMA-NAMA KAMPUNG PROYEK MUHAMMAD HUSNI THAMRIN DKI JAKARTA".

b) Future Population in Kampungs

In 1976 Kmapung Population is 53.0 % of tje total population in DKI Jakarta and in Central Jakarta, Jakarta Pusat, it accupies 61.5 % of its population.

The density is already extremely high and especially in Central Jakarta it is 511 persons/Ha.

The future kampung population is unpredictable because it largely depends upon the effect of the "Kampung Improvement Project" and the policy of the Government.

In this study the total area of Kampungs is assumed not to be changing in the future while the population in kampungs increases at the rate of 40 % of the natural growth rate of the DKI Jakarta total. This means about 60 % of the natural increase in kampungs will move out to better neighbourhoods.

Consequently, in 200 the share of the kampung population will decline, down to 36.9 % of the total DKI Jakarta population.

Table 4-29 KAMPUNG POPULATION

	1976	1980	1990	2000	2010
Residential Population in Kampungs (1000 persons	3,095.7	3,190.9	3,421.4	3,639.5	3,840.9
Average Annual Growth Rates (% yr.)	-	0.76	0.72	0.62	0.54

c) Zonal Distribution of Future Kampung Population

The total kampung population in 200 will be 3,633.5. Assuming that the maximum kampung population density will be 600 persons/Ha, the Kampung population is distributed over zones based on "DAFTAR PETA JAKARTA PLANNING ATLAS 1975, PROYEK MHT". The minimum population density as a result is 375 persons/Ha.

2) Residential Population in Areas of Otehr Uses

a) Residential Population in Industrial Areas

At present, there are supposed to exist a considerable number of small sclae home industries within industrial areas. This type of industry will decrease along with increase of large scale manufacturing enterprises within industrial areas.

In this report the residentail population density in the smae areas is assumed to decrease from 60 persons/Ha in 1976 to 30 persons/Ha in 2000.

Table 4-30 RESIDENTIAL POPULATION DENSITY IN INDUSTRIAL AREAS

	1976	1980	1990	2000	2010
Residential Population Density	60	55	43	30	25

b) Residential Population in Commercial/Administrative Areas

There are many retails on the ground floor with residential accommofation attached above. The percentage of the residential portion in the total floor area in commercial and administrative area is lower than the average in the CBD and higher outside the CBD.

In this report, larger percentage of the total floor are within the CBD than outside the CBD is assumed to be the residential portion. When the average floor area per resident, about 12 m^2/ person, is applied, the above floor area of residential use, the average residential population density within commercial and administrative areas is figures out.

In the future a higher percentage of the floor area within commercial and administrative areas will be serving as shops and offices as the specialization of landuse goes on.

Therefore, in this report the average residential population density within commercial and administrative area is assumed to remain the same in the future while the percentage of the residential portion in the total floor area within commercial and administrative areas decrease both in the CBD and outside the CBD.

c) Residential Population in Agriculture Areas

As mentioned before almost all worker in the primary sector will reside within agricultural areas. But there will be a considerable number of residents who have work places outside of the agricultural sector.

In this report the average residential population density within agricultural areas is assumed to be 5 persons/Ha at present, remaining the same in future.

3) Population in Residential Areas Outside Kampungs

Subtrating those residential populations in Kampungs, industrial areas, commercial and administrative areas and agricultural areas from the total population , the residential population in the residential areas outside Kampungs is obtained.

The average population density in residential areas outside Kampungs comes out to be 170 persons/Ha in 1976 and 200 persons/Ha in 2000.

4) Zonal Distribution of Population in Residential Areas outside Kampungs

In 1976 the population density in residential areas varies from 60 persons/Ha except very exceptional zones within almost all parts are accupied by Kampungs.

The future distribution of the residential population outside kampungs over zones is done assuming average zonal residential population densities within residential areas for each zone taking the existing population density at present and the type of housing projects planned into concideration.

5) Residential Population by Landuse

To summarize the residential population in different landuses these are shown in below table, and zonal future population are given in Table 4-36 through Table 4-39.

Table RESIDENTIAL POPULATION BY LANDUSE

(Units: 1.000 Persons)

Landuse	1976	1980	1990	2000	2010
Industrial Areas	92.6	148.8	241.4	255.3	285.8
Commercial/Administrative Areas	524.4	574.4	699.3	824.3	949.8
Agricultural Areas	140.5	116.7	69.2	23.0	8.8
Residential Areas	5.097.5	5.720.1	7.380.1	8.757.4	10.065.6
Excluding Kampungs	2.001.8	2.529.2	3.958.7	5.117.9	6.225.3
Kampungs	3.095.7	3.190.9	3.421.4	3.639.5	3.840.3
Total:	5.855.0	6.560.0	8.390.0	9.860.0	11.310.0

(2) Employed Population and Jobs by Zone

1) Existing Situation by Zone

The employed population and jobs in Jakarta have been estimated to be 2,105 thousand persons ans 2,168 thousand jobs.
The all day, work trip generataion has been also analyzed to be 2,112 thousand persons trips, comprising of intra-zonal and inter-zonal work trips of 1,153 thousand persons trips and 959 thousand persons trips respectively.

An analysis of zonal parameter such as population, employed population and jobs provide the dominant factors, among others of transportation characteristics in the region. Therefore such parameters are often used in forecasting future traffic demand and a pattern of peak-hour traffic.

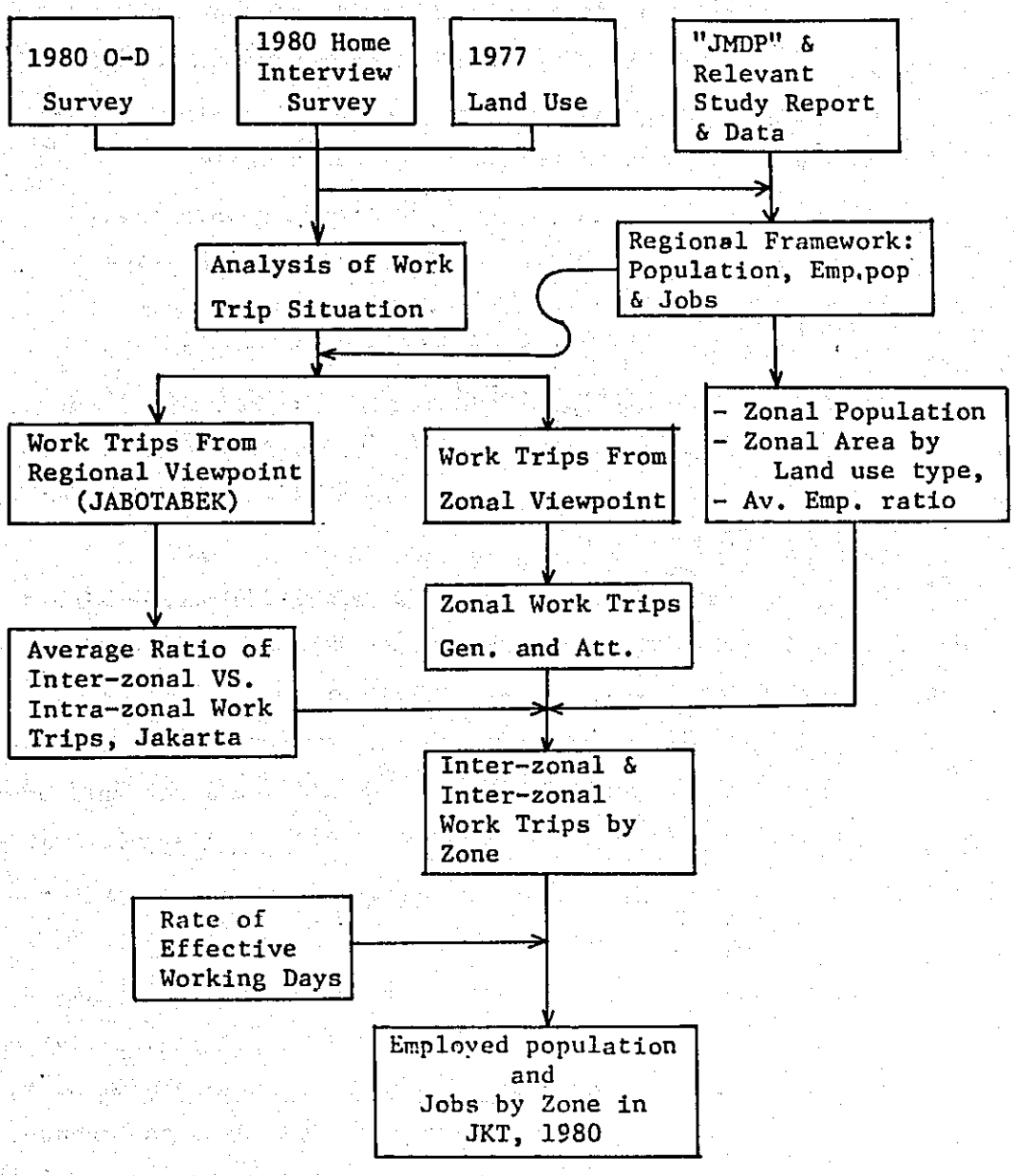
In order to estimate these zonal parameters, the following method has been employed (Refer to Fig-

a) Analysis of work trip situation is made based on the road-side O-D survey and the home interview survey with reference to the latest land use map in Jakarta, 1977.

b) On the basis if the above analyses, regioanl framework on population, employed population annd jobs will be establised taking consederation if such regional development plans as relevant study reports and data.

c) Zonal work trip generation and attraction are derived from the O-D survey analysis. In order to estimated zonal employed population the average employment ratio derived from the regional frame work is adjusted for respective zones based in the average intra-zonal trip ratio (intra-zonal vs. inter-zonal work trip generation) and zonal work trip generation derived from the 1980 / work trips generation derived from the 1980 Work Trips O-D matrix.

Fig. 4-11 METHODOLOGICAL FLOW CHART FOR ESTIMATIONS OF ZONAL EMPLOYED POPULATION AND JOBS In JAKARTA, 1980



d) From the above estimation of zonal employed population, intra-zonal work trips are estimated and it is added to the inter-zonal work trip attraction to calculate the number of jobs by zone taking account of the rate of effective working days.

Thus, existing parameters of population, jobs and employed population are estimated as given in Table

2) Future Employed Population by Zone

The existing employment rates differs from zone to zone, because of unequal employement opportunity owing largely to the income level and social status of households and/or different education levels of inhabitants.

The future employment rates, however, will be developed and nearly equalized in each zone to the average rates of employment level of the region.

Based on the above consideration, the zones with lower rates of employment are defined to attain rapidly the regional average rate of employment than the zones with higher rates of employment.

Consequently, the future employed population in each zone is estimated.

Futhermore, the future employed population in primary sector are assumed to have their work places in their residential zones. Accordingly they are distributed to each zone area of agricultural landuse which is derived from the " DKI Jakarta Landuse, 2000 ".

By subtracting the agricultural employed population from a total employed population of the zone, a total of employed population in both secondary and tertiary sectors are calculated as shown in Table 4-37 through Table 4-40.

3) Estimation of Future Jobs by Zone

a) Number of Jobs in Sectior I

(i) General,

According to "JMAINS", 1975, the total area of agricultural fields amounted to 27.767 Ha *)-1 in 1972 in the whole DKI Jakarta region of 56,362 Ha. By measuring the map of present landause provided by DKI Jakarta this figure is estimated to have increased up to 28.101 Ha in the new DKI Jakarta region of 65.406 Ha by the change of the DKI Jakarta boundary.

The density of employed population in the primary sector is figured out from the employed population in the primary sector estimated in Sec. 4.4.2,(2)-" Employment Situation ". Since it will be conceivable that inter-zonal work trips will be made in the agricultural sector the number of employed population is equal to the number of jobs.

The density of the employed population in this sector would increase in the future due to the labour intensiveness of the modernized agriculture aiming at the market within the metropolitan areas.

Table 4-32
NUMBER OF JOBS IN AGRICULTURAL AREAS IN JAKARTA

	1980	1990	2000	2010
Sector I Workers (1,000 persons)	57.1	36.0	15.0	7.0
Density (persons/Ha)	2.45	2.45	3.3	4.0
Agricultural Area(Ha)	23.333	14.694	4,600	1.750

(ii) Zonal Distribution of Agricultural Jobs

Agricultural areas are classified into green areas in the land-use map by DKI Jakarta. Setting a side those parts of green areas which are judged to be serving for other uses, parks, river banks, etc., the size of existing agricultural areas in each zone measured on the above maps.

In the future the size of agricultural areas in wach zone is planned to decrease proportion to the total agricultural area in the framework.

Primary sector jobs are distributed over zones applying the density of agricultural workers to the size of agricultural areas in each zone.

b) Number of Jobs in Sector II and Industrial Areas

(i) General

Secondary sectors jobs would exist not only in industrial areas but also in areas of other uses, and so, for tje purpose of zonal distribution they are grouped into:

1) To be allocated within industrial areas;
2) To be allocated within commercial and administrative areas; and
3) To be allocated in proportion to the residential population.

The portion to be allocated within commercial and administrative areas is estimated to be 10 % of the total number of the secondary sector in 1980 and is assumed to remain in the same proportion in the future.

The portion to be allocated in propotion to the residential population is estimated to be 30% in 1976 and 25% in 1980 the absolute number is assumed to be increasing along with the residential population. The rest is to be allocated within industrial areas.

Table 4-33
DIVISION OF SECTOR II JOBS FOR ZONAL ALLOCATION

(Unit: 1,000 Jobs)

	1980	1990	2000	2010
To be Allocated within Industrial Areas	243.8 (65.0%)	433.8 (70.6%)	683.2 (74.7%)	909.4 (76.5%)
To be Allocated within Commercial/ Administrative Areas	37.5 (10.0%)	61.5 (10.0%)	91.5 (10.0%)	118.9 (10.0%)
To be Allocated Proportionally to Residential Population	93.8 (25.0%)	119.5 (19.4%)	140.4 (15.3%)	161.1 (13.5%)
T o t a l :	375.1 (100.0%)	614.8 (100.0%)	915.1 (100.0%)	1,189.4 (100.0%)

(ii) Industrial Areas

Industrial Areas amounted to 1,543 Ha in total in 1976 within which are 166,800 secondary sector jobs, and so, the density of day-time population in the secondary sector was 108 workers/Ha. The industrial areas on "Draft Master Plan, Scale 1:20,000*)" by the DKI Office are measured to be 8,522 Ha.

