REPUBLIC OF THE PHILIPPINES

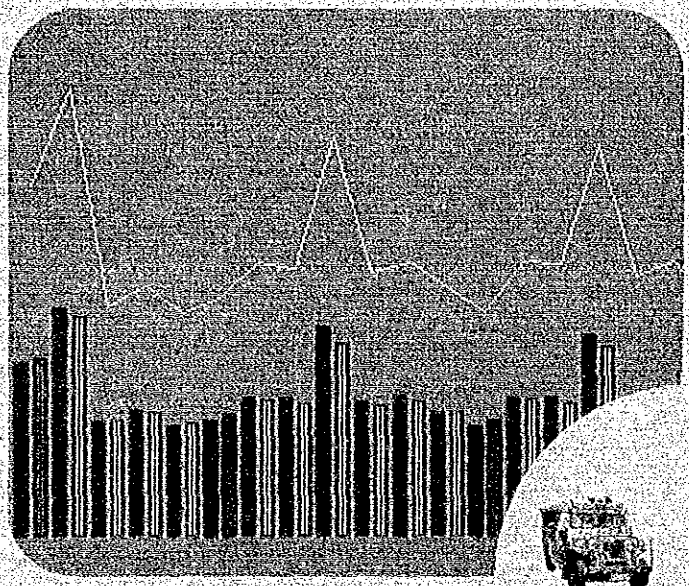
No. 51

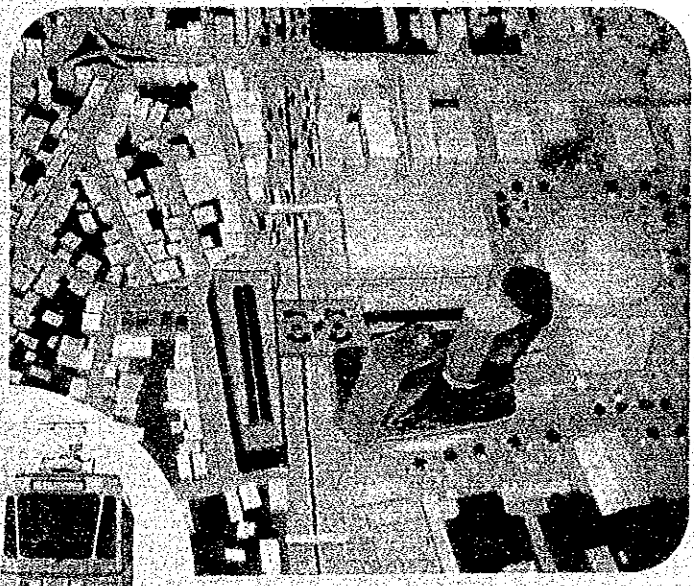
JUMSTP

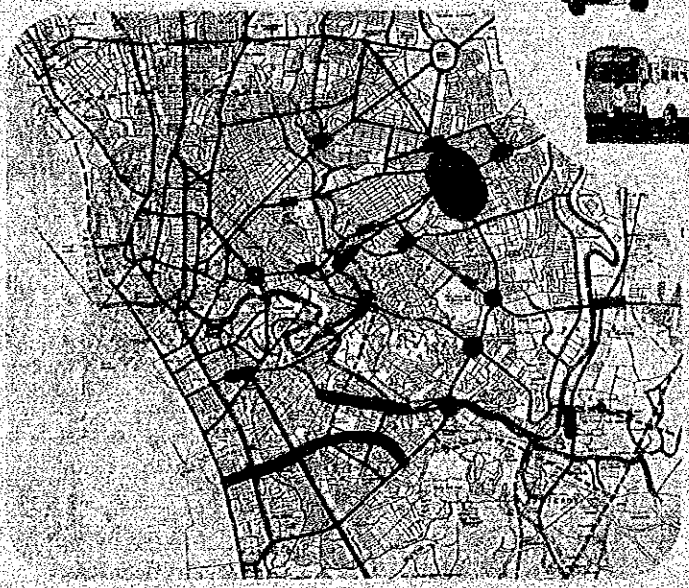
The Metro Manila Transportation Planning Study Phase II Final Report

TECHNICAL REPORT

Public Transportation Route Structure Improvement Study







SEPTEMBER 1985

JAPAN INTERNATIONAL COOPERATION AGENCY

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1.0 STUDY FRAMEWORK

1.1 OBJECTIVES

Traffic problems in Metro Manila have been addressed by various government agencies such as TEAM-MPWH, CHPG, MOTC, and MMC. The recently-completed MMUTSTRAP B1 Study summarized many of their activities and presented a number of recommendations. JUMSUT II reviewed and refined the existing proposals and developed additional ones - with particular regard to the role and characteristics of public transportation in Metro Manila - both on the short-term and mid-term viewpoints.

The study examined the short-term and mid-term opportunities for improving the routes of public transport. A number of factors causing traffic congestion were, likewise, analyzed in order to evaluate the validity of alternative rerouting plans.

The study aims to:

a) Assist in the partial relief of traffic congestion by:

- recommending localized route modifications in and around congested terminal/turning points and other traffic generating sources such as markets, schools, etc.;

- recommending the rerouting of jeepneys to alternative less-congested roads;

b) Improve public transportation service by:

- recommending the expansion of public transport coverage in areas where service is currently deficient;

- recommending minor and major facilities in relation to the proposed rerouting;

c) Facilitate management and control of public transportation routes by:

- recommending possible integration of similar routes or simplifying the route structure;

d) Strengthen the public transportation route structure vis-a-vis the following impacts:

- improvement/construction of transportation facilities inclusive of C-3/R-10, LRT and PNR;

- possible land use deveploments and resultant change in urban structure;

- new government policies such as the entry limitation of provincial jeepneys to Metro Manila and defining maximum length for jeepney routes;

e) Optimize the utilization of limited road space by:

- re-engineering the modal split between public and private transportation, and jeepney and bus;

- developing new public transportation routes for new roads, including C-3 and R-10.

1.2 STUDY AREA

The study area is the entire Metro Manila for macroscopic analyses of the network, and the central-eastern part for detailed planning, as shown in Figure 1.1.

The primary road system for the detailed planning phase is predefined by radial and circumferential roads. These are:

Radial Roads	:	España/Quezon Ave./D. M. Marcos Avenue E. Rodriguez R. Magsaysay/Aurora Boulevard Ortigas Avenue Shaw Boulevard J. P. Rizal Buendia
Circumferential Roads	:	C-2 C-4 (EDSA) C-3 (partially existing)

1.3 APPROACH

Because of the existence of a number of past studies on Metro Manila's transportation problems, JUMSUT II took a practical approach (shown in Figure 1.2) which built on the former.

a) Short-term Approach. All existing studies relevant to JUMSUT II's objectives were reviewed; their findings and proposals were summarized and listed as a springboard for further analysis. The problems were subsequently categorized in terms of physical location and nature of the problems, for which surveys were conducted before coming out with plans and proposals.

Those areas which probably cannot be dealt with in a short time due to financial, physical, or political constraints, are deferred into the mid-term planning.

b) Mid-term Approach. This looks at the public transportation aspects from the developmental scenario of continuous improvements and adjustments in the light of:

- changing public transportation demand characteristics;
- standardizing public transportation service level by area and corridor;
- demand/supply gaps as a result of additions to road traffic and network.

The time horizon taken into acount for this task is the year 1990, when several other major transportation investments are expected to be completed.

The outputs of the study area are as follows:

Short-term Proposals :

a) Proposals and plans for the identified problem areas in the central-eastern part of Metro Manila.

b) Proposed route list for regulatory use which reflects the above plans.

c) Investments, if any, required to support the above rerouting plans.

Mid-term Proposals :

a) Proposals in relation to the jeepney and bus route structure.

b) Proposed investments for the improvement of public transportation services.

The study was carried out in close coordination with LTPD/MOTC and other government agencies. The plans pertaining to the rerouting of jeepneys were screened, refined, and extensively discussed due to their controversial nature. Some of them have already been implemented.