Notes: *) "Draft Master Plan, Scale 1:20,000" is future landuse map drawn, based upon the planning standards in "Jakarta Master Plan, 1965 - 1985", 1966. The Study Team have information that the planning standards have been revised every 5 years. The landuse in 2000 in this study is a modification of "Draft Master Plan, Scale 1:20,000".

The portion to be allocated in propotion to the residential population is estimated to be 30% in 1976 and 25% in 1980 the absolute number is assumed to be increasing along with the residential population. The rest is to be allocated within industrial areas.

Table 4-34
SECTOR II JOBS AND INDUSTRIAL AREAS

	1976	1980	1990	2000	2010
Sector II Jobs (x 1,000 persons)	166.8	244.2	433.8	683.2	909.4
Density (Persons/Ha)	108.1	109.3	91.3	80.2	65.6
Industrial Areas (Ha)	1,543	2,235	4,749	8,522	13,864

In "Jakarta Master Plan 1965 - 1985" the density of day-time population in the secondary sector is estimated to decrease to less than 100 jobs/Ha which is close to a standard of industrilized nations, and 8.552 Ha and 80.2 Jobs/Ha in 2000 seem to be a reasonable figures.

(iii) Zonal Distribution of Sector II Jobs and Industrial Areas

The size of industrial areas in each zone is measured on "Draft Master Plan, Scale 1:20,000" and the portion of secondary sector jobs to be allocated within industrial areas is allocated in proportion to the size of industrial areas in each zone.

Those to be allocated proportionally to residential population are distributed over zones proportionally to zonal residential population as already mentioned previously.

c) Number of Jobs in Section III and Commercial/Administrative Areas

(i) General

Tertiary sector jobs would exist not only in commercial and administrative areas but also in areas of other uses, and so, for the purpose of zonal distribution they are grouped into:

1) To be allocated within commercial and administrative areas; and

2) To be allocated in proportion to the residential population.

The portion to be allocated in proportion to the residential population is estimated to be 30% of the total tertiary sector workers in 1980 and is assumed to be increasing along with the residential population. The rest, 70% in 1980, will be allocated within commercial and administrative areas.

Table 4-35
DIVISION OF SECTOR III JOBS FOR ZONNAL ALLOCATION

(Unit: 1,000 jobs)

	1980	1990	2000	2010
To be Allocated within commercial/ Administrative Areas (%)	1,317.7 (70)	1,927.7 (70)	2,559.5 (70)	3,151.4 (70)
To be Allocated Proportionally to residential Population (%)	564.7 (30)	826.1 (30)	1,096.9 (30)	1,350.6 (30)
T o t a l :	1,882.4 (100)	2,753.8 (100)	3,656.4 (100)	4,502.0 (100)

(ii) Total Number of Jobs within Commercial/Administrative Areas

The total numner of job within commercial and administrative areas is figured out, adding the number of jobs in the secondary and the teritary sector.

Table 4-36
NUMBER OF JOBS IN COMMERCIAL/ADMINISTRATIVE AREAS

(Unit: 1,000 jobs)

	1980	1990	2000	2010
Sector II Jobs	37.5	61.5	91.5	118.9
Sector III Jobs	1,317.7	1,927.7	2,559.5	3,151.4
T o t a l :	1,355.2	1,989.2	2,651.0	3,270.3

(iii) Zonal Distribution of Sector III Jobs

1) To be Allocated in proportion to Commercial/ Administrative Areas

Secondary and tertiary sector workers within commercial/administrative areas, which are figured out in the previous table, are distributed over zones proportionally to area of commercial/ administrative use.

2) To be Allocated in proportion to Zonal Residentiail Population

This portion is to be distributed in proportion to zonal residential population.

The estimated future jobs in Sectors II & III by zone provide the weighting factors of the zones so as to predict future work trip attraction.
On the contrary, the estimated future employed population in Sectors II & III provide those for the prediction of future work trip generation.

Thus, zonal planning parameters used for the future traffic demand forecast are estimated and listed in Tables 4-67 through 4-49 .

Table 4-37 RESIDENTIAL POPULATION, EMPLOYED POPULATION, NUMBER OF JOBS, 1980.

(Unit : 1,000 persons)

ZONE NO.	NAME OF ZONE	RESIDENTIAL POPULATION			EMPLOYED POPULATION			JOBS
		KAMPUNGS	OUTSIDE KAMPUNGS	TOTAL	SECTOR I	SECTOR II + III	SECTOR I + II + III	I + II + III
1.	GAMBIR	85.3	95.8	181.1	-	75.2	75.2	100.8
2.	SAWAH BESAR	109.5	88.4	197.9	-	51.4	51.4	57.1
3.	KEMAYORAN	140.7	108.0	248.7	-	71.1	71.1	74.4
4.	SENEN	116.9	65.8	182.7	-	50.6	50.6	60.4
5.	CEMPAKA PUTIH	178.9	83.4	262.3	-	68.9	68.9	70.3
6.	MENTENG	74.8	88.0	162.8	-	63.3	63.3	84.1
7.	KEBON MELATI	187.3	61.5	248.8	-	88.3	88.3	96.7
8.	GELORA	7.7	3.2	10.9	-	9.9	9.9	10.3
	JAKARTA PUSAT	901.1	594.1	1495.2	-	478.7	478.7	554.1
9.	KANAL MUARA	-	8.8	8.8	1.0	1.7	2.7	4.0
10.	KAPUK MUARA	-	10.8	10.8	2.3	0.5	2.8	3.0
11.	PEJAGALAN	61.6	68.2	129.8	-	58.5	58.5	68.2
12.	MANGGA DUA UTARA	-	30.1	30.1	-	12.4	12.4	20.2
13.	PADEMANGAN	85.8	17.0	102.8	-	23.7	23.7	23.0
14.	SUNTER	-	42.8	42.8	1.2	14.4	15.6	27.6
15.	PEPANGGO	128.3	30.7	159.0	0.4	37.0	37.4	37.8
16.	TANJUNG PRIOK	-	38.4	38.4	-	16.8	16.8	30.4
17.	KOJA	11.9	61.6	73.5	-	16.9	16.9	20.4
18.	TUGU	136.1	20.2	156.3	0.7	31.6	32.3	32.1
19.	PEGANGSAAN II	-	25.3	25.3	3.0	8.4	11.4	8.6
20.	SEMPER	17.8	84.1	101.9	0.5	23.4	23.9	24.3
21.	SUKAPURA	-	27.0	27.0	4.2	0.5	4.7	4.9
	JAKARTA UTARA	441.5	465.0	906.5	13.3	245.8	259.1	304.6
22.	SEMANAN	-	41.2	41.2	1.0	10.6	11.6	12.0
23.	PEGADUNGAN	-	73.7	73.7	3.0	12.8	15.8	14.6
24.	CENGKARENG	36.0	83.7	119.7	1.6	27.7	29.3	26.0
25.	JELAMBAR	46.8	74.0	120.8	0.4	62.2	62.2	60.2
26.	TOMANG	64.4	22.7	87.1	0.1	48.7	48.8	46.4
27.	PALMERAH	136.5	44.1	180.6	0.1	88.1	88.2	86.2
28.	TAMAN SARI	103.4	92.3	195.7	-	52.9	52.9	59.6
29.	TAMBORA	213.4	67.7	281.1	-	65.3	65.3	63.1
30.	KEMBANGAN	3.5	74.4	77.9	3.3	21.1	24.4	24.2
31.	KEBON JERUK	38.9	61.4	100.3	2.2	25.7	27.9	26.5
	JAKARTA BARAT	642.9	635.2	1278.1	11.4	70.1	426.8	418.8
32.	TEBET	228.3	52.3	280.5	0.1	92.4	92.5	97.8
33.	SETIA BUDI	113.2	126.5	239.7	0.1	72.1	72.2	68.6
34.	MAMPANG PRAPATAN	84.1	123.7	207.8	1.0	66.9	67.9	74.8
35.	PEJATEN	13.5	136.8	150.3	2.7	43.7	46.4	41.0
36.	SERENGSENG SAWAH	4.1	70.9	75.0	2.7	511.3	14.0	13.6
37.	KEBAYORAN BARU	80.0	143.2	223.2	0.3	11.0	102.8	116.2
38.	GROGOL UTARA	60.3	102.1	162.4	1.4	41.2	42.6	42.7
39.	KEBAYORAN LAMA	43.4	79.5	122.9	1.5	30.3	31.8	28.0
40.	CILANDAK	13.7	91.4	105.1	1.4	25.8	27.2	25.3
	JAKARTA SELATAN	640.6	926.1	1566.9	11.2	486.2	497.4	490.0
41.	MATRAMAN	196.3	24.1	220.4	-	53.9	53.9	50.7
42.	PULO GADUNG	114.6	121.5	236.1	0.5	101.6	102.1	91.4
43.	CIPINANG BESAR	194.2	85.2	279.4	0.5	81.0	81.5	79.1
44.	KELENDER	30.1	52.3	82.4	2.5	41.2	43.7	28.5
45.	CILILITAN	22.4	157.1	179.5	2.2	72.9	75.1	70.9
46.	HALIM P. KUSUMAH	-	49.6	49.6	1.9	2.2	18.6	15.2
47.	GEDONG	7.2	88.6	95.8	2.6	24.3	26.9	24.6
48.	LUBANG BUAYA	-	74.9	74.9	5.2	11.0	16.2	15.5
49.	PENGGILINGAN	-	40.0	40.0	2.6	8.8	11.4	11.4
50.	CAKUNG	-	55.2	55.2	2.9	10.8	13.7	13.3
	JAKARTA TIMUR	564.8	748.5	1313.3	20.9	78.3	443.1	400.6
	JAKARTA TOTAL	3190.9	3369.1	6560.0	57.1	364.0	2,105.1	2,168.1

Table 4-38 RESIDENTIAL POPULATION, EMPLOYED POPULATION, NUMBER OF JOBS, 1990

(Unit : 1,000 persons)

ZONE NO.	NAME OF ZONE	RESIDENTIAL POPULATION			EMPLOYED POPULATION			JOBS
		KAMPUNGS	OUTSIDE KAMPUNGS	TOTAL	SECTOR I	SECTOR II+III	TOTAL	I+II+III
1	GAMBIR	83.4	96.8	180.2	-	73.4	73.4	183.4
2	SAWAH BESAR	106.6	96.5	203.1	-	65.3	65.3	80.6
3	KEMAYORAN	148.3	94.3	243.1	-	81.6	81.6	84.4
4	SENEN	120.9	50.3	171.2	-	56.6	56.6	74.0
5	CEMPAKA PUTIH	180.3	95.2	275.5	-	88.9	88.9	94.4
6	MENTENG	72.0	93.9	165.9	-	65.2	65.2	116.7
7	KEBON MELATI	188.4	59.1	247.5	-	92.5	92.5	106.7
8	GELORA	9.6	6.4	16.0	-	10.9	10.9	20.3
	JAKARTA PUSAT	909.5	593.0	1502.5	-	534.4	534.4	760.5
9	KANAL MUARA	-	36.0	36.0	0.3	12.3	12.6	4.0
10	KAPUK MUARA	-	33.8	33.8	1.7	9.2	10.9	4.5
11	PEJAGALAN	69.5	137.9	207.4	-	88.6	88.6	65.4
12	MANGGA DUA UTARA	-	26.8	26.8	-	10.9	10.9	18.5
13	PADEMANGAN	86.1	30.4	116.5	-	35.5	35.5	28.9
14	SUNTER	-	105.2	105.2	0.8	39.2	40.0	47.1
15	PEPANGGO	141.0	60.0	201.0	0.3	61.5	61.8	51.6
16	TANJUNG PRIOK	-	34.6	34.6	-	14.5	14.5	41.9
17	KOJA	13.2	47.0	60.2	-	18.4	18.4	48.5
18	TUGU	150.1	43.0	193.1	0.8	55.6	56.4	93.7
19	PEGANGSAAN II	-	44.0	44.0	1.7	17.0	18.7	16.0
20	SEMPER	19.7	105.0	124.7	0.5	37.8	38.3	65.3
21	SUKA PURA	-	75.3	75.3	2.0	18.7	20.7	16.2
	JAKARTA UTARA	479.6	779.0	1.258.6	8.1	419.2	427.3	501.5
22	SEMANAN	-	83.1	83.1	0.3	27.4	27.7	25.3
23	PEGADUNGAN	-	171.3	171.3	1.9	48.8	50.7	56.3
24	CENGKARENG	45.8	143.3	189.1	1.5	57.6	59.1	41.5
25	JELAMBAR	55.0	84.8	139.8	0.2	64.7	64.9	74.4
26	TOMANG	64.4	44.6	109.0	-	53.2	53.2	63.4
27	PAL MERAH	147.4	68.8	216.2	-	97.0	96.9	87.5
28	TAMAN SARI	103.8	100.6	204.4	-	66.8	66.8	71.5
29	TAMBORA	206.6	83.1	289.7	-	88.7	88.7	73.1
30	KEMBANGAN	4.6	177.2	181.8	2.1	61.6	63.7	31.8
31	KEBON JERUK	54.0	120.0	174.0	1.2	56.5	57.7	31.7
	JAKARTA BARAT	681.6	1.076.8	1.758.4	7.2	622.3	629.5	556.5
32	TEBET	251.7	62.1	313.8	-	113.0	113.0	79.9
33	SETIA BUDI	116.7	137.9	254.6	-	87.7	87.7	94.0
34	MAMPANG PRAPATAN	103.1	143.4	246.5	0.7	87.6	88.3	84.0
35	PEJATEN	18.0	211.5	229.5	1.7	78.2	79.9	51.6
36	SERENGSENG SAWAH	5.0	146.9	151.9	2.0	40.6	42.6	30.5
37	KEBAYORAN BARU	87.1	169.7	256.8	0.2	110.9	111.	154.5
38	GROGOL UTARA	72.1	167.6	239.7	0.8	76.5	77.3	64.7
39	KEBAYORAN LAMA	51.6	145.9	197.5	0.9	62.5	63.4	85.2
40	CILANDAK	18.1	138.3	156.4	0.9	49.3	50.2	34.4
	JAKARTA SELATAN	723.4	1.323.3	2.046.7	7.2	706.3	624.8	628.8
41	MATRAMAN	203.9	40.9	244.8	-	76.6	76.6	56.0
42	PULO GADUNG	132.9	154.8	287.7	0.3	119.6	119.9	87.6
43	CIPINANG BESAR	217.5	101.5	319.0	0.3	107.8	108.1	75.5
44	KELENDER	38.5	153.0	191.5	1.6	88.7	90.3	42.9
45	CILILITAN	26.0	186.2	212.2	1.5	85.3	86.8	94.8
46	HALIM PERDANA KUSUMAH	-	85.5	85.5	1.3	31.6	32.9	17.9
47	GEDONG	8.5	136.2	144.7	1.6	46.5	48.1	50.1
48	LUBANG BUAYA	-	169.2	169.2	3.5	46.8	50.3	45.7
49	PENGGILINGAN	-	49.3	49.3	1.9	14.7	16.6	31.9
50	CAKUNG	-	119.9	119.9	1.5	36.1	37.6	150.8
	JAKARTA TIMUR	627.3	1.196.5	1.823.8	13.5	517.4	667.2	653.2
	JAKARTA TOTAL	3.421.4	4.968.6	8.390.0	36.0	2,935.9	2,971.9	3,100.5

Table : 4-39 RESIDENTIAL POPULATION, EMPLOYED POPULATION, NUMBER OF JOBS, 2000

(Unit : 1,000 persons)

ZONE NO.	NAME OF ZONE	RESIDENTIAL POPULATION			EMPLOYED POPULATION			JOBS
		KAMPUNGS	OUTSIDE KAMPUNGS	TOTAL	SECTOR I	SECTOR II + III	I + II + III	I + II + III
1	GAMBIR	81.1	91.7	172.8	-	77.5	77.5	266.4
2	SAWAH BESAR	103.2	97.7	200.9	-	71.0	71.0	104.2
3	KEMAYORAN	155.6	73.2	228.8	-	84.5	84.5	94.6
4	SENEN	124.4	29.4	153.8	-	56.0	56.0	88.0
5	CEMPAKA PUTIH	181.1	97.4	278.5	-	98.9	98.9	118.7
6	MENTENG	69.0	93.8	162.3	-	70.4	70.4	149.6
7	KEBON MELATI	189.0	48.2	237.2	-	97.7	97.	116.9
8	GELORA	11.4	9.0	20.4	-	15.3	15.3	30.4
	JAKARTA PUSAT	914.8	540.4	1.455.2	-	571.3	571.3	968.8
9	KANAL MUARA	0	68.1	68.1	-	26.2	26.2	4.1
10	KAPUK MUARA	0	59.6	59.6	0.8	20.7	21.2	6.1
11	PEJAGALAN	77.1	181.7	258.8	-	121.7	121.7	62.7
12	MANGGA DUA MUARA	3.0	8.1	11.1	0	5.0	5.0	16.8
13	PADEMANGAN	84.6	9.9	94.5	0	31.7	31.7	34.9
14	SUNTER	0	170.2	170.2	0.3	69.9	71.2	56.5
15	PEPANGGO	152.5	42.0	194.5	0.1	65.7	65.8	65.7
16	TANJUNG PRIOK	0	14.8	14.8	0	6.8	6.8	53.5
17	KOJA	14.3	5.8	20.1	0	6.7	6.7	76.5
18	TUGU	163.2	88.5	251.6	0.4	80.3	80.7	155.4
19	PEGANGSAAN	0	81.5	81.5	0.6	37.6	38.2	23.4
20	SEMPER	21.4	134.1	160.5	0.2	54.0	54.2	106.5
21	SUKAPURA	0	177.7	177.7	0.6	53.0	53.6	27.6
	JAKARTA UTARA	516.0	1.047.0	1.563.0	3.0	580.0	583.0	699.7
22	SEMANAN	0	135.3	135.3	0	49.6	49.6	38.8
23	PEGADUNGAN	0	298.2	298.2	0.8	96.2	97.0	98.3
24	CENGKARENG	54.9	209.0	263.9	0.7	90.0	90.7	57.1
25	JELAMBAR	61.8	78.5	140.3	0.1	71.7	71.8	88.8
26	TOMANG	82.4	39.1	121.5	0	65.3	65.3	80.7
27	PAL MERAH	153.5	73.9	227.4	0	112.2	112.2	88.9
28	TAMAN SARI	100.2	72.5	172.7	0	62.1	62.1	83.5
29	TAMBORA	190.8	47.6	238.4	0	80.2	80.2	83.2
30	KEMBANGAN	5.5	309.4	314.9	0.8	120.6	121.4	39.5
31	KEBON JERUK	68.6	191.0	259.6	0.5	94.1	94.6	37.1
	JAKARTA BARAT	717.7	1.454.5	2.172.2	2.9	842.0	844.9	695.9
32	TEBET	272.9	39.7	312.6	0	123.8	123.8	80.1
33	SETIA BUDI	117.3	117.5	234.8	0	88.9	88.9	119.7
34	MAMPANG PRAPATAN	123.6	141.6	265.2	0.3	104.3	104.6	93.6
35	PEJATEN	23.0	291.3	314.3	0.8	119.6	120.4	62.3
36	SERENGSENG SAWAH	5.9	240.3	246.2	0.8	75.1	75.9	47.5
37	KEBAYORAN BARU	93.1	172.6	265.7	0.1	126.4	126.5	193.2
38	GROGOL UTAMA	84.6	235.2	319.8	0.3	113.2	113.5	86.9
39	KEBAYORAN LAMA	60.1	220.6	280.7	0.4	98.6	99.0	42.4
40	CILANDAK	23.1	187.0	210	0.4	73.7	74.1	43.6
	JAKARTA SELATAN	803.6	1.645.8	2.449.4	3.1	923.6	926.7	769.3
41	MATRAMAN	207.9	15.6	223.5	0	76.9	76.9	61.3
42	PULO GADUNG	151.8	149.5	301.3	0.1	138.2	138.3	83.9
43	CIPINANG BESAR	240.3	64.0	304.3	0.1	113.4	113.5	72.1
44	KELENDER	47.8	279.2	327.0	0.7	169.2	169.9	57.5
45	CILILITAN	29.7	183.4	213.1	0.7	95.3	96.0	118.8
46	HALIM PERDANA KUSUMA	0	124.3	124.3	0.6	52.0	52.6	20.8
47	GEDONG	9.9	180.4	190.3	0.7	68.9	69.6	75.8
48	LUBANG BUAYA	0	285.5	285.5	1.6	91.7	93.3	76.0
49	PENGGILINGAN	0	52.4	52.4	1.0	18.4	19.4	52.5
50	CAKUNG	0	198.5	198.5	0.5	68.0	68.5	288.6
	JAKARTA TIMUR	687.4	1.532.8	2.220.2	6.0	892.0	893.0	907.3
	JAKARTA TOTAL	3,639.5		9,860.0	15.0	3,308.7	3,823.7	4,041.0

Table 4-40 RESIDENTIAL POPULATION, EMPLOYED POPULATION, NUMBER OF JOBS, 2010

(Unit : 1,000 persons)

ZONE NO.	NAME OF NAME	RESIDENTIAL POPULATION			EMPLOYED POPULATION			JOBS
		KAMPUNGS		TOTAL	SECTOR I	SECTOR I+II	I + I + III	I + II +III
1	GAMBIR	85.6	110.1	195.7	0	93.0	93.0	337.0
2	SAWAH BESAR	108.9	117.3	226.2	0	84.7	84.7	127.0
3	KEMAYORAN	164.2	87.9	252.1	0	98.6	98.6	109.0
4	SENEN	131.3	35.3	166.6	0	64.2	64.2	103.9
5	CEMPAKA PUTIH	191.1	116.9	308.0	0	115.8	115.8	143.2
6	MENTENG	72.8	112.6	185.4	0	85.0	85.0	181.6
7	KEBON MELATI	199.5	57.9	257.4	0	112.2	112.2	133.5
8	GELORA	12.0	10.8	22.8	0	18.1	18.1	38.7
	JAKARTA PUSAT	965.4	648.8	1.614.2	0	671.6	671.6	1173.9
9	KANAL MUARA	0	81.8	81.8	0	33.3	33.3	4.5
10	KAPUK MUARA	0	71.6	71.6	0.4	26.6	27.0	7.5
11	PEJAGALAN	81.4	218.2	299.6	0	149.3	149.3	67.1
12	MANGGA DUA UTARA	3.2	9.7	12.9	0	6.1	6.1	17.4
13	PADEMANGAN	89.3	11.9	101.2	0	35.9	35.9	41.4
14	SUNTER	0	204.4	204.0	0.1	90.5	90.6	83.4
15	PEPANGGO	160.9	50.4	211.3	0	75.7	75.7	79.6
16	TANJUNG PRIOK	0	17.8	17.8	0	8.7	8.7	64.9
17	KOJA	15.1	7.0	22.1	0	7.8	7.8	99.2
18	TUGU	172.1	106.3	278.4	0.2	94.4	94.6	203.8
19	PEGANGSAAN II	0	97.9	97.9	0.3	48.4	48.7	29.6
20	SEMPER	22.6	167.0	189.6	0.1	67.7	67.8	139.0
21	SUKAPURA	0	213.4	213.4	0.3	67.9	68.2	36.3
	JAKARTA UTARA	544.6	1.257.4	1.802.0	1.4	712.3	713.7	973.9
22	SEMANAN	0	162.5	162.5	0	63.1	63.1	49.7
23	PEGADUNGAN	0	358.1	358.1	0.4	123.0	123.4	130.5
24	CENGKARENG	57.9	251.0	308.9	0.3	112.5	112.5	70.9
25	JELAMBAR	65.2	94.3	159.5	0.1	86.4	86.5	105.1
26	TOMANG	87.0	46.9	133.9	0	76.3	76.3	97 8
27	PAL MERAH	162.0	88.7	250.7	0	131.1	131.1	98.1
28	TAMAN SARI	105.7	87.1	192.8	0	73.5	73.5	97.9
29	TAMBORA	201.4	57.2	258.6	0	92.1	92.1	96.6
30	KEMBANGAN	5.8	371.5	377.3	0.4	153.8	154.2	47.4
31	KEBON JERUK	72.4	229.3	301.7	0.2	116.3	116.5	43.4
	JAKARTA BARAT	757.4	1.746.6	2.504.0	1.4	1,027.8	1.029.2	837.4
32	TEBET	288.2	27.7	355.9	0	141.0	141.0	87.8
33	SETIABUDI	123.8	141.1	264.9	0	106.3	106.3	145.1
34	MAMPANG PRAPATAN	120.4	170.0	300.4	0.1	125.4	125.5	107.6
35	PEJATEN	24.3	349.8	374.1	0.4	151.4	151.8	73.9
36	SERENGSENG SAWAH	6.2	288.5	294.7	0.4	75.9	96.3	61.2
37	KEBAYORAN BARU	98.2	207.2	305.4	0	154.2	154.2	232.6
38	GROGOL UTARA	89.3	282.4	371.7	0.1	139.6	139.7	107.3
39	KEBAYORAN LAMA	63.4	264.9	328.3	0.2	122.5	122.7	59.2
40	CILANDAK	24.4	224.5	248.9	0.2	92.8	93.0	52.6
	JAKARTA SELATAN	848.2	1.976.1	2.824.3	1.4	1,129.1	1.130.5	918.3
41	MATRAMAN	219.4	18.7	238.1	0	86.6	86.6	69.9
42	PULO GADUNG	160.2	179.5	339.7	0.1	165.3	165.3	89.8
43	CIPINANG BESAR	253.6	76.8	330.4	0.1	130.4	130.5	77.0
44	KELENDER	50.4	335.2	385.6	0.3	212.1	212.4	70.8
45	CILILITAN	31.3	220.2	251.5	0.3	119.7	120.0	143.2
46	HALIM PERDANA KUSUMA	0	149.2	149.2	0.3	66.6	66.9	24.2
47	GEDUNG	10.4	216.6	227.0	0.3	87.3	88.0	97.0
48	LUBANG BUAYA	0	342.8	342.8	0.7	117.9	118.6	99.8
49	PENGGILINGAN	0	62.9	62.9	0.5	24.1	24.6	68.6
50	CAKUNG	0	238.3	238.3	0.2	86.9	87.1	391.3
	JAKARTA TIMUR	725.3	1.840.2	2.565.5	2.8	340.0	1.100.0	1,131.6
	JAKARTA TOTAL	3.840.9	7.469.1	11.310.0	7.0	1.416.0	4.645.0	4,935.1