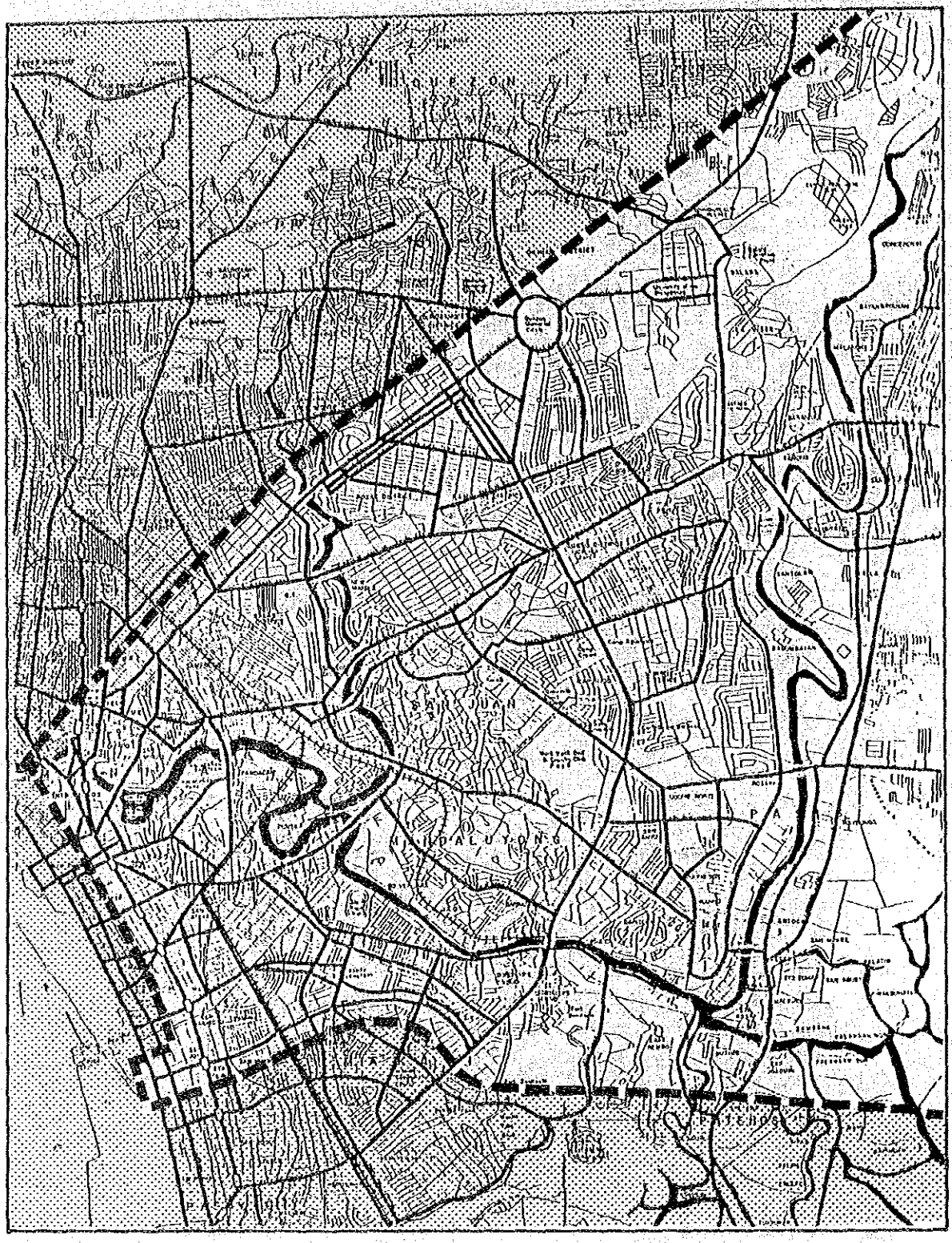
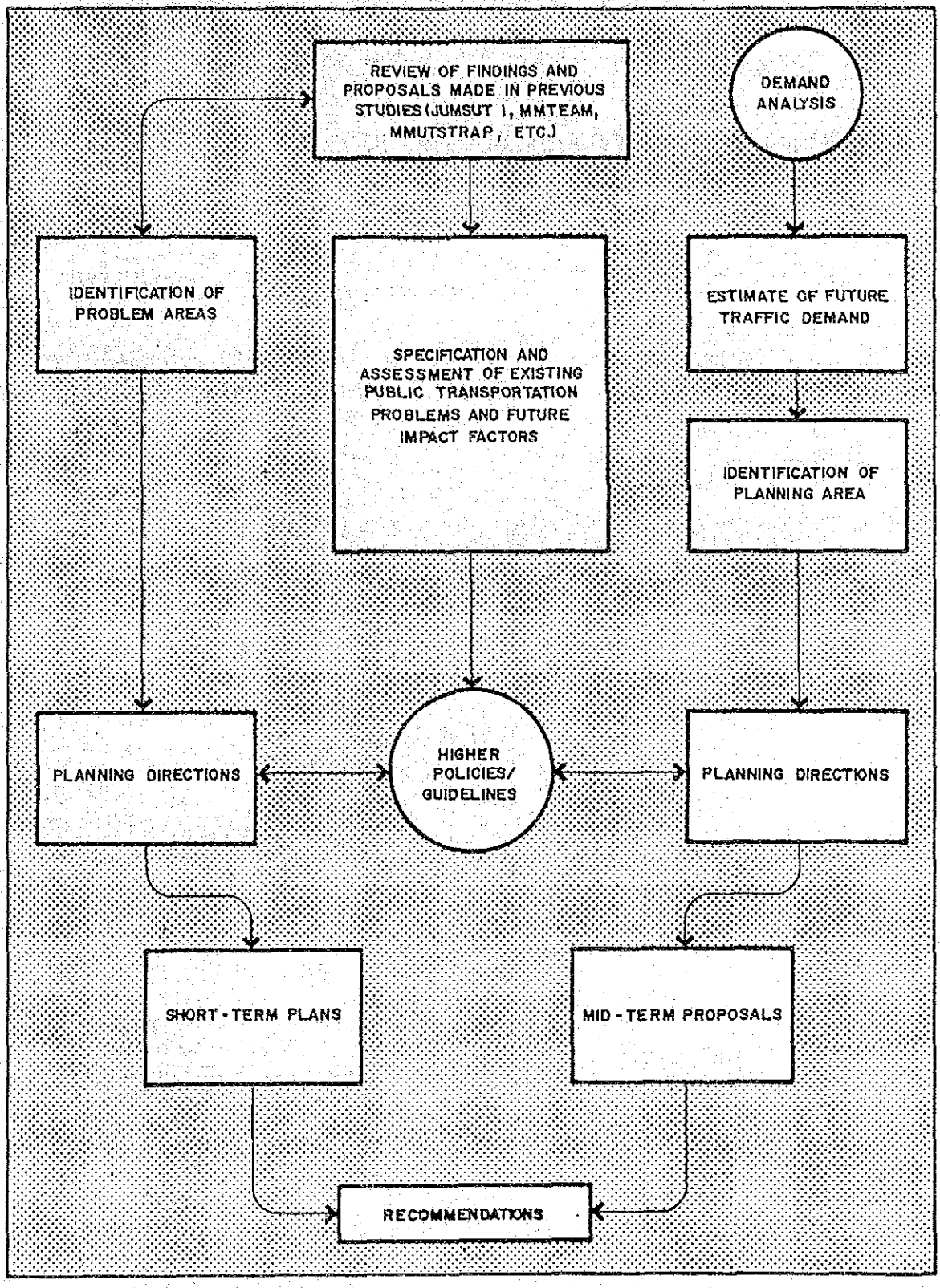


Figure 1.1
Study Area for Public Transportation Planning Study

Figure 1.2
Framework for Public Transportation Route Improvement Study



2.0 PUBLIC TRANSPORTATION OVERVIEW

2.1 SUPPLY CHARACTERISTICS

2.1.1 Road System and Traffic

The total length of the Metro Manila road system is around 4,078 kilometers (excluding private road). In terms of administrative classification, these roads are divided into national (754 kilometers or 19%), provincial (164 kilometers or 4%), city (1,417 kilometers or 35%), municipal (502 kilometers or 12%), and barangay (1,241 kilometers or 30%). Table 2.1 gives a status of major radial and circumferential roads.

Table 2.1
Current Status of Radial/Circumferential Roads

Major Road	Planned		Existing		Status of the Remaining Sections 2/
	Length (Km)	No.of Lanes 1/	Length (Km)	No.of Lanes 1/	
R-1 Roxas Boulevard	16	D6	9	D6	Being designed
R-2 Taft Ave., Quirino Ave.	6	-	6	4-D6	Completed
R-3 South Superhighway	24	-	26	D6	Completed
R-4 Imelda Ave., Mercedes Street	11	4	5	2	D/D completed (partially)
R-5 Shaw Boulevard	11	4	8	4	Under planning
R-5A Ortigas Avenue	9	4 partly 2	9	2-4	Under planning
R-6 R. Magsaysay Blvd. Aurora Blvd.	16	6-8	16	4-D6	-
R-7 España, Quezon Ave., Don Marcos Ave.	17	6-10	17	D4-6	-
R-8 Andalucia, Dimasalang	16	4-D4	16	2-D4	Under planning
R-9 J.A. Santos, Rizal Ave. Ext., McArthur Hwy.	14	4	14	2-6	-
R-10 not existing	13	4-6	-	-	D/D completed, partly under construction
C-1 C.M. Recto	7	4-8	7	2-8	Under planning
C-2 Pres. Quirino Ave. A. Mendoza, Tayuman	10	6	19	2-6	D/D completed
C-3 5th Ave., Sgt. Rivera St., G. Araneta Ave., Buendia	18	6	10	2-6	D/D completed
C-4 EDSA, Samson Road	27	D10	24	2-D10	Implementation being awaited
C-5 Rodriguez Ave. Katipunan	38	6	12	2	F/S partly completed
C-6 not existing	49	6	-	-	Under planning

Source: Available Study Reports and Plans.