4.3 Future Traffic Demand

4.3.1 Estimation of Future Person Trips

(1) All Day Work Trip Generation and Attraction in Jakarta

1) Total Work Trips in Jakarta

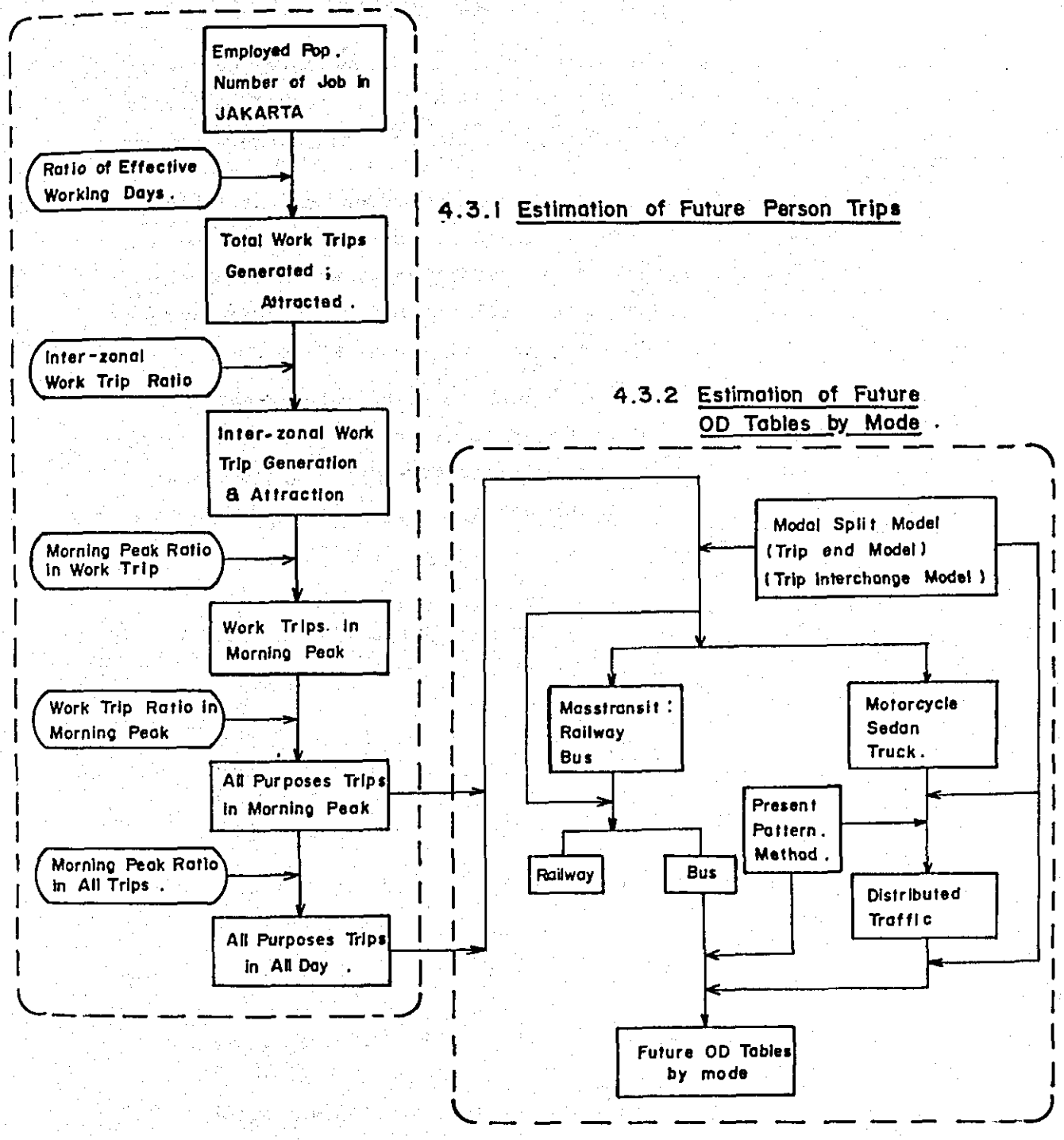
The future excess in-flow of work trips to Jakarta has been estimated in the previous section. While, the ratio of effective working days is 0,956 at present, this will decline in the future, because of the development of social welfare and a higher participation in recreational activities. Based on the above consideration future ratio of effective working days are assumed to be 0.93 for the year 1990 and 0.90 for the years 2000 and 2010.

With reference to the estimated future employed population and jobs in Jakarta, total of inter-zonal work trip generation and attraction are estimated in accordance with the flow chart shown in Fig. 4-12.

Table 4-41 TOTAL WORK TRIPS IN JAKARTA

	1980	1990	2000	2010
Ratio of Effective Working Days.	0.956	0.93	0.90	0.90
Employed population (1000 persons)	2,105.1	2,792.0	3,823.7	4,645.0
Number of Jobs (1000 persons)	2,167.5	3,100.5	4,041.0	4,935.2
Total Work Trip Gen. (1000 person trips)	2,012.4	2,764.0	3,441.3	4,180.5
Total Work Trip Att. (1000 person trips)	2,072.1	2,883.5	3,636.9	4,441.7
Excess In-flow of Work Trips to JKT (1000 persons)	59.7	119.5	195.6	261.2

Fig. 4-12 FLOW CHART FOR ESTIMATIONS OF FUTURE TRAFFIC DEMAND



2) Intra-zonal vs. Inter-zonal Work Trips

According to the Home Interview Survey, those who have their work places inside their zone and outside their zone account for 52.35% and 47.65% respectively as an average of the total workers sampled.

The development of the transportation network as well as a higher level of employment opportunity will encourage people to find their preferred jobs regardless of the physical distance of the work trips. This mean that those who have their work places outside their zone will increase on an average in Jakarta.

Based on the above premise the future rates of inter-zonal work trip generation over a total work trip generation are assumed as shown below and the future inter-zonal work trip attraction as well as inter-zonal work trip generation are estimated below :

Table 4-42

FUTURE WORK TRIP GENERATION AND ATTRACTION IN JAKARTA
(Inter-zonal Work Trips)

	1980	1990	2000	2010
Total Work Trip Gen. (1,000 P.T.)	2,012.4	2,764.0	3,441.3	4,180.5
Inter-zonal Work Trip Rate (%)	47.65	55.0	60	62.5
Inter-zonal Work Trip Gen. (1000 P.T.)	959.3	1,520.2	2,064.8	2,612.8
Intra-zonal Work Trips (1000 P.T.)	1,053.1	1,243.8	1,376.5	1,567.7
Total Work Trip Att. (1000 P.T.)	2,072.1	2,883.5	3,636.9	4,441.7
Inter-zonal Work Trip Att. (1000 P.T.)	1,019.0	1,639.7	2,260.4	2,874.0

(3) Work Trips in the Morning Peak

The existing person trip O-D tables with four categories, which are All Day all trips, All Day work trips, Peak-hour all trips, and Peak-hour work trips are presented in Tables and . Work Trips in Morning Peak are derived from Work Trips in All Day multiplied by the Morning Peak Ratio of Work Trips.
This ratio is 0 515 for the year 1980, and is expected to increase in future with th development of employment level and increase in permanent employees. This ration is assumed to be 0.55 for the year 1990 and 0.60 for the year 2000 and 2010.

The results are shown in Table 4-45 and 4-46 .

(4) All trips in the Morning Peak

In order to convert Work Trips to all trips it is necessary to know Work Trip Ratio in the Morning Peak.

This ratio in the year 1980 is 0.72 for generated trips and 0.74 for attracted trips. It is expected that the higher the economic activities grow, the more work trips tend to be concentrated.

Work Trip ratio in the Morning Peak is, therefore, assumed to be 0.75 for the years 1990, 2000 and 2010.
The results are shown in Table 4-45 and 4-47 .

(5) All Trips in All Day

All Trips in the Morning Peak is to be converted to All Trips in All Day, by using the Morning Peak Ratio. This ratio is largely influenced by Morning Peak Ratio of Work Trips and Work Trip Ratio in the Morning Peak. In the yaer 1980, the morning peak ratio of all trips was 0.15 and is assumed to be 0.18 for the year 1990 and 0.20 for the years 2000 and 2010 in consideration of the other ratios.

Under the premise that the number of All Trips generated in All Day, must coincide with those attracted in All Day for respective zones, adjustment has been made.

The results are shown in Table 4-45 and 4-48 .

Table 4-43 ALL DAY PERSON TRIP O - D FOR ALL PROPOSES AND WORK PURPOSE IN 1980.

(Unit : 1000 Person Trips)

Origin \ Destination		JAKARTA	TANGERANG	BOGOR	BEKASI	BOTABEK S-TOTAL	OUTSIDE JABOTABEK	TOTAL
Jakarta	AP:	3,960.2	181.4	196.6	114.9	492.9	51.7	4,504.8
		(22.1)				(16.6)		(21.3)
	WP:	873.3	29.4	33.9	17.6	80.9	5.1	959.3
Tangerang	AP:	190.0	4.3	7.1	0.2	11.6	1.9	203.5
	WP:	53.4	0.8	1.6	0	2.4	0.3	56.1
Bogor	AP:	218.4	3.4	14.7	0.3	18.4	1.4	238.2
	WP:	56.1	0.7	3.2	0.1	4.0	0.2	60.3
Bekasi	AP:	130.1	0.3	0.4	5.5	6.2	0.4	136.6
	WP:	30.8	0.1	0.1	1.0	1.2	0.0	32.1
BOTABEK S-Total	AP:	538.5	8.0	22.2	6.0	36.2	3.7	578.3
		(26.1)				(21.0)		(25.7)
	WP:	140.3	1.6	4.9	1.1	7.6	0.6	148.5
Outside JABOTABEK	AP:	53.8	2.0	1.3	4.9	8.2	0.4	62.4
	WP:	5.4	0.2	0.1	0.2	0.5	0	5.9
TOTAL	AP:	4,552.5	191.4	220.1	125.8	537.3	55.7	5,145.5
		(22.4)				(16.6)		(21.6)
	WP:	1,019.0	31.2	38.9	18.9	89.0	5.7	1,113.7

Note: AP: All Purposes
( ): All Day Work Trip Ratio (%)
WP: Work Purpose

Table 4-44 PEAK-HOUR PERSON TRIP O - D FOR ALL PURPOSES AND WORK PURPOSE IN 1980

(Unit : 1000 Person Trips)

Origin \ Destination		JAKARTA	TANGERANG	BOGOR	BEKASI	BOTABEK S-TOTAL	OUTSIDE JABOTABEK	TOTAL
Jakarta	AP:	600.4	34.2	27.3	16.8	78.3	6.3	685.0
		(74.2%)				(58.1%)		(72.1%)
	WP:	445.6	17.7	16.7	11.1	45.5	3.0	494.1
Tangerang	AP:	32.8	0	0	0	0	0	32.8
	WP:	24.9	0	0	0	0	0	24.9
Bogor	AP:	41.6	0	0.4	0	0.4	0	42.0
	WP	31.6	0	0.3	0	0.3	0	31.9
Bekasi	AP	27.8	0.1	0.1	0.1	0.3	0	28.1
	WP	19.7	0	0	0	0	0	19.7
BOTABEK S-Total	AP	102.2	0.1	0.5	0.1	0.7	0	102.9
		(74.6%)						(74.3%)
	WP	76.2	0	0.3	0	0.3	0	76.5
Outside JABOTABEK	AP	4.9	0	0.1	0	0.1	0	5.0
	WP	3.0	0	0	0	0	0	3.0
TOTAL	AP	707.5	34.3	27.9	16.9	79.1	6.3	792.9
		(74.2%)				(57.9%)		(72.3%)
	WP	524.8	17.7	17.0	11.1	45.8	3.0	573.6

Note : AP : All Purposes
( ): Peak-2 hour Work Trip Ratio (%)
WP : Work Purpose

Table 4-45 TRIP FACTORS

	1980	1990	2000	2010
RATIO OF EFFECTIVE WORKING DAYS	0.956	0.93	0.90	0.90
WORK TRIP - MORNING PEAK RATIO	G. 0.515 A. 0.515	0.55	0.60	0.60
MORNING PEAK - WORK TRIP RATIO	G. 0.72 A. 0.74	0.75	0.75	0.75
ALL PURPOSE TRIPS MORNING PEAK RATIO	G. 0.15 A. 0.15	0.18	0.20	0.20

G. - - - - Generated. A. - - - - Attracted

GENERATED TRIPS IN DKI

(Unit : 1,000 Person Trips)

	1980	1990	2000	2010
ALL DAY - WORK TRIPS	959.4	1520.2	2064.8	2612.8
MORNING PEAK - WORK TRIPS	494.1	836.1	1238.9	1567.7
MORNING PEAK - ALL PURPOSE TRIPS	685.0	1114.8	1651.9	2090.3
ALL DAY - ALL PURPOSE TRIPS	4504.8	6436.7	8650.5	10973.8

ATTRACTED TRIPS IN DKI

(Unit : 1,000 Person Trips)

	1980	1990	2000	2010
ALL DAY - WORK TRIPS	1019.0	1639.7	2260.4	2874.0
MORNING PEAK - WORK TRIPS	524.8	901.8	1356.2	1724.4
MORNING PEAK - ALL PURPOSE TRIPS.	707.5	1202.4	1808.3	2299.2
ALL DAY - ALL PURPOSE TRIPS	4552.5	6436.7	8650.5	10973.8

Table 4-46

ESTIMATED WORK TRIPS. (Unit : 1,000 Person Trips)

		ALL DAY			MORNING PEAK		
		OUT FLOW WORK	GENERATED	ATTRACTED	TRIP TO DKJ	GENERATED	ATTRACTED
1980	TANGERANG	24.0	56.1	32.1	7.2	24.8	17.6
	BOGOR	22.2	60.3	38.1	14.8	31.9	17.1
	BEKASI	13.2	32.1	18.9	8.6	19.7	11.1
	OTHERS	0.3	5.9	5.6	0.1	3.1	3.0
	TOTAL	59.7	154.4	94.7	30.7	79.5	48.8
1990	TANGERANG	42.7	87.2	44.5	23.5	58.2	34.7
	BOGOR	43.0	97.1	54.1	23.6	53.4	29.8
	BEKASI	33.2	53.4	20.2	18.3	31.3	13.0
	OTHERS	0.6	9.5	8.9	0.3	5.2	4.9
	TOTAL	119.5	247.2	127.7	65.7	136.0	70.3
2000	TANGERANG	63.2	136.0	72.8	37.9	81.6	43.7
	BOGOR	71.0	132.8	61.8	42.6	79.7	37.1
	BEKASI	60.4	82.5	22.1	36.2	49.5	13.3
	OTHERS	1.0	13.8	12.8	0.6	8.3	7.7
	TOTAL	195.6	365.1	169.5	117.3	219.1	101.8
2010	TANGERANG	84.3	188.2	103.9	50.6	112.9	62.3
	BOGOR	94.9	158.4	63.5	56.9	95.1	38.2
	BEKASI	80.6	109.0	28.4	48.4	65.5	17.0
	OTHERS	1.3	17.7	16.4	0.8	10.6	9.8
	TOTAL	261.2	473.3	212.1	156.7	284.0	127.3

Table 4-47

ESTIMATED GENERATED TRIPS OF ALL PURPOSES IN MORNING PEAK

(Unit : 1000 Person Trips)

	1980	1990	2000	2010
TANGERANG	32.9	77.6	108.8	150.9
BOGOR	42.1	71.2	106.3	127.1
BEKASI	28.0	41.7	66.0	87.4
OTHERS	5.0	6.9	11.1	14.2

ESTIMATED ATTRACTED TRIPS OF ALL PURPOSES IN MORNING PEAK

(Unit : 1000 Person Trips)

	1980	1990	2000	2010
TANGERANG	34.4	46.3	58.3	83.1
BOGOR	27.9	39.7	49.5	50.9
BEKASI	16.9	17.3	17.7	23.6
OTHERS	6.3	6.5	10.3	13.1

Table 4-48

ESTIMATED GENERATED & ATTRACTED TRIPS OF ALL PURPOSES IN ALL DAY

(Unit : 1000 Person Trips)

	1980	1990	2000	2010
TANGERANG	203.5	431.1	544.0	752.2
BOGOR	238.2	395.6	531.5	634.0
BEKASI	136.6	231.7	330.0	436.0
OTHERS	62.4	114.2	151.6	196.6

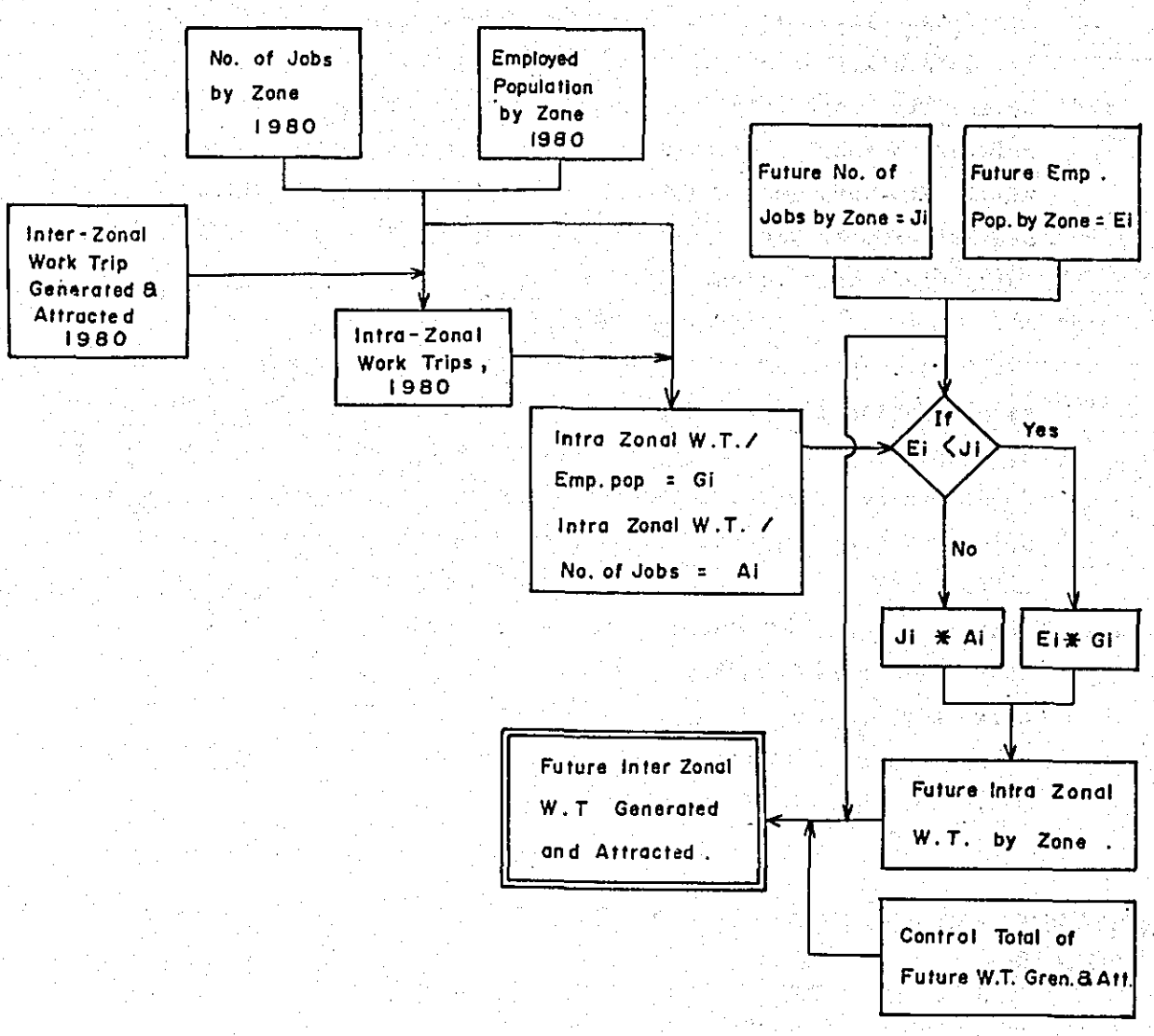
(2) Zonal Work Trip in All Day

1) Inter-zonal Work Trips

Employment level and the number of jobs in a zone determine predominantly the frequency of Work Trips.
Especially, work trips generated and there attracted are directly related to zonal employment level and the number of jobs respectively. However, work trips relevant to this transportation study are inter-zonal work trips, otherwise a total work trips precluding intra-zonal work trips.

The frequency of intra-zonal work trips can not be predicable by a single factor like zonal population, employment level or the number of jobs. Only the fact being defined is that intra-zonal work trips do not exceed the total generation or attraction of work trips whichever they are smaller. Furthermore, the existing ratios of intra-zonal work trips over the zonal employed population or the number of jobs, whichever they are smaller, indicate zonal characteristics. Taking these into account, the future inter-zonal work trips generated and attracted are estimated following the flow chart presented in Fig. 4-13 and the resulting estimations are shown in Table 4-49 .

Fig. 4-13 FLOW CHAR FOR ESTIMATIONS OF FUTURE WORK TRIPS IN ALL DAY .



2) Conversion of All Day Work Trips

According to the Person Trip O-D table in 1980, the following conversion ratios have been calculated in order to estimate each category of person trips.

- Peak ratio of work trips by zone
- Ratio of work trips over all trips in the morning peak -2 hour by zone
- Peak ratio of all trips by zone

Taking the above conversion ratios by zone, the future person trips for such categories as Morning peak Work Trips, Morning peak All Trips and All Day All Trips are calculated and then adjusted so as to coincide with the control totals of the trip categories which are determined in the previous section.

Eventually, the estimated future person trips generated and attracted are presented in Table 4-50 and 4-52.

Table 4-49 ESTIMATED ALL DAY ALL TRIPS IN DKI JAKARTA

(unit: 1000 person trips)

ZONE NO.	GENERATED				ATTRACTED			
	1980	1990	2000	2010	1980	1990	2000	2010
1	239.15	336.29	443.17	560.68	242.66	336.29	443.17	560.68
2	95.00	130.67	169.07	215.09	100.58	130.67	169.07	215.09
3	127.20	135.20	151.13	183.13	129.27	135.20	151.13	183.13
4	112.36	135.12	157.06	191.91	126.29	135.12	157.06	191.91
5	114.33	153.20	196.50	250.07	125.63	153.20	196.50	250.07
6	190.89	236.39	283.45	349.61	215.15	236.39	283.45	349.61
7	228.72	216.05	230.66	272.59	206.49	216.05	230.66	272.59
8	32.79	50.59	71.21	89.62	36.80	50.59	71.21	89.62
9	6.64	29.26	59.72	76.53	6.55	29.26	59.72	76.53
10	4.22	18.08	35.12	45.52	4.66	18.08	35.12	45.52
11	187.36	235.73	303.57	372.59	184.83	235.73	303.57	372.59
12	39.38	38.47	29.44	31.76	56.45	38.47	29.44	31.76
13	27.20	41.94	32.24	39.86	24.06	41.94	32.24	39.86
14	48.74	92.27	211.00	272.01	72.29	93.27	211.00	272.01
15	43.60	77.69	78.44	96.44	46.00	77.69	78.44	96.44
16	55.48	82.38	89.88	109.60	92.45	82.38	89.88	109.60
17	22.73	74.12	121.17	157.43	33.82	74.12	121.17	157.43
18	28.43	133.00	229.98	323.17	32.97	133.00	229.98	323.17
19	27.50	37.91	73.21	95.80	22.34	37.91	73.21	95.80
20	30.36	110.79	182.37	247.54	39.00	110.79	182.37	247.54
21	1.73	19.32	70.69	93.70	2.61	19.32	70.69	93.70
22	18.50	42.69	77.24	102.34	19.23	42.69	77.24	102.34
23	13.05	58.34	99.34	149.98	11.72	59.34	99.34	149.98
24	44.83	93.20	149.09	196.06	40.72	93.20	149.09	196.06
25	194.29	209.00	237.60	287.34	189.92	209.00	237.60	287.34
26	144.47	172.63	210.58	256.76	154.44	172.63	210.58	256.76
27	217.95	216.02	237.09	279.30	229.55	216.02	237.09	279.30
28	106.13	121.23	140.83	172.97	111.00	121.23	140.83	172.97
29	105.16	134.96	107.22	135.54	75.57	134.96	107.22	135.54
30	44.62	110.68	207.55	267.96	45.61	110.68	207.55	267.96
31	40.52	85.06	140.97	178.32	41.14	85.06	140.97	178.32
32	169.72	185.69	201.71	238.19	156.99	185.69	201.71	238.19
33	131.50	159.14	200.00	250.96	116.91	159.14	200.00	250.96
34	144.26	176.80	205.68	254.45	154.46	176.80	205.68	254.45
35	81.84	133.43	199.80	260.12	82.26	133.43	199.80	260.12
36	7.12	37.67	77.41	105.85	6.68	37.67	77.41	105.85
37	285.00	337.01	399.80	491.11	310.33	337.01	399.80	491.11
38	57.30	105.39	156.79	202.67	60.96	105.39	156.79	202.67
39	41.50	88.05	141.43	182.35	41.70	88.05	141.43	182.35
40	29.05	76.42	115.12	151.48	42.55	76.42	115.12	151.48
41	88.39	122.08	119.53	143.58	67.92	122.08	119.53	143.58
42	267.93	263.25	291.54	352.01	239.43	263.25	291.54	352.01
43	153.11	197.80	206.52	246.48	158.49	197.80	206.52	246.48
44	109.16	160.87	290.88	369.70	97.12	160.87	290.88	369.70
45	186.59	219.84	263.16	326.98	194.42	219.84	263.16	326.98
46	43.66	68.16	99.30	128.84	51.68	68.16	99.30	128.84
47	44.90	88.81	134.65	181.25	44.77	88.81	134.65	181.25
48	17.07	56.86	116.52	159.92	17.53	56.86	116.52	159.92
49	17.30	45.53	72.69	96.71	17.41	45.53	72.69	96.71
50	23.83	299.30	531.12	729.57	20.54	299.30	531.12	729.57
JKT	4,504.79	6,436.69	8,650.49	10,973.80	4,552.49	6,436.69	8,650.49	10,973.80

Table 4-50 ESTIMATED PEAK 2-HOUR ALL TRIPS IN DKI JAKARTA

(unit: 1000 person trips)

ZONE NO.	GENERATED				ATTRACTED			
	1980	1990	2000	2010	1980	1990	2000	2010
1	27.50	25.87	28.82	35.55	61.45	133.26	210.97	268.69
2	11.11	14.27	16.89	21.48	15.30	25.27	39.87	50.57
3	16.40	18.76	20.92	25.74	20.05	23.36	30.46	36.18
4	17.52	19.62	20.94	25.41	19.34	26.37	37.25	45.59
5	17.03	23.22	26.83	33.47	29.67	44.41	68.62	88.40
6	19.32	18.24	20.85	25.93	37.25	57.92	81.00	99.21
7	36.59	37.35	41.84	49.82	23.76	27.56	32.65	38.00
8	1.34	1.39	2.04	2.44	8.43	18.09	26.18	36.22
9	0.40	3.34	7.67	9.83	2.59	2.61	2.77	3.10
10	0.66	4.86	10.71	13.79	1.09	1.73	2.51	3.27
11	28.66	50.52	78.68	99.26	32.56	31.27	31.48	34.30
12	4.25	3.59	1.72	2.18	11.13	10.22	11.06	11.23
13	5.60	11.72	6.51	7.47	2.07	2.69	3.90	5.01
14	4.53	10.02	28.66	37.03	15.99	20.65	39.94	50.67
15	6.49	14.87	13.30	15.27	4.78	7.13	10.00	13.09
16	4.05	3.36	1.66	2.18	18.60	27.95	40.43	48.84
17	2.56	2.91	1.18	1.50	8.39	35.34	73.04	95.03
18	5.17	9.95	16.25	21.42	6.76	50.50	98.29	139.88
19	3.68	5.43	13.90	18.02	2.68	5.10	7.96	10.48
20	3.46	5.77	9.03	12.26	6.87	35.12	65.22	88.44
21	0.26	4.58	20.69	26.53	0.57	2.45	5.03	7.89
22	5.40	14.80	32.08	41.87	1.73	3.80	6.26	8.43
23	4.45	15.46	33.38	47.20	2.38	17.59	28.25	44.66
24	12.55	35.80	64.49	82.65	3.30	5.93	9.18	12.62
25	26.61	26.37	30.58	37.56	27.01	36.30	46.62	55.50
26	15.74	16.34	21.02	24.98	26.43	39.69	53.31	65.93
27	23.75	25.95	33.20	40.12	28.26	28.84	30.85	34.74
28	11.68	14.84	14.93	18.73	18.44	21.60	33.32	40.07
29	21.22	39.18	26.13	32.67	11.64	14.99	19.06	24.28
30	13.03	50.90	112.82	145.56	1.78	2.42	3.21	4.05
31	12.72	40.77	79.59	100.41	3.01	2.56	3.24	4.04
32	35.81	50.13	61.07	72.52	12.72	13.26	14.47	16.72
33	25.37	20.45	33.14	41.52	26.09	42.87	68.96	86.83
34	17.31	24.95	32.54	41.11	24.73	28.38	33.55	39.83
35	14.73	32.24	56.97	74.70	9.38	12.45	16.29	20.49
36	1.68	14.10	32.16	42.06	0.06	0.18	0.35	0.56
37	24.22	25.11	30.11	37.53	67.09	97.23	130.80	158.54
38	15.35	35.02	59.20	75.43	3.90	6.29	9.19	12.05
39	9.54	30.11	56.22	71.93	2.13	2.95	3.96	5.14
40	8.12	21.32	37.04	48.65	4.21	6.20	8.69	11.25
41	16.17	33.87	32.27	37.85	5.70	6.92	8.43	10.49
42	42.06	52.94	68.58	85.70	34.02	33.16	33.80	37.13
43	30.31	53.15	62.04	75.52	12.69	12.69	13.08	14.72
44	20.62	45.72	97.15	122.46	5.16	8.02	11.47	14.70
45	38.94	37.91	44.12	56.67	30.64	45.55	69.90	91.10
46	6.62	14.30	26.51	34.69	4.07	5.01	6.22	7.69
47	10.01	17.92	27.97	37.32	4.13	10.66	18.12	24.47
48	3.31	12.55	30.85	40.23	2.50	8.50	16.10	22.69
49	3.08	4.43	5.58	7.48	2.77	12.85	24.55	33.59
50	3.67	10.40	20.75	28.36	3.98	85.98	172.44	236.99
JKT	685.00	1,114.80	1,651.90	2,090.29	707.49	1,202.39	1,808.29	2,299.19