1/ Figures with "D" means number of lanes divided
2/ D/D: detailed design, F/S: feasibility study

The level of vehicular traffic on these roads is estimated at 16.2 million vehicle-kilometers per day broken down in Table 2.2. Most of these traffic (67.5%) is composed of private vehicles (car, taxi,truck), while the rest (32.5%) are buses and jeepneys. In terms of passenger demand, the ratios are 74.4% for public transport mode and 25.6% for private transport mode. It can be concluded therefore that available road spaces are used as follows: 40% by private car/taxi, 40% by bus/jeepney, and 20% by truck and other vehicles.

Table 2.2
Vehicular Traffic Volume on Metro Manila Roads

Mode	No. of Trips (000)	Vehicle-Kms./Day (000)	(%)
Private	1,380	10,917	67.5
Car and Taxi	1,109	8,724	53.9
Truck and Others	271	2,193	13.6
Public	-	5,267	32.5
Bus	-	793	4.9
Jeepney	-	4,474	27.6
Total	-	16,184	100.0

Source: JUMSUT I

The observed traffic volume on major corridors for 1979/81 is illustrated by Figure 2.1. These were produced from the traffic count survey conducted by TEAM/MPWH, supplemented by surveys in JUMSUT I. The capacities of major roads were evaluated with due consideration to physical conditions such as the width of carriageway, number of lanes, side friction, and so on.

The traffic volume ranges from 10 to 100 thousand vehicles per day, depending upon the corridors and the number of lanes. Heavier vehicle volume was observed along EDSA, Quezon Boulevard, South Superhighway, Roxas Boulevard, and Taft Avenue where volume in excess of 65,000 vehicles per day is common. It reaches as much as 100,000 along some sections (J. P. Rizal and Ayala) of EDSA.

It is apparent from Figure 2.1 also that in these major roads, there is a distinctive split in the share of total traffic according to the roads. Thus, EDSA, South Superhighway, Roxas Boulevard, Pres. Quirino (C-2), and Buendia are dominated by private transport vehicles, while most of the other roads are by public transport vehicles. This is largely due to the prevailing policy restricting jeepneys along most of the sections of EDSA, Roxas Boulevard, and South Superhighway. No jeepney route exists along Pres. Quirino (C-2). Along EDSA, South Superhighway, and Roxas Boulevard, over 85% of total vehicular traffic consist of private vehicles. The jeepney takes up about 60% of the total on Quezon Boulevard and Taft Avenue.

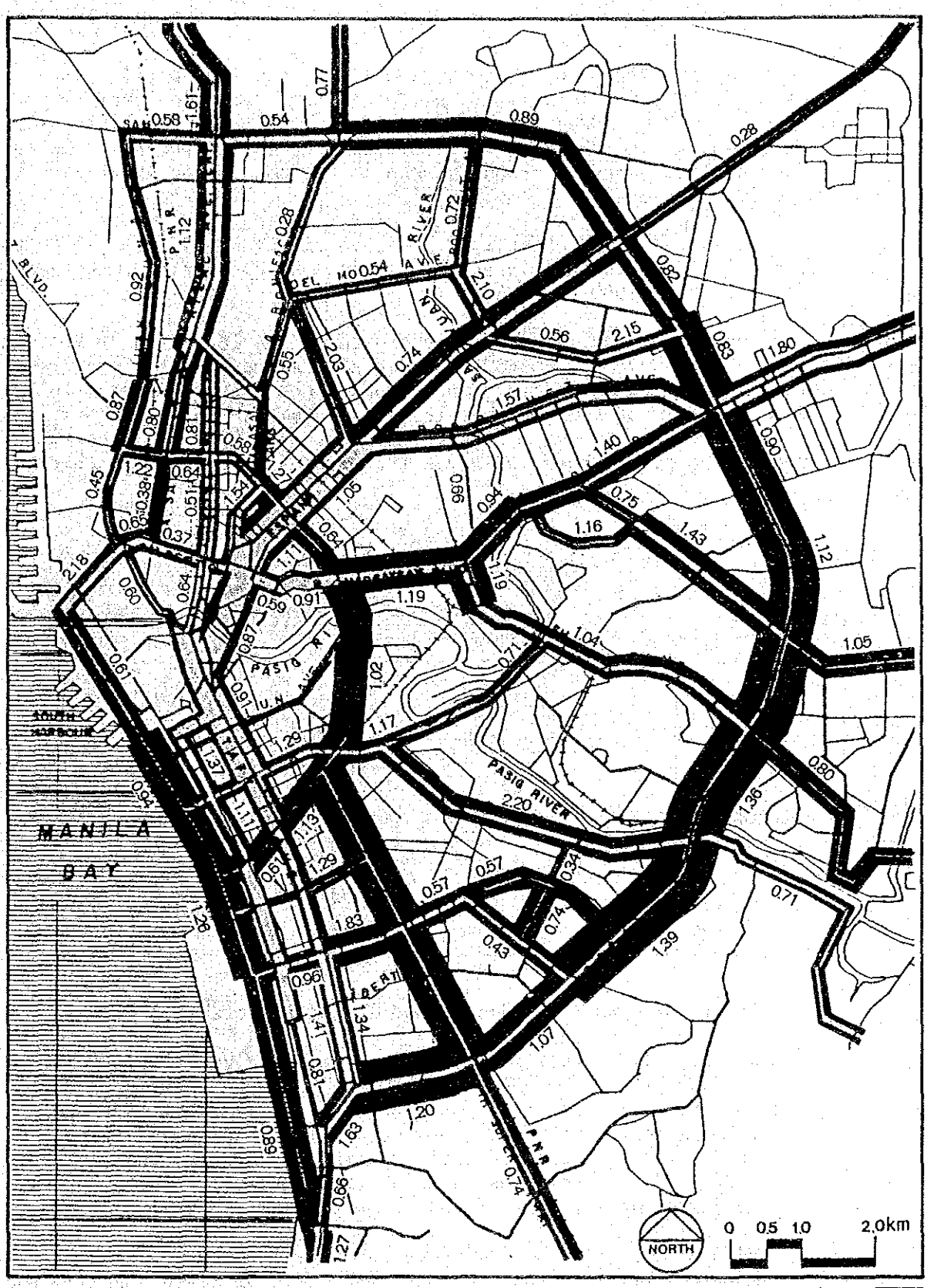


Figure 2.1
Vehicular Traffic Flow
on Major Roads

Changes in vehicular traffic demand for the metropolis can be gleaned from the results of the Cordonline/Screenline Surveys conducted in 1970, 1980, and 1984 (see Table 2.3). For comparability, the same survey stations were used for all three surveys; except the north and south screenlines which did not appear important in the 1970 survey.

A 10% increase in vehicular traffic volume is noted from 1970 to 1984 for screenlines west and east. A 2% decline, however, occurred from 1980 to 1984.

For the cordonline, a tremendous growth of 59% in vehicular traffic was observed from 1970 to 1984; this decelerated to a 7% increase from 1980 to 1984. The jump in volume could be attributed to the developments of the peripheral areas of Metro Manila. This, of course, meant a wider radius of activity space and the increasing use of the outer roads vis-a-vis the already saturated CBD roads.