Table 4-51 ESTIMATED ALL DAY WORK TRIPS IN DKI JAKARTA

(unit: 1000 person trips)

ZONE NO.	GENERATED				ATTRACTED			
	1980	1990	2000	2010	1980	1990	2000	2010
1	42.06	41.38	43.27	53.51	66.51	143.61	213.25	272.96
2	17.94	24.10	26.75	34.12	23.28	38.28	56.65	72.17
3	28.39	33.95	35.53	43.84	31.48	36.51	44.65	53.27
4	19.42	22.74	22.77	27.72	38.68	38.94	51.60	63.41
5	24.42	33.32	37.76	47.24	35.75	38.87	55.61	71.82
6	33.88	35.29	37.84	47.30	53.70	83.13	109.03	134.12
7	44.04	47.01	49.42	59.03	52.06	60.12	66.78	78.16
8	7.42	8.05	11.06	13.26	7.89	16.87	24.64	31.81
9	1.20	10.38	22.32	28.69	2.46	2.47	2.46	2.76
10	1.01	7.78	16.10	20.79	1.17	1.85	2.51	3.28
11	34.38	63.23	92.59	116.91	42.51	41.61	39.29	42.99
12	6.92	6.11	2.75	3.50	14.45	13.22	13.41	13.68
13	6.56	14.36	7.48	8.62	5.90	8.21	10.37	13.57
14	7.99	18.49	49.62	64.30	19.47	25.04	45.42	57.88
15	10.85	26.00	21.81	25.12	11.13	16.51	21.73	28.57
16	9.72	8.44	3.93	5.15	22.61	33.84	45.91	55.70
17	4.67	5.55	2.11	2.69	8.00	33.52	64.99	84.92
18	6.62	13.32	20.41	26.98	6.45	48.00	87.62	125.24
19	6.64	10.24	24.59	31.98	4.05	7.68	11.24	14.86
20	6.85	11.96	17.55	23.91	7.29	37.10	64.63	88.02
21	0.37	6.71	28.43	36.56	0.61	2.62	5.05	7.96
22	4.54	13.01	26.46	34.63	4.96	10.86	16.74	22.65
23	3.59	13.06	26.47	37.53	2.49	18.38	27.67	43.94
24	9.16	27.33	46.19	59.38	6.13	10.97	15.92	21.98
25	39.36	40.78	44.38	54.67	37.04	49.56	59.69	71.36
26	31.73	34.44	41.57	49.55	29.42	44.00	55.42	68.84
27	53.93	61.61	73.97	89.66	51.99	52.83	53.01	59.95
28	19.58	26.01	24.56	30.90	25.96	30.28	43.80	52.92
29	18.38	35.32	22.10	27.72	16.24	20.81	24.82	31.71
30	10.80	44.12	91.76	118.74	10.67	14.44	18.01	22.67
31	10.75	36.02	65.99	83.50	9.46	11.96	14.22	17.80
32	43.22	63.30	72.34	86.16	31.06	32.47	33.00	38.29
33	30.77	38.62	39.44	49.56	27.20	44.50	67.13	84.41
34	31.46	47.42	58.03	73.54	38.03	43.46	46.17	57.45
35	20.26	46.39	76.90	101.15	15.18	20.06	24.61	31.10
36	1.78	15.64	33.47	43.93	1.42	4.38	7.90	12.43
37	60.95	66.09	74.35	92.95	73.80	106.48	134.36	163.55
38	15.07	35.96	57.03	72.89	15.07	24.17	33.12	43.64
39	11.04	36.46	63.87	81.95	7.41	10.24	12.89	16.80
40	9.41	25.86	42.14	55.51	7.69	11.35	14.70	19.25
41	16.89	35.91	33.08	38.92	13.81	16.71	19.07	23.83
42	58.45	76.94	93.52	117.22	48.31	46.77	44.56	49.34
43	33.44	61.33	67.16	82.00	31.03	30.56	29.92	35.82
44	27.80	64.46	128.48	162.45	13.17	20.38	27.34	35.20
45	42.17	49.13	53.78	69.29	38.15	56.46	74.30	90.07
46	9.65	21.75	37.83	49.65	6.45	7.89	9.19	11.29
47	10.47	19.60	28.71	38.43	8.36	21.49	34.26	46.48
48	3.81	15.13	34.90	45.65	3.23	10.91	19.38	28.62
49	4.58	6.90	8.15	10.96	4.59	21.20	37.98	50.62
50	4.32	12.83	24.01	32.99	4.11	118.07	222.10	306.56
JKT	958.86	1,520.05	2,064.78	2,612.79	1,019.10	1,639.68	2,260.34	2,873.96

Table 4-52 ESTIMATED PEAK 2-HOUR WORK TRIPS IN DKI JAKARTA

(unit: 1000 person trips)

ZONE NO.	GENERATED				ATTRACTED			
	1980	1990	2000	2010	1980	1990	2000	2010
1	18.78	18.31	20.30	25.03	47.94	105.48	167.31	213.34
2	7.76	10.32	12.15	15.45	11.03	18.49	29.23	37.10
3	13.04	15.45	17.15	21.09	15.62	18.46	24.12	28.67
4	11.85	13.74	14.60	17.71	14.27	19.75	27.96	34.22
5	12.11	16.37	19.67	24.53	21.34	32.41	50.17	64.56
6	13.21	13.63	15.50	19.37	28.09	44.32	62.10	76.10
7	25.14	26.58	29.64	35.28	18.47	21.73	25.79	30.07
8	0.93	1.00	1.47	1.75	7.04	15.33	23.92	30.76
9	0.28	2.42	5.53	7.09	2.06	2.11	2.24	2.51
10	0.50	3.82	8.38	10.79	0.80	1.29	1.87	2.43
11	19.24	35.13	54.44	68.66	22.60	22.03	22.22	24.22
12	2.89	2.53	1.21	1.53	8.75	8.15	8.83	8.96
13	3.94	8.55	4.72	5.42	1.53	2.17	2.99	3.82
14	2.87	6.57	18.70	24.16	12.26	16.07	31.15	39.53
15	4.99	11.85	10.54	12.10	3.69	5.58	7.85	10.28
16	2.69	2.31	1.14	1.49	13.93	21.25	30.79	37.21
17	1.90	2.23	0.90	1.14	5.96	25.47	52.73	68.64
18	3.70	7.37	11.98	15.79	4.56	34.56	67.38	95.94
19	2.69	4.10	10.46	13.56	1.80	3.48	5.45	7.18
20	2.33	4.03	6.27	8.52	4.55	23.64	43.98	59.67
21	0.19	3.42	15.38	19.71	0.36	1.59	3.27	5.13
22	3.97	11.27	24.31	31.72	1.44	3.22	5.31	7.16
23	3.40	12.25	26.33	37.22	1.96	14.73	23.69	37.48
24	7.72	22.81	40.89	52.40	2.50	4.56	7.07	9.73
25	17.99	18.47	21.32	26.18	18.75	25.57	32.90	39.19
26	11.73	12.61	16.15	19.19	19.83	30.21	40.65	50.30
27	17.63	19.95	25.40	30.69	22.04	22.83	24.46	27.56
28	8.26	10.87	10.88	13.65	13.52	16.07	24.83	29.88
29	13.90	26.47	17.56	21.96	8.40	10.97	13.97	17.78
30	9.33	37.76	83.29	107.44	1.27	1.76	2.34	2.94
31	9.86	32.74	63.60	80.22	1.56	2.01	2.55	3.18
32	27.33	39.64	48.04	57.04	9.48	10.10	10.96	12.67
33	17.97	22.34	24.19	30.30	18.53	30.90	49.79	62.36
34	11.94	17.83	23.15	29.24	19.89	23.16	27.42	32.57
35	10.56	23.95	42.12	55.22	6.80	9.16	12.01	15.11
36	1.19	10.35	23.51	30.76	0.04	0.14	0.27	0.42
37	18.36	19.72	23.53	29.32	49.46	72.73	96.03	118.87
38	11.18	26.41	44.44	56.61	3.17	5.19	7.60	9.98
39	7.56	24.71	45.92	58.72	1.29	1.82	2.45	3.18
40	6.20	16.86	29.14	38.26	3.19	4.76	6.65	8.67
41	11.42	24.05	23.49	27.55	4.08	5.03	6.13	7.64
42	30.68	40.26	51.90	64.84	25.22	24.94	25.37	27.99
43	21.98	39.93	46.38	56.44	8.60	8.73	9.02	10.15
44	16.57	36.05	60.44	101.37	3.27	5.16	7.39	9.49
45	25.19	29.07	33.75	43.34	21.58	32.55	45.75	55.24
46	5.10	11.40	21.02	27.50	2.80	3.49	4.34	5.31
47	7.92	14.68	22.81	30.43	2.56	6.71	11.43	15.44
48	2.55	10.04	24.56	32.02	2.13	7.34	13.92	20.49
49	2.43	3.63	4.55	6.09	2.36	11.10	21.24	28.20
50	2.71	7.97	15.83	21.64	2.16	63.27	127.13	174.81
JKT	494.09	806.09	1,238.90	1,567.69	524.79	901.79	1,356.19	1,724.39

4.3.2. Estimation of Future OD Tables by mode

The procedure for estimating future modal split is shown in Fig. 4 - 14. . Main stream of the procedure is as follows:

1) Estimate future person trip . by mass transit (Bus and Railway) by using an estimated control total.

2) Estimate person trip by Railway by using an estimated Railway/Mass Transit Ratio.

3) By deducting 2) from 1) above, calculate person trip by Bus, and this is used to calculate person trip OD table by Bus. OD table is obtained by Frator method, by using present pattern.

4) Calculate person trip . by Individual Transit (Motorcycle, Sedan and Truck) by deducting 1) above from estimated person trip by all modes, and then obtain person trip OD table by Individual Transit.

5) Calculate temporary person trip OD table by Motorcycle by using a diversion curve by distance among Individual Transit and distance table for each OD pair.. Then, make the person trip obtained equal to the estimated control total.

6) By deducting 5) from 4) above, calculate person trip OD table for Sedan plus Truck.

7) Person trip OD tables for Bus and Motorcycle are converted to vehicle trip OD tables by using the estimated number of passengers per vehicle, respectively.

This estimation has been made for Morning Peak (7:00 - 9:00) and Off Peak (9:00 - 24:00 - 7:00) individually, and then these two bands have been added to form all Day.

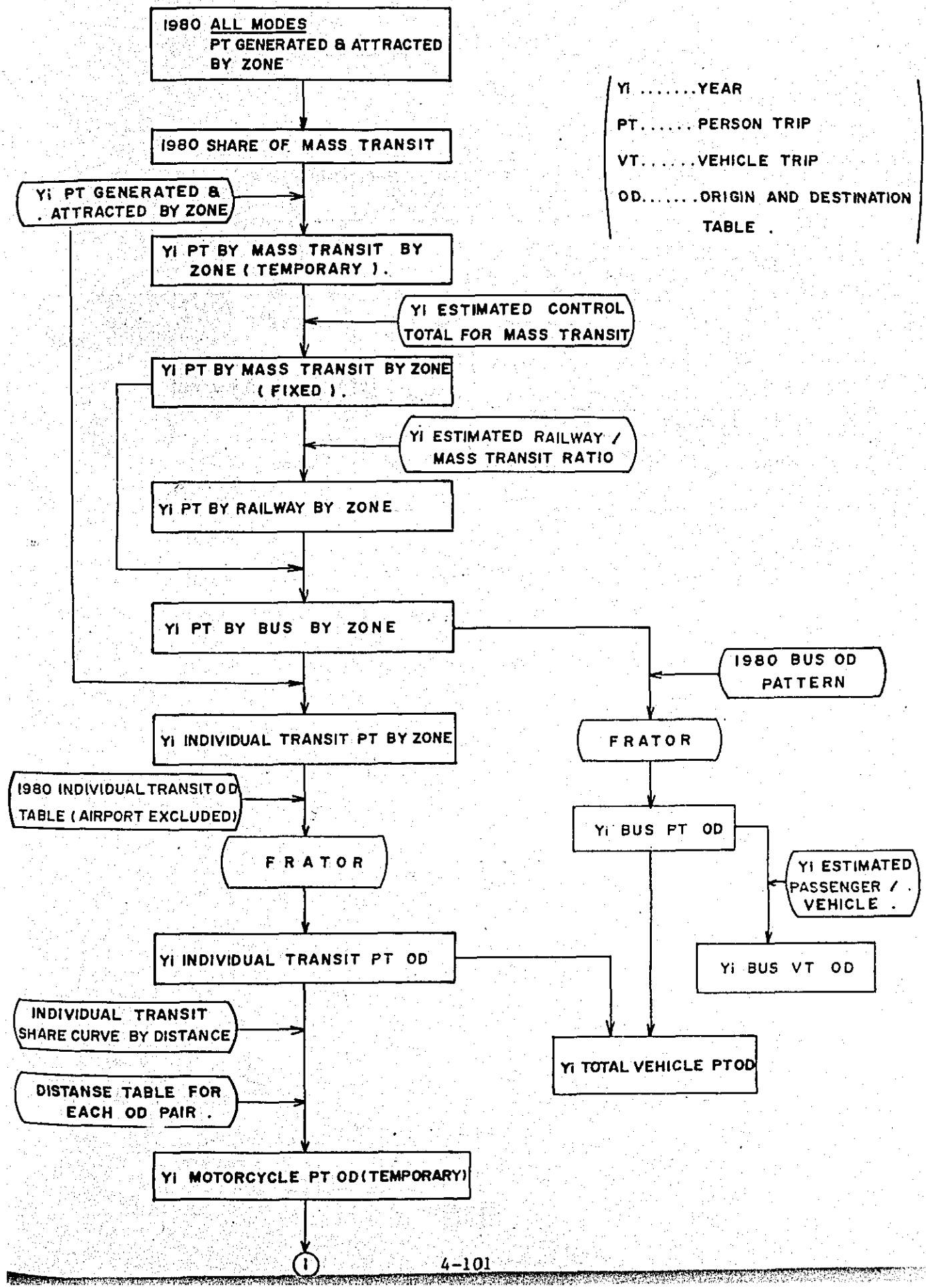
Estimated data for each process are shown in Tables and Figures as follows;

- Yi Estimated Control Total for Mass Transit — Table 4-53
- Yi Estimated Railway/Mass Transit Transit Ratio — Table 4-54
- Diversion curve by Distance among Individual Transit — Figure 4-15
- Yi Estimated Person Trip for Motorcycle — Table 4-55
- Yi Average Occupancy Estimated — Table 4-56

The results of the estimation are shown in Table 4-57 4-61 and Figure 4-16, 4-17.

Fig.4-14

ESTIMATING FLOW FOR FUTURE OD TABLE BY MODE



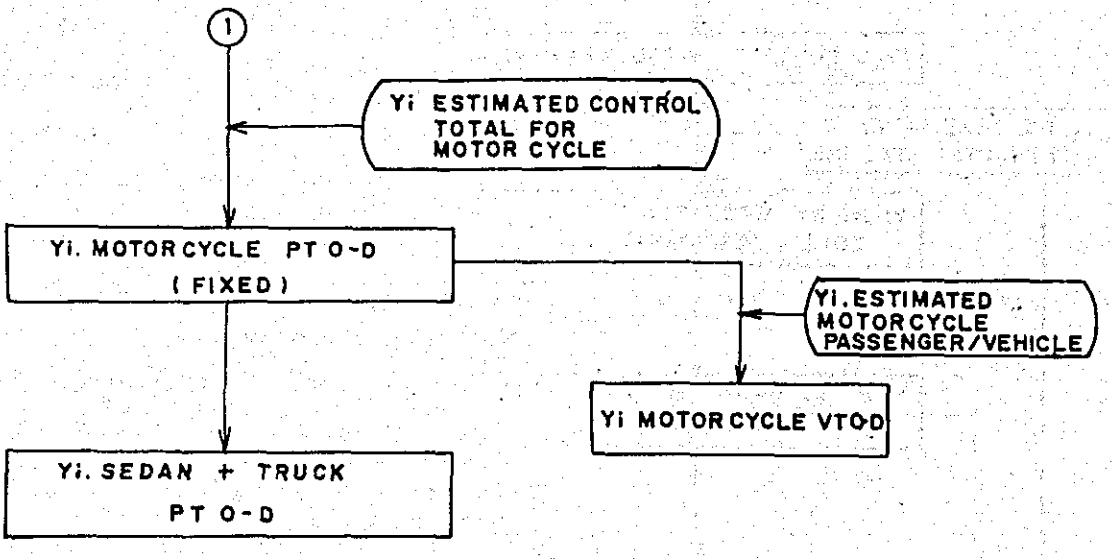

1
Yi ESTIMATED CONTROL TOTAL FOR MOTOR CYCLE
Yi. MOTOR CYCLE PT O-D (FIXED)
Yi. ESTIMATED MOTOR CYCLE PASSENGER/VEHICLE
Yi MOTOR CYCLE VTO-D
Yi. SEDAN + TRUCK PT O-D

Table 4-53 PASSENGERS ESTIMATED FOR MASS TRANSIT

Unit : trips

		1990		2000		2010	
		G	A	G	A	G	A
Peak Hours	JKT	668,900	1,073,700	1,175,400	1,463,200	1,609,400	
	Outside JKT	128,300	204,500	102,800	284,700	138,500	
Off Peak	JKT	2,871,300	4,116,600	4,014,900	5,669,800	5,523,600	
	Outside JKT	633,900	885,500	987,200	1,229,600	1,375,800	

Note : G - - - - - Generated

A - - - - - Attracted

Table 4-54 TEMPORARY WEIGHTING FACTOR FOR RAILWAY RATIO OVER MASS TRANSIT

	1990		2000		2010	
RANKING	DKI JAKARTA	OUTSIDE DKI JAKARTA	DKI JAKARTA	OUTSIDE DKI JAKARTA	DKI JAKARTA	OUTSIDE DKI JAKARTA
I	0.35	0.60	0.55	0.80	0.55	0.80
II	0.30	0.50	0.40	0.70	0.40	0.70
III	0.10	0.15	0.15	0.50	0.15	0.50
IV	0.05	0.05	0.10	0.10	0.10	0.10

RANKING OF ZONES FOR RAILWAY

Rank	DKI JKT (1-50)	Outside of DKI JKT (51 - 80)
I	1,4,6,7,8,12,13,28,29, 30,41.	68,70,71,56,55,62,63,58,59, 65,51.
II	2,3,10,11,22,23,24,27,32,33,34, 35,36,38,39,42,49,50.	67,60 54,52.
III	5,9,10,11,22,23,24,27,32,33,34, 35,36,38,39,42,49,50.	57. 53. 61. 69. 64. 66.72. 73.
IV	17,18,19,20,21,25,26 31,37,40,45,46,47,48.	74,75,76,77,78,79,80.

Fig. 4-15 DIVERSION CURVE BETWEEN MOTORCYCLE AND SEDAN / TRUCK (BY DISTANCE) .

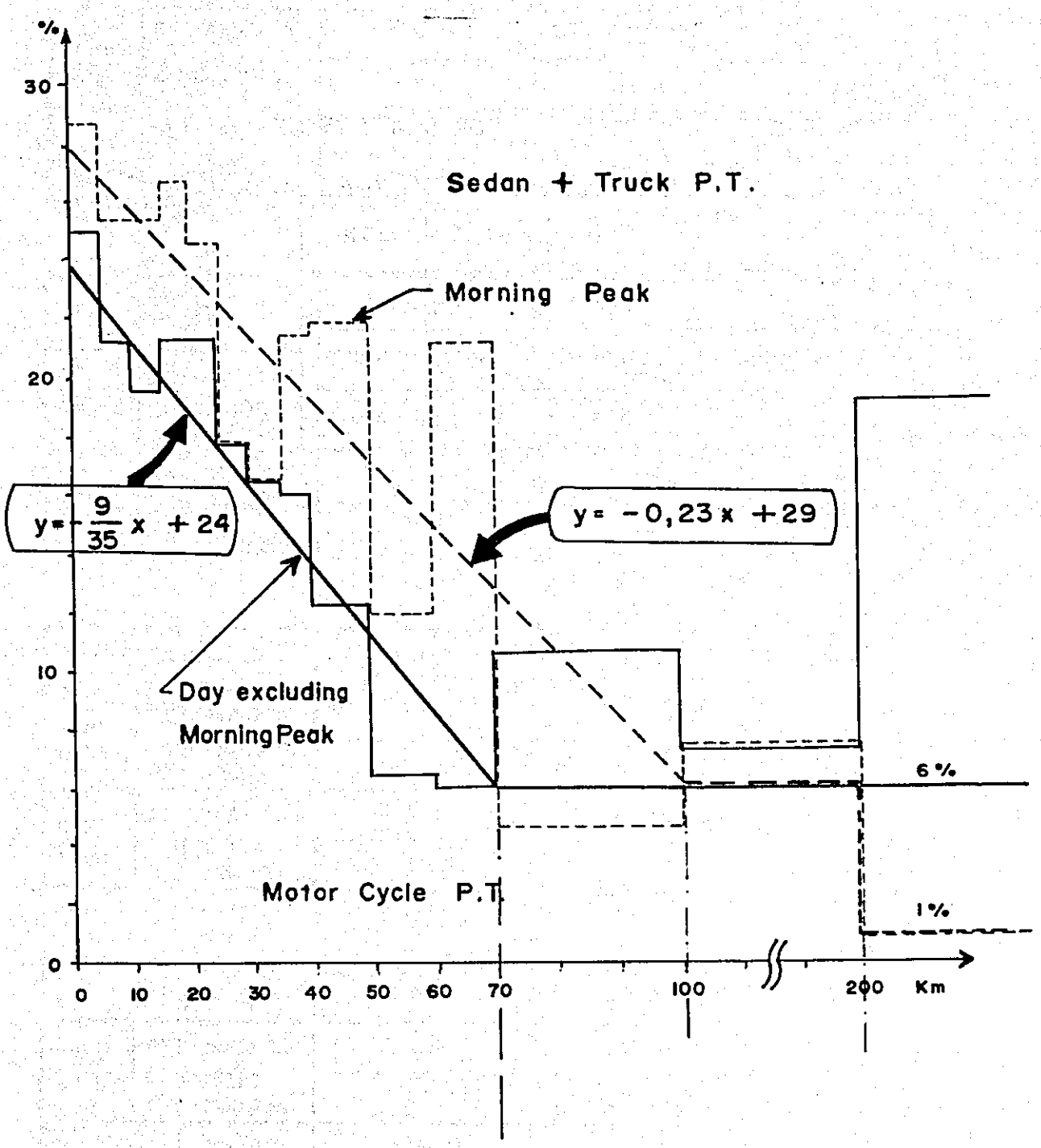


Table 4-55

ESTIMATED PERSON TRIP FOR MOTORCYCLE

(Unit : 1000 trips)

	1990	2000	2010
Peak	94.3	105.8	114.6
Off Peak	478.8	495.4	511.9
All Day	573.1	601.2	626.5

Table 4-56 AVERAGE OCCUPANCY ESTIMATED

Unit: Person/vehicle

MOTORCYCLE		1990	2000	2010
PEAK HOURS	DKI JAKARTA	1.30	1.30	1.30
	OUTSIDE DKI JAKARTA	1.30	1.30	1.30
OFF PEAK	DKI JAKARTA	1.40	1.40	1.40
	OUTSIDE DKI JAKARTA	1.40	1.40	1.40

SEDAN		1990	2000	2010
PEAK HOURS	DKI JAKARTA	2.35	2.30	2.30
	OUTSIDE DKI JAKARTA	2.55	2.50	2.50
OFF PEAK	DKI JAKARTA	2.45	2.40	2.40
	OUTSIDE DKI JAKARTA	2.70	2.60	2.60

TRUCK		1990	2000	2010
PEAK HOURS	DKI JAKARTA	3.50	3.00	3.00
	OUTSIDE DKI JAKARTA	3.50	3.00	3.00
OFF PEAK	DKI JAKARTA	3.75	2.50	2.50
	OUTSIDE DKI JAKARTA	3.25	3.00	3.00

B U S		1990	2000	2010
PEAK HOURS	DKI JAKARTA	17.50	20.00	20.00
	OUTSIDE DKI JAKARTA	17.00	18.00	18.00
OFF PEAK	DKI JAKARTA	15.00	17.00	17.00
	OUTSIDE DKI JAKARTA	15.00	18.00	18.00

Note : Peak = Morning Peak Hours (7.00 - 9.00)

Off Peak = The Other Hours.

Table 4-57.

ESTIMATED FUTURE PERSON TRIPS

Unit: Thousand person trips

	1990		2000		2010	
	MORNING PEAK	ALL DAY	MORNING PEAK	ALL DAY	MORNING PEAK	ALL DAY
MOTORCYCLE	94.3	573.3	105.8	599.3	114.6	626.6
SEDAN + TRUCK	420.4	2733.4	561.0	3329.1	613.1	3725.4
BUS	632.2	3659.1	886.3	4709.6	1210.2	6482.1
RAILWAY	164.5	641.8	391.1	1568.6	536.6	2162.4
T O T A L	1311.4	7607.6	1944.2	10206.4	2474.5	12996.5

Table 4-58.

ESTIMATED FUTURE PERSON TRIPS IN JAKARTA .

Unit : Thousand Person trips/2hours

MORNING PEAK	1990		2000		2010	
	Generated	Attracted	Generated	Attracted	Generated	Attracted
MOTORCYCLE	83.5	89.6	94.0	102.2	101.9	111.1
SEDAN + TRUCK	362.1	391.2	484.8	531.7	529.8	583.1
BUS	568.5	577.2	805.2	822.9	1097.4	1126.6
RAILWAY	100.3	144.3	268.4	352.6	365.8	482.8
TOTAL	1114.4	1202.3	1652.4	1809.4	2094.9	2303.6

Unit : Thousand person trips/24hours

ALL DAY	1990		2000		2010	
	Generated	Attracted	Generated	Attracted	Generated	Attracted
MOTORCYCLE	519.9	519.6	546.2	546.0	572.5	572.3
SEDAN + TRUCK	2376.4	2376.6	2914.7	2915.1	3273.2	3272.6
BUS	3152.5	3114.4	4098.2	4035.2	5632.7	5546.1
RAILWAY	387.4	426.2	1091.7	1155.6	1499.8	1587.5
TOTAL	6436.2	6436.8	8650.8	8651.9	10978.2	10978.5

Table 4-59 ESTIMATED FUTURE PERSON TRIP-YEAR (1990)

Unit : Person Trips/2 Hours

Morning Peak		DKI		BOTABEK		OTHERS		TOTAL	
		VOLUME	%	VOLUME	%	VOLUME	%	VOLUME	%
DKI	Motor Cycle	78.9	8.5	4.6	5.6	0.1	1.6	83.5	8.2
	Sedan + Truck	333.1	36.0	24.1	29.2	4.9	79.0	362.1	35.7
	Bus	513.6	55.5	53.8	62.2	1.2	19.4	568.5	56.1
	TOTAL	925.6	100.0	82.5	100.0	6.2	100.0	1014.1	100.0
BOTABEK	Motor Cycle	10.6	8.4	0.0	0.0	0.0	-	10.6	8.4
	Sedan + Truk	54.9	43.6	0.2	100.0	0.0	-	55.1	43.7
	Bus	60.4	48.0	0.0	0.0	0.0	-	60.4	47.9
	TOTAL	125.9	100.0	0.2	100.0	0.0	-	126.1	100.0
OTHERS	Motor Cycle	0.1	1.5	0.0	0.0	0.0	-	0.1	1.5
	Sedan + Truk	3.2	49.2	0.1	100.0	0.0	-	3.3	50.0
	Bus	3.2	49.2	0.0	0.0	0.0	-	3.2	48.5
	TOTAL	6.5	100.0	0.1	100.0	0.0	-	6.6	100.0
TOTAL	Motor Cycle	89.6	8.5	4.6	5.5	0.1	1.6	94.3	8.2
	Sedan + Truck	391.2	37.0	24.4	29.5	4.9	79.0	420.5	36.7
	Bus	577.2	54.5	53.8	65.0	1.2	19.4	632.2	55.1
	TOTAL	1058.0	100.0	82.8	100.0	6.2	100.0	1147.0	100.0