Table 2.3
Changes in Vehicular Traffic Demand
(1970 to 1984 : 24 hours)

	Section	1970 UTSMMA (000)			1980 MMUTIP (000)			1984 JUMSUT 11(000)			1984/1970 Ratio			1984/1980 Ratio		
		Pub.	Priv.	Total	Pub.	Priv.	Total	Pub.	Priv.	Total	Pub.	Priv.	Total	Pub.	Priv.	Total
SCREENLINE	EW.West	79	230	309	88	211	299	79	206	285	1.00	0.90	0.92	0.90	0.98	0.95
	EW.East	22	92	114	33	142	175	32	147	179	1.45	1.60	1.57	0.98	1.04	1.03
	Sub-total	101	322	423	121	353	474	111	353	464	1.11	1.10	1.10	0.92	1.00	0.98
	NS.North	NA	NA	NA	86	210	295	83	198	282	NA	NA	NA	0.97	0.95	0.96
	NS.South	NA	NA	NA	50	224	274	45	221	266	NA	NA	NA	0.91	0.99	0.97
	Sub-total				136	434	569	128	419	548				0.95	0.97	0.96
	TOTAL				257	787	1,043	240	772	1,012				0.94	0.98	0.97
CORDONLINE	North	10	25	35	31	37	67	26	40	65	2.60	1.60	1.86	0.85	1.08	0.97
	East	9	17	26	18	25	43	19	23	42	2.10	1.35	1.62	1.02	0.93	0.97
	South	18	33	51	25	30	55	25	45	71	1.39	1.36	1.39	0.99	1.53	1.28
	TOTAL	37	75	112	74	92	165	70	108	178	1.89	1.44	1.59	0.94	1.18	1.07

2.1.2 Public Transportation Routes and Its Characteristics

The Metro Manila public transport, as it is generally known, consists largely of jeepneys and buses. The buses are further classified into standard bus, double decker, limited bus, love bus, minibus, and provincial bus. They cover Metro Manila and its environs. Since the metropolitan activity space extends to the neighboring areas of Metro Manila as well, short distance provincial operations form an important part of the urban public transport system.

The coverage of jeepney and bus services is apparent in Table 2.4. Jeepney claims a total of 610 kilometers of Metro Manila roads, while bus routes add up to 330 kilometers. Common to both modes is approximately 290 kilometers; with 88 percent of the bus network duplicated by the jeepney.

Table 2.4
Length of Roads Covered by Jeepney and Bus within Metro Manila

Mode	Length (kms.)		Total Metro Manila
	Within EDSA	Outside EDSA	
Jeepney	288.8	320.7	609.5
Bus	153.5	173.7	327.2
Total	318.7	331.0	649.7

Source: JUMSUT I

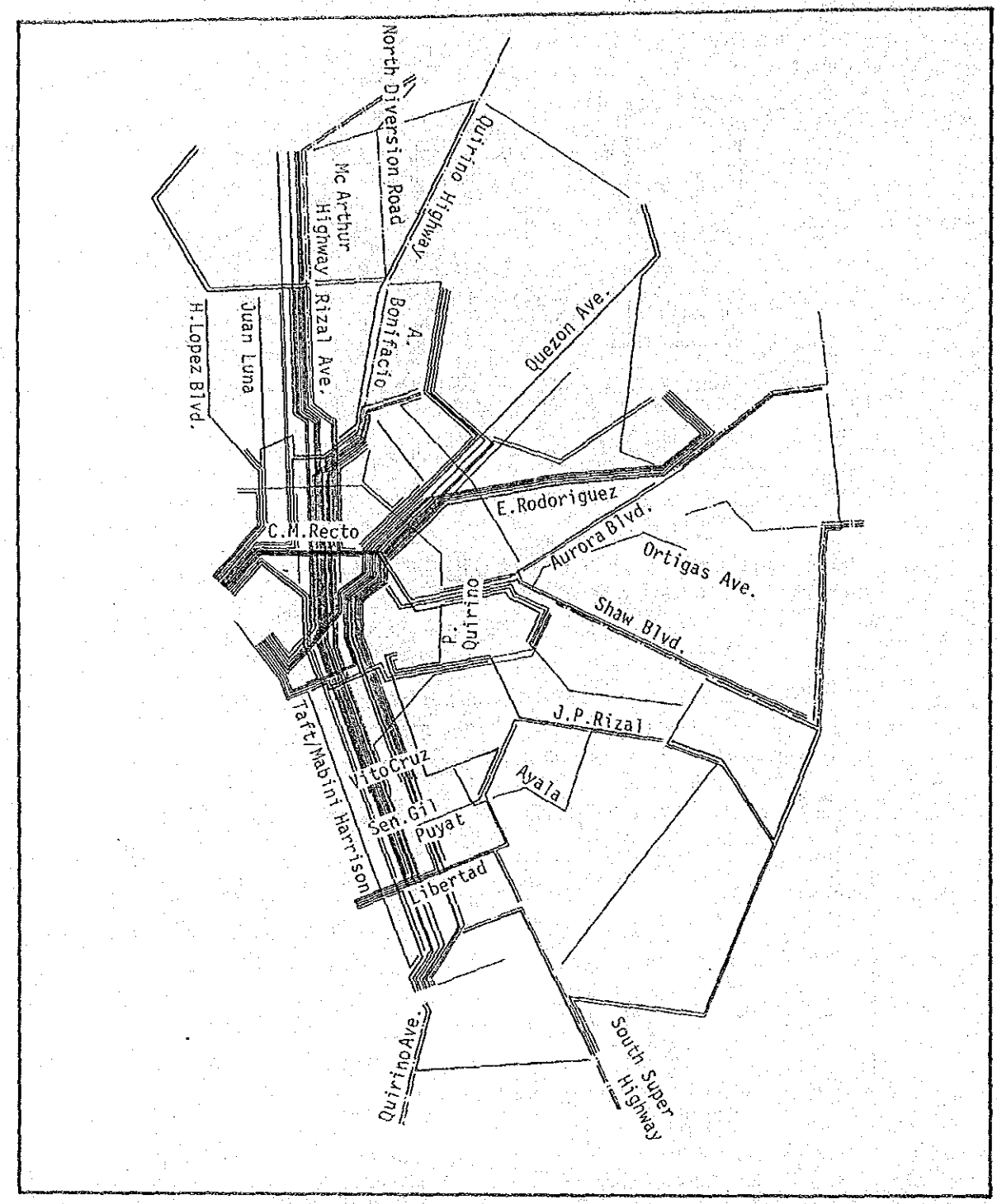
There are a total of 744 jeepney and 197 bus routes in Metro Manila, as shown in Table 2.5.

Table 2.5
Number of Existing Jeepney and Bus Routes in the Study Area

Mode	Metro Manila	Intercity	Total
Jeepney:	640	104	744
Bus:	150	47	197
- Standard Bus	106	13	119
- Double Decker	3	0	3
- Limited Bus	5	0	5
- Love Bus	27	1	28
- Mini-bus	9	20	29
- Provincial Bus	0	13	13

Source: JUMSUT I

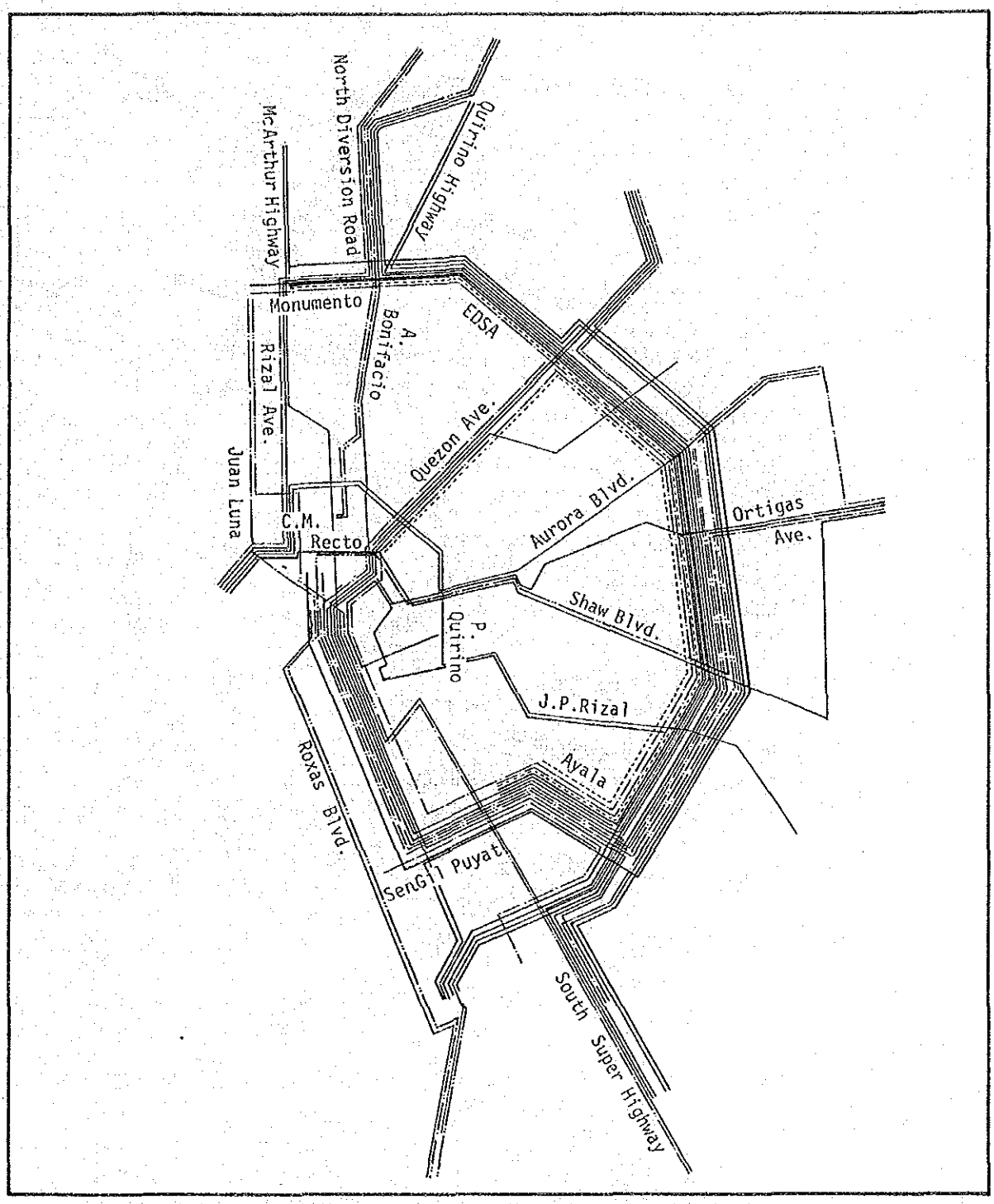
Figures 2.2 and 2.3 show the existing basic route structures and configurations of jeepney and bus, respectively. Jeepney routes are generally short and concentrated on radial roads, especially on Taft Avenue, Rizal Avenue, Espana, and R. Magsaysay; while bus routes are long and concentrated on circumferential roads (EDSA). Figure 2.4 shows the jeepney and bus vehicular traffic flow.



LEGEND:

- INTRACITY ROUTES (FREQUENCY 150 AND MORE/HR)
- INTRACITY ROUTES (FREQUENCY: 150 OR LESS/HR)
- INTERCITY ROUTES (FREQUENCY: 150 AND MORE/HR)
- INTERCITY ROUTES (FREQUENCY: 150 OR LESS/HR)

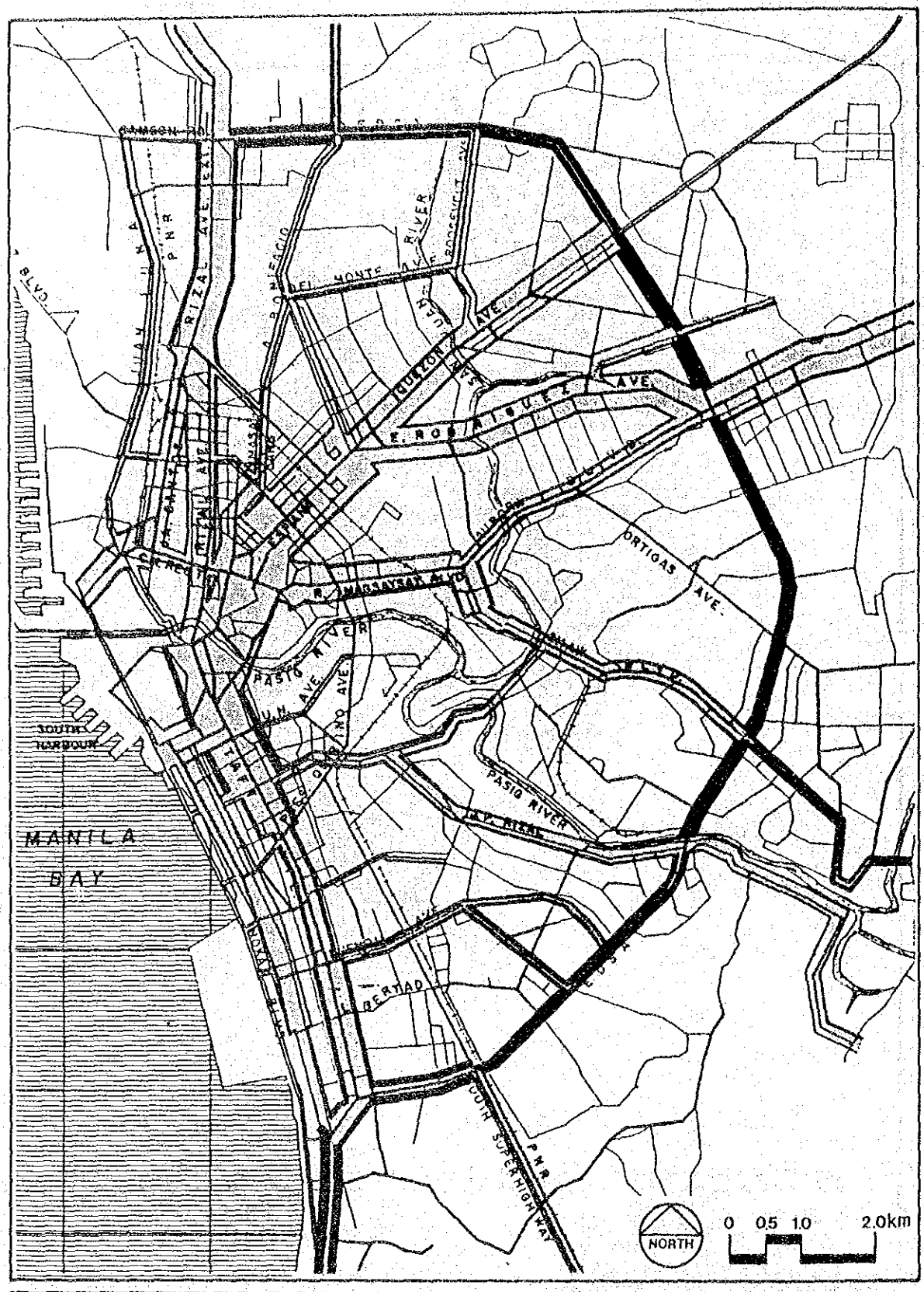
Figure 2.2
Existing Jeepney
Route Structure



LEGEND:

- ORDINARY BUS (FREQUENCY 30 AND MORE/HR)
- ORDINARY BUS (FREQUENCY 30 OR LESS/HR)
- LIMITED BUS (FREQUENCY 30 AND MORE/HR)
- LIMITED BUS (FREQUENCY 30 OR LESS/HR)
- LOVE BUS (FREQUENCY 30 AND MORE/HR)
- LOVE BUS (FREQUENCY 30 AND LESS/HR)
- MINI BUS (FREQUENCY 30 AND MORE/HR)
- MINI BUS (FREQUENCY 30 AND LESS/HR)

Figure 2.3
Existing Bus
Route Structure



BUS ↔ JEEPNEY

30,000 10,000 (VEH./DAY)

Figure 2.4
Bus/Jeepney Vehicular
Traffic Flow on
Major Roads

The public transport characteristics on the supply side as presented in Table 2.6 can be summarized as follows:

a) The number of jeepney units actually operating for any given day is approximately 35,600 units (29,300 units for intra-city routes and 6,300 for inter-city routes). Considering that the utilization rate of jeepney units is approximately 85%, it is estimated that 41,000 units (of which 34,500 are for intra-city routes alone) exist for Metro Manila public transport services.

b) The average length of jeepney routes is 10.4 kilometers and 24.6 kilometers for intra-city and inter-city services, respectively; while those for intra-city and inter-city bus routes are 21.1 kilometers and 40.5 kilometers, respectively.

c) The total public transport seating capacity provided by bus and jeepney is 107 million seat-kilometers, 61% of which are provided by the jeepney.

Table 2.6
Metro Manila
Public Transport Supply Characteristics

Mode		Route				Fleet Capacity			Operating Characteristics		
		No. of Routes	Road Coverage (Kms.)	Total Route Length (Kms.)	Ave. Route Length (Kms.)	Estd. No. of Units 2/ Running	Total Vehicle Kms./16 Hrs. (000)	Total Seat-Kms./16 Hrs. (000)	Ave.Kms. Running 16 Hrs.	Ave.No. of Turn-Around Trips/ 16 Hrs.	Ave. Daily Load Factor 1/
INTRACITY	Jeepney	640	571	6,661	10.4	29,261	3,154	48,995	107.8	5.2	54.1
	Bus	149	287	3,148	21.1	4,368	506	29,508	115.9	2.7	57.2
	Subtotal	789	608	9,809	-	33,629	3,660	78,503	-	-	55.2
INTERCITY	Jeepney	104	195	2,559	24.6	6,226	1,043	16,118	166.5	3.4	52.0
	Bus	48	172	1,944	40.5	1,543	237	12,740	153.9	1.9	53.7
	Subtotal	152	255	4,503	-	7,809	1,280	28,858	-	-	52.7
TOTAL	Jeepney	744	610	9,220	12.4	35,527	4,197	65,112	118.1	4.8	53.5
	Bus	197	327	5,092	25.8	5,911	744	42,248	125.8	2.4	56.1
	Subtotal	941	650	14,312	-	41,438	4,941	107,360	-	-	54.6

Source: JUHSUT I

1/ Load Factor is calculated by dividing Passenger-Kms. by Seat-Kms.

2/ Only those actually operating are included.

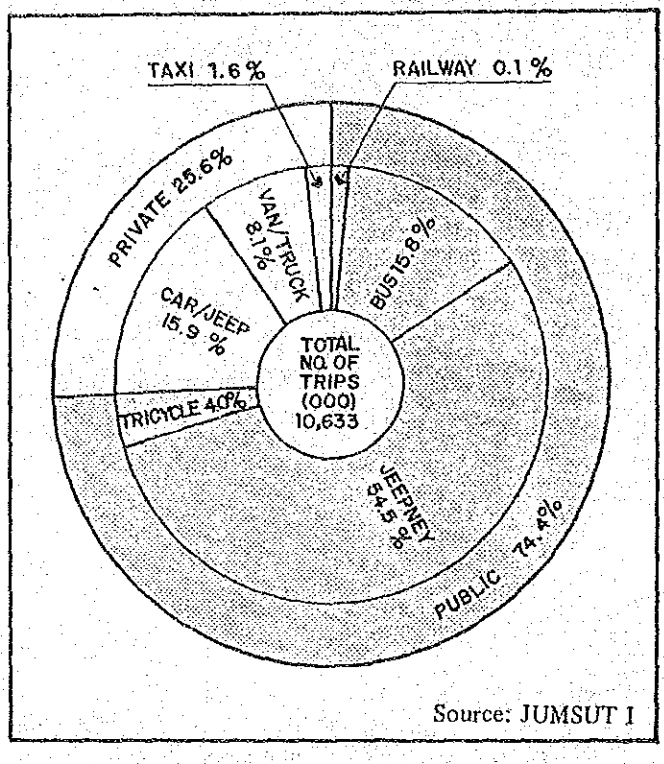
2.2 DEMAND CHARACTERISTICS AND SERVICE LEVEL

2.2.1 Demand Characteristics

The total number of linked trips generated by Metro Manila residents as of 1980 was estimated to be 10,633,000 per day, excluding walk trips. This has been estimated for residents of 7 years old and above or 4,796,400 persons out of a total population of 5,926,000 in 1980.

Total trips are classified into those using public transport modes (bus, jeepney, PNR, tricycle) and those by private modes (car/jeep, van/pick-up/truck, taxi). The former have a share of 74.4% or 7.9 million trips, while the latter, 25.6% or 2.7 million trips (see Figure 2.5). For public transport modes, jeepneys have a significant share of total demand. This mode comprises 54.5% of the total demand or 73.4% of public transport demand alone. However, a distinct 40% of "business" trips are notably made by cars.

Figure 2.5
Overall Transportation Demand by Mode



Of the total trips, 77% are made by persons from the non-car-owning households who rely heavily on public transport, especially the jeepney. The remaining 23% are made by persons who belong to car-owning households and more than half of these trips are by private car.

The most important factor to determine the intermodal relation between private and public transportation is the income of users. Table 2.7 shows that public transportation is used mainly by people with a monthly family income of less than ₱2,500, while the high income group of more than ₱4,000 uses mostly private transportation.

The average trip length of passengers varies considerably between bus and jeepney and between intra- and inter-city movements. These are 3.8 kilometers and 8.8 kilometers for intra-city and inter-city jeepney routes, respectively; and 8.5 kilometers and 15.6 kilometers for intra-city and inter-city bus routes, respectively (see Table 2.8).

Table 2.7
Income Distribution of Public and Private Transport Users

Ave. Household Income Range (₱/month)	Household		No. of Trips/Day					
			Public		Private		Total	
	Number	(%)	000	(%)	000	(%)	000	(%)
500 & less	138,306	(13.4)	903	(11.4)	68	(2.5)	971	(9.1)
501 - 1,000	499,187	(48.3)	2,419	(30.6)	476	(17.5)	2,895	(27.2)
1,000 - 2,500	322,910	(31.3)	3,782	(47.9)	1,124	(41.3)	4,906	(46.1)
2,501 - 4,000	52,037	(5.0)	647	(8.1)	528	(19.4)	1,175	(11.1)
4,001 & over	19,745	(2.0)	160	(2.0)	526	(19.3)	686	(6.5)
Total	1,032,185	(100)	7,911	(100)	2,722	(100)	10,633	(100)
Unknown	62,646		-		-		-	

Source: JUMSUT I

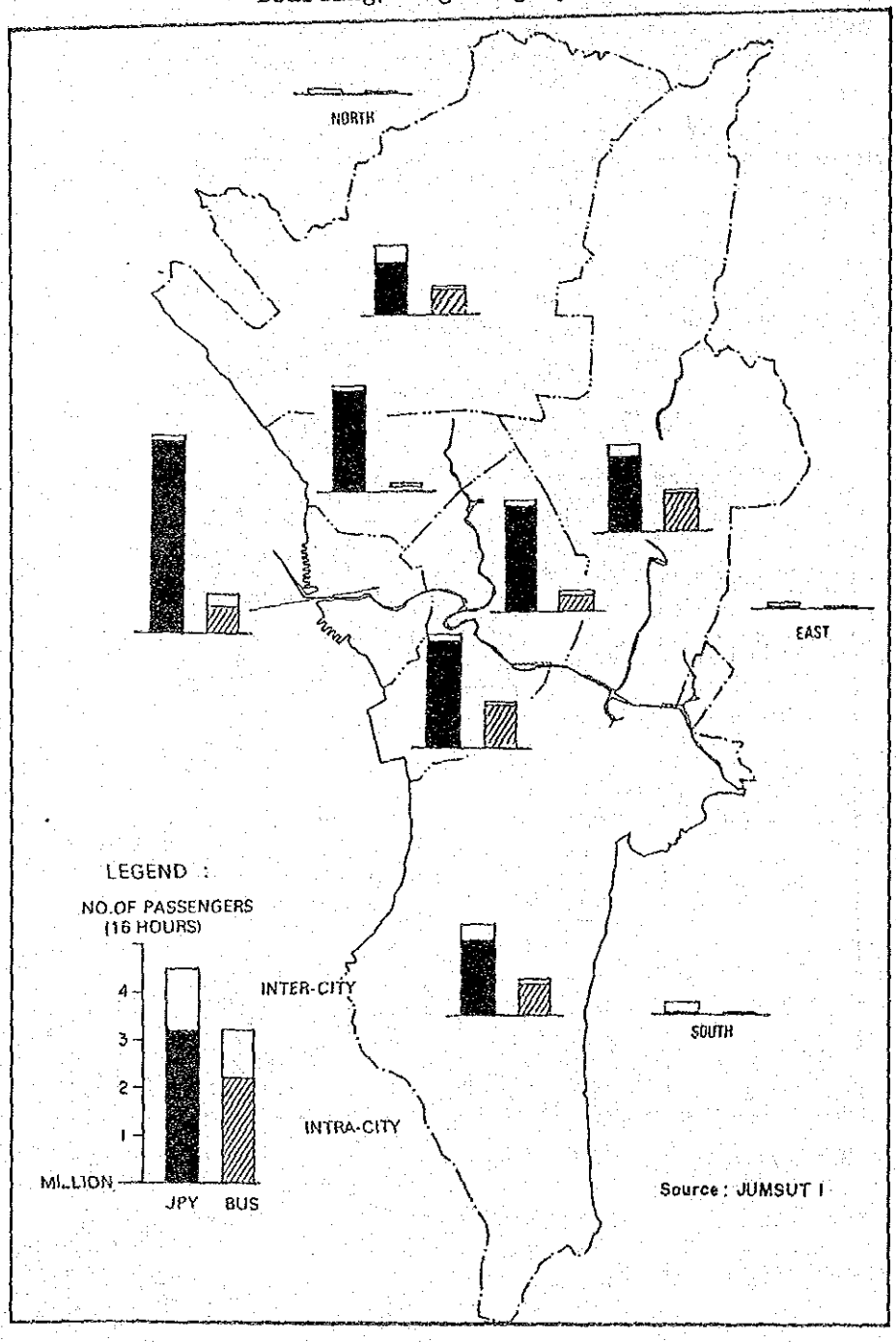
Table 2.8
Public Transport Demand Characteristics

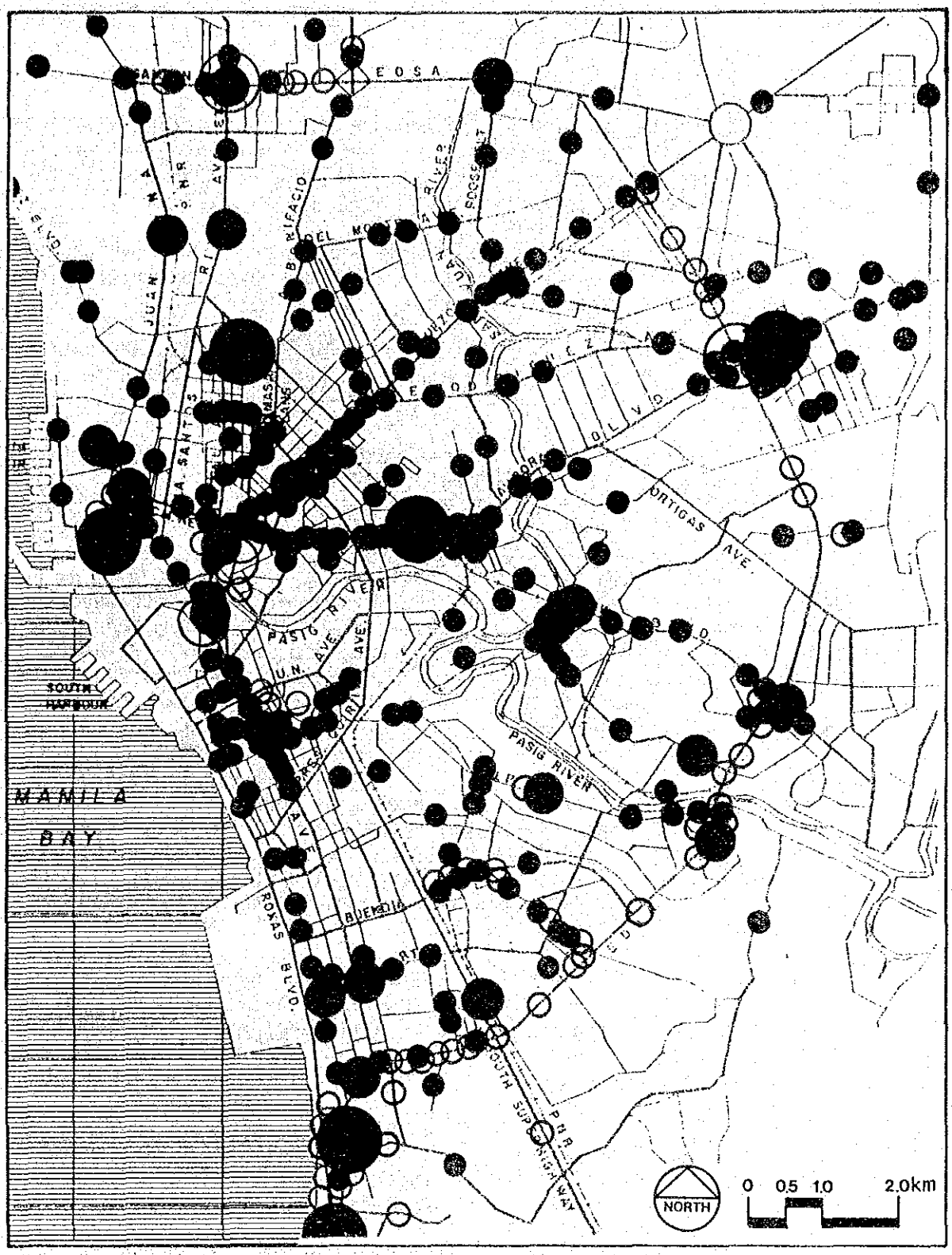
Mode	Total No. of Pass./16 Hrs.				Ave. Trip Length (Kms)
	000	(%)	000	(%)	
INTRA-CITY:					
Jeepney	6,935	(67.3)	26,485	(45.2)	3.8
Bus	1,990	(19.3)	16,875	(28.8)	8.5
Subtotal	8,925	(86.6)	43,360	(74.0)	4.9
INTER-CITY:					
Jeepney	947	(9.2)	8,382	(14.3)	8.8
Bus	437	(4.2)	6,838	(11.7)	15.6
Subtotal	1,384	(13.4)	15,220	(26.0)	11.0
TOTAL					
Jeepney	7,882	(76.5)	34,867	(59.5)	4.4
Bus	2,427	(23.5)	23,713	(40.5)	9.8
Total	10,309	(100.0)	58,580	(100.0)	5.7

Source: JUMSUT I

Figures 2.6 and 2.7 show the distribution of boarding and alighting passengers for bus and jeepney, respectively. Although jeepney passengers generate everywhere, heavier concentration is seen in the area within C-2 and other major terminal areas such as Blumentritt, Monumento, Cubao, Sta. Mesa, Guadalupe, Baclaran, Libertad, etc. On the other hand, major traffic generating areas for buses are rather limited to those along EDSA, including Cubao and other areas such as Quiapo and Divisoria.

Figure 2.6
Number of Jeepney and Bus Passengers
Boarding/Alighting by Area





NO. OF BOARDING & ALIGHTING PASSENGERS/16HRS.

10,000 & OVER
50,000 – 10,000
10,000 – 50,000

JEEPNEY
BUS

SOURCE: JUMSUT I

Figure 2.7
Bus/Jeepney Boarding/Alighting Passenger Distribution

2.2.2 Analysis on Service Levels

This section deals with the assessment of the current service levels of public transportation in order to formulate the directions for the route structure improvement plans. Major consideration is given on the following points:

a) Identification of existing poor public transportation service areas to be able to include the possibility of expanding the service area.

b) Determination of a suitable type of public transportation service in relation to the residents' characteristics by zone.

c) Improvement of the existing public transportation route structure to minimize passenger inconvenience.

Poor Public Transportation Service Area

Figure 2.8 shows the areas where the service of public transportation is considered to be poor. These areas are far from the existing jeepney and bus routes by more than 250 meters. Relatively extensive areas are not served by jeepney nor bus, particularly those outside EDSA. In most cases, however, tricycles supplement the needs of passengers.

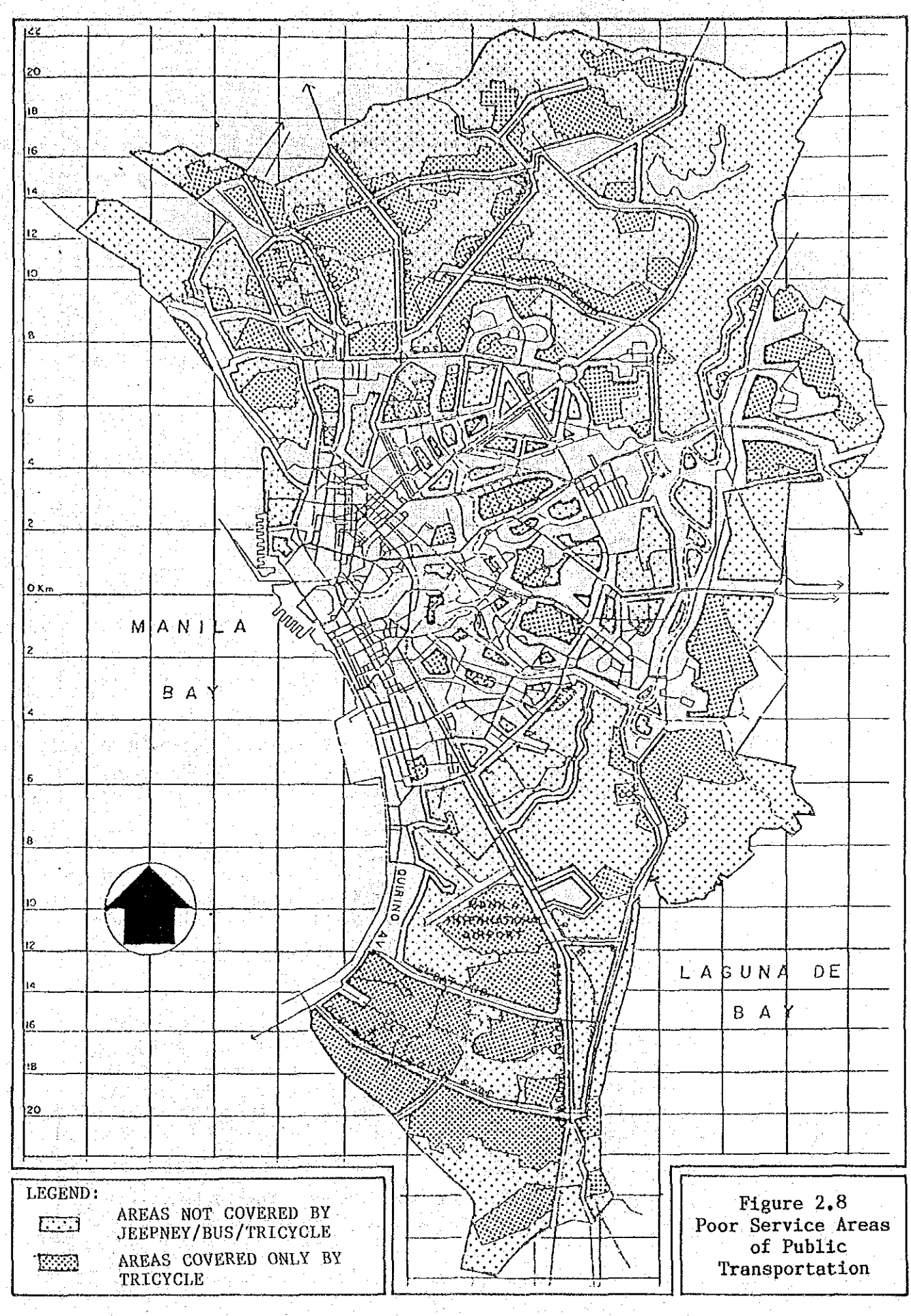
Most of the areas not covered by jeepney and bus are subdivisions, low density residential areas or open spaces. Others include high density areas (e.g., Bagumbayan) or major generating/attracting sources (e.g., Sta. Mesa). On the other hand, most of the areas served only by tricycle are medium or high density residential areas. In these areas, streets are often too narrow even for jeepneys, much less for buses.

Table 2.9 shows the result of a small-scale household interview survey conducted by JUMSUT II in some selected poor public transportation service areas. It clearly indicates that people in low-income areas are forced to walk while tricycles and cars supplement the jeepney and bus transportation service in higher income areas.

For these areas, especially for those of low income, the service levels of public transportation must be raised. These, however, can be done only by mid-term countermeasures, i.e.:

a) improve the secondary and distributor road system in the area;

b) shift jeepney and bus route franchises to cover these areas after the above physical improvement.



LEGEND:

AREAS NOT COVERED BY JEEPNEY/BUS/TRICYCLE

AREAS COVERED ONLY BY TRICYCLE

Figure 2.8
Poor Service Areas
of Public
Transportation

Table 2.9
Interrelation Between Household Income and Access Mode
in Poor Public Transportation Service Areas
(As of December 1984)

Area	No. of Samples Interviewed	Average Household Income (₱/month)	Access Mode (%)					
			Car/ Jeep	Jpy	Bus	Tri-cycle	Others	Walk
New Manila	63	5,300	37	0	3	0	5	55
Sampaloc	61	3,200	5	15	0	21	0	59
San Juan	98	2,700	4	4	0	0	2	90
Tatalon Estate (QC)	81	2,200	0	1	0	0	0	99
Kalentong	77	3,400	5	0	1	51	3	40
Total	380	3,300	9	4	1	14	2	70

Dependence on Public Transportation

Figure 2.9 shows the areas as classified by their dependency on public transportation service, public transportation trip generation, and average household income.

As previously stated, it is essentially important to provide public transportation service to the low income area because no other means of transportation is available.

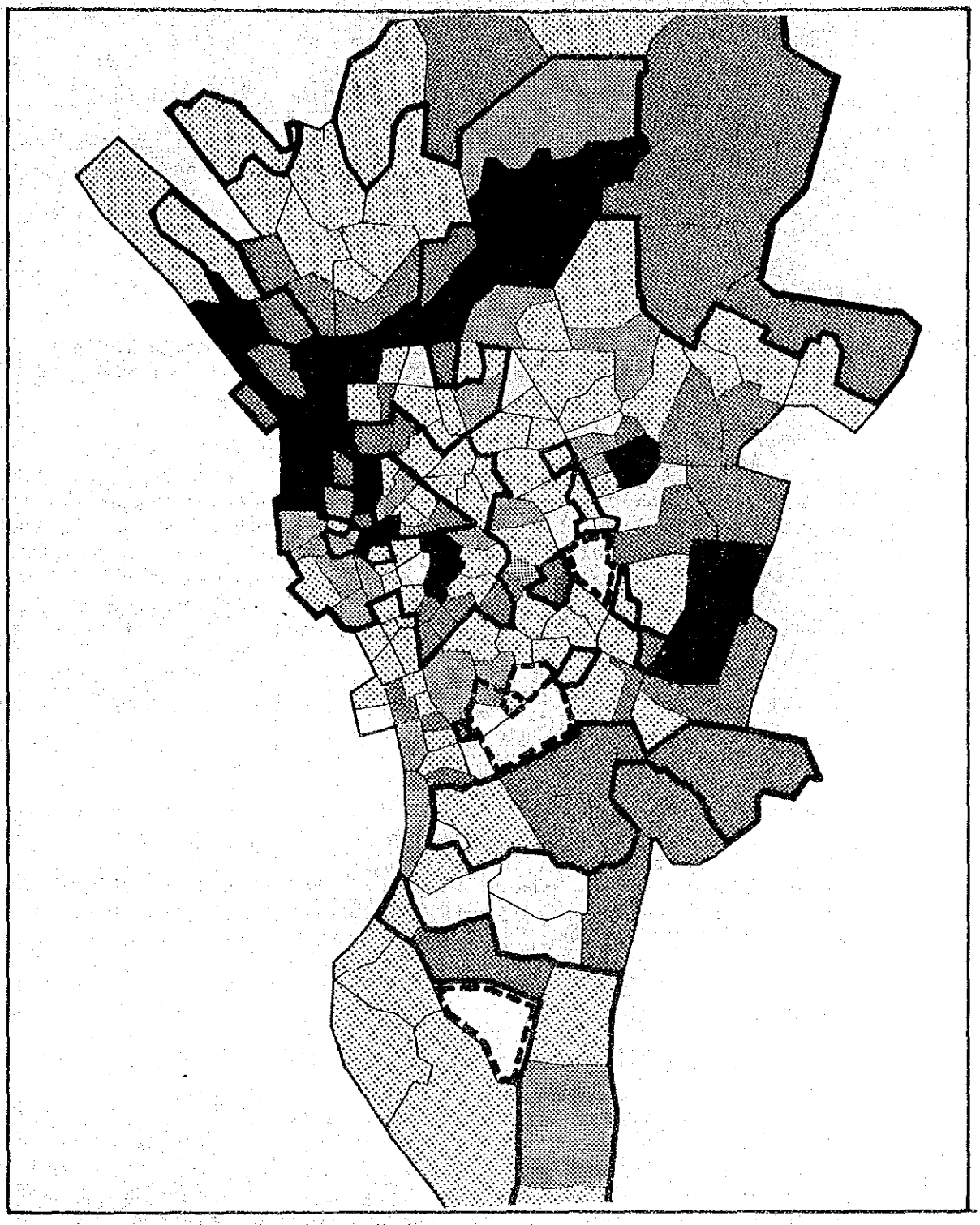
a) High Dependence - Low Income Area:

If trip generation/attraction is large, bus or jeepney should be introduced depending on the road condition. This area is seen typically along the following roads:

- Quirino Highway
- Juan Luna
- H. Lopez

If trip generation/attraction is small, low cost public transportation such as tricycle must be considered. In this case, therefore, tricycle should play the role of feeder service to/from the local activity centers or public transportation terminals.

- Upper Caloocan
- Northern Part of Quezon City (Novaliches, Fairview, etc.)
- Taguig



Symbol	Dependence on Public Transportation in Trip Generation (%)	Public Transportation Trip Generated (trips/day)	Average Monthly Household Income (₱/month)
	less than 50	-	
	50 - 79	less than 50,000	
	50 - 79	50,000 and above	
	80 and above	less than 50,000	
	80 and above	50,000 and above	

Figure 2.9
Areas where Public Transportation is Indispensable

b) Low Dependence - High Income Area

Public transportation modes providing premium service, which can compete with private car, should be considered.

- EDSA