Excluding Railway

Unit : Person Trips / 24 Hours

All Day		DKI		BOTABEK		OTHERS		TOTAL	
		VOLUME	%	VOLUME	%	VOLUME	%	VOLUME	%
DKI	Motor Cycle	476.1	9.2	41.3	5.4	2.5	2.4	519.9	8.6
	Sedan + Truck	2095.1	40.4	235.5	30.7	45.7	44.5	2376.4	39.3
	Bus	2607.9	50.4	490.1	63.9	54.6	53.1	3152.5	52.1
	TOTAL.	5179.1	100.0	766.9	100.0	102.8	100.0	6048.8	100.0
BOTABEK	Motor Cycle	41.2	5.6	8.5	14.2	0.4	5.3	50.1	6.2
	Sedan + Truck	239.8	32.5	51.4	85.8	7.2	94.7	298.4	37.1
	Bus	456.0	61.9	0.0	0.0	0.0	0.0	456.0	56.7
	TOTAL	737.0	100.0	59.9	100.0	7.6	100.0	804.5	100.0
OTHERS	Motor Cycle.	2.3	2.4	1.0	5.9	0.1	8.3	3.3	2.9
	Sedan + Truck	41.7	44.1	15.9	94.1	1.1	91.7	58.6	52.1
	Bus	50.5	53.5	0.0	0.0	0.0	0.0	50.6	45.0
	TOTAL	94.5	100.0	16.9	100.0	1.2	100.0	112.5	100.0
TOTAL	Motor Cycle	519.6	8.6	50.7	6.0	3.0	2.7	573.3	8.2
	Sedan + Truck	2376.6	39.6	302.8	35.9	54.0	48.4	2733.4	39.3
	Bus	3114.4	51.8	490.1	58.1	54.6	48.9	3659.1	52.5
	TOTAL	6010.6	100.0	843.6	100.0	111.6	100.0	6965.8	100.0

Excluding Railway

Unit : Person Trips/2 Hours

Morning Peak		DKI		BOTABEK		OTHERS		TOTAL	
		VOLUME	%	VOLUME	%	VOLUME	%	VOLUME	%
DKI	Motor Cycle	90.4	7.0	3.4	3.9	0.2	2.1	94.0	6.8
	Sedan + Truck	455.8	35.4	21.5	24.9	7.5	77.3	484.8	35.0
	Bus	741.8	57.6	61.5	71.2	2.0	20.6	805.2	58.2
	TOTAL	1288.0	100.0	86.4	100.0	9.7	100.0	1384.0	100.0
BOTABEK	Motor Cycle	11.6	7.3	0.0	0.0	0.0	0.0	11.6	7.3
	Sedan + Truk	71.1	44.9	0.2	100.0	0.0	0.0	71.3	44.9
	Bus	75.8	47.8	0.0	0.0	75.8	100.0	75.8	47.8
	TOTAL	158.5	100.0	0.2	100.0	75.8	100.0	158.7	100.0
OTHERS	Motor Cycle	0.2	1.9	0.0	0.0	0.0	0.0	0.2	1.9
	Sedan + Truk	4.8	46.6	1.0	100.0	0.0	0.0	4.9	47.0
	Bus	5.3	51.5	0.0	0.0	5.3	100.0	5.3	51.0
	TOTAL	10.3	100.0	1.0	100.0	5.3	100.0	10.4	100.0
TOTAL	Motor Cycle	102.2	7.0	3.5	4.0	0.2	0.0	105.8	6.8
	Sedan + Truck	531.7	36.5	21.8	25.1	7.5	0.8	561.0	36.1
	Bus	822.9	56.5	61.5	70.9	886.3	99.2	886.3	57.1
	TOTAL	1456.8	100.0	86.8	100.0	894.0	100.0	1553.1	100.0

Excluding Railway

Unit : Person Trips / 24 Hours

All Day		DKI		BOTABEK		OTHERS		TOTAL	
		VOLUME	%	VOLUME	%	VOLUME	%	VOLUME	%
DKI	Motor Cycle	501.8	7.7	41.8	4.6	2.6	1.9	546.2	7.2
	Sedan + Truck	2584.8	39.7	272.3	29.8	57.6	42.5	2914.7	38.6
	Bus	3423.7	52.6	599.0	65.6	75.4	55.6	4098.2	54.2
	TOTAL	6510.3	100.0	913.1	100.0	135.6	100.0	7559.1	100.0
BOTABEK	Motor Cycle	41.8	4.8	7.5	12.0	0.4	4.7	49.7	5.3
	Sedan + Truck	277.8	32.3	55.2	88.0	8.2	95.3	341.2	36.6
	Bus	541.0	62.9	0.0	0.0	0.0	0.0	541.0	58.1
	TOTAL	860.6	100.0	62.7	100.0	8.6	100.0	931.9	100.0
OTHERS	Motor Cycle	2.4	1.9	1.0	5.0	0.1	6.7	3.4	2.3
	Sedan + Truck	52.5	41.9	19.2	95.0	1.4	93.3	73.2	49.8
	Bus	70.4	56.2	0.0	0.0	0.0	0.0	70.4	47.9
	TOTAL	125.3	100.0	20.2	100.0	1.5	100.0	147.0	100.0
TOTAL	Motor Cycle	546.0	7.3	50.3	5.0	3.0	2.1	599.3	6.9
	Sedan + Truck	2915.1	38.9	346.7	34.8	67.2	46.1	3329.1	38.6
	Bus	4035.2	53.8	599.1	60.2	75.4	51.8	4709.6	54.5
	TOTAL	7496.3	100.0	996.1	100.0	145.6	100.0	8638.0	100.0

Excluding Railway

Table 4-61. ESTIMATED FUTURE PERSON TRIP-YEAR (2010)

Unit : Person Trips/2 Hours

Morning Peak		DKI		BOTABEK		OTHERS		TOTAL	
		VOLUME	%	VOLUME	%	VOLUME	%	VOLUME	%
DKI	MotorCycle	98.4	6.1	3.3	3.2	0.2	1.6	101.9	5.9
	Sedan+Truck	500.1	31.0	20.4	19.5	9.3	76.2	529.8	30.6
	Bus	1013.8	62.9	80.9	77.3	2.7	22.1	1097.4	63.5
	TOTAL	1612.3	100.0	104.6	100.0	12.2	100.0	1729.1	100.0
BOTABEK	MotorCycle	12.6	6.4	0.0	0.0	0.0	-	12.6	6.5
	Sedan + Truk	77.4	39.6	0.2	100.0	0.0	-	77.6	39.6
	Bus	105.6	54.0	0.0	0.0	0.0	-	105.6	53.9
	TOTAL	195.6	100.0	0.2	100.0	0.0	-	195.8	100.0
OTHERS	MotorCycle	0.2	1.5	0.0	0.0	0.0	-	0.2	1.5
	Sedan + Truk	5.6	42.8	0.1	100.0	0.0	-	5.7	43.2
	Bus	7.3	55.7	0.0	0.0	0.0	-	7.3	55.3
	TOTAL	13.1	100.0	0.1	100.0	0.0	-	13.2	100.0
TOTAL	MotorCycle	111.1	6.1	3.3	3.2	0.2	1.6	114.6	5.9
	Sedan + Truck	583.1	32.0	20.7	19.7	9.3	76.2	613.1	31.6
	Bus	1126.6	61.9	80.9	77.1	2.7	22.2	1210.2	62.5
	TOTAL	1820.8	100.0	104.9	100.0	12.2	100.0	1937.9	100.0

Excluding Railway

Unit : Person Trips / 24 Hours

All Day		DKI		BOTABEK		OTHERS		TOTAL	
		VOLUME	%	VOLUME	%	VOLUME	%	VOLUME	%
DKI	Motor Cycle	527.5	6.5	42.0	3.6	3.1	1.8	572.5	6.1
	Sedan + Truck	2909.8	35.8	294.8	25.2	68.5	38.8	3273.2	34.5
	Bus	4696.7	57.7	830.9	71.2	105.0	59.4	5632.7	59.4
	TOTAL	8134.0	100.0	1167.7	100.0	176.6	100.0	9478.4	100.0
BOTABEK	Motor Cycle	41.9	3.8	7.6	12.0	0.4	4.1	50.0	4.3
	Sedan + Truck	298.8	27.4	55.5	88.0	9.3	95.9	363.6	31.2
	Bus	751.9	68.8	0.0	0.0	0.0	0.0	751.9	64.5
	TOTAL	1092.6	100.0	63.1	100.0	9.7	100.0	1165.5	100.0
OTHERS	Motor Cycle	2.9	1.8	1.2	5.0	0.1	5.3	4.1	2.2
	Sedan + Truck	64.0	38.9	22.9	95.0	1.8	94.7	88.7	46.6
	Bus	97.5	59.3	0.0	0.0	0.0	0.0	97.5	51.2
	TOTAL	164.4	100.0	24.1	100.0	1.9	100.0	190.3	100.0
TOTAL	Motor Cycle	572.3	6.1	50.7	4.1	3.6	1.9	626.6	5.8
	Sedan + Truck	3272.6	34.8	373.2	29.7	79.6	42.3	3725.4	34.4
	Bus	5546.1	59.1	831.0	66.2	105.0	55.8	6482.1	59.8
	TOTAL	9391.0	100.0	1254.9	100.0	188.2	100.0	10834.1	100.0

Excluding Railway

Fig.4-16 **PASSENGER DESIRE LINE IN 2000 BY ALL MODES IN ALL DAY**

(EXCLUDING RAILWAY)

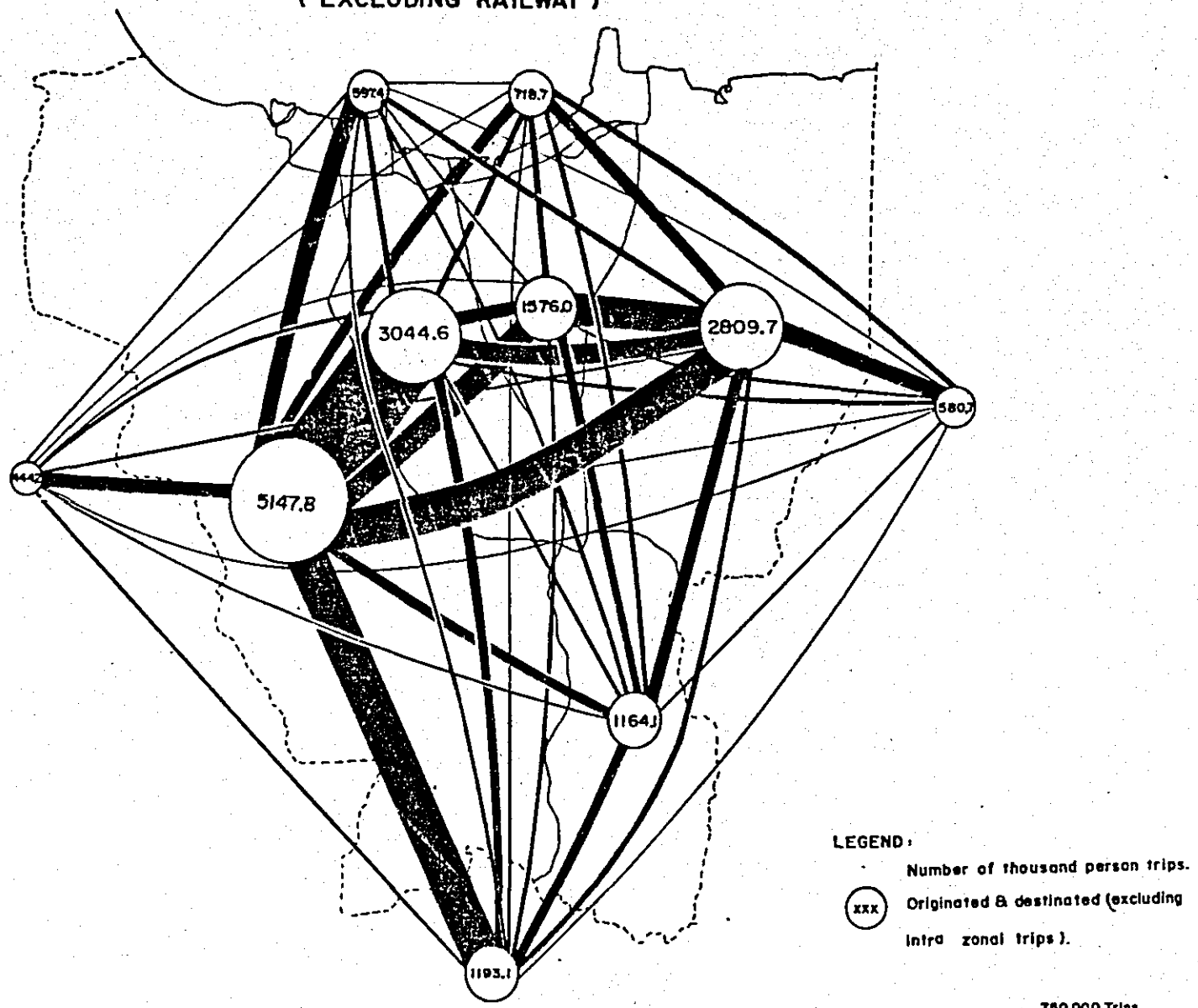


Fig.4-17 PASSENGER DESIRE LINE IN 2000 BY ALL MODES IN MORNING PEAK
(EXCLUDING RAILWAY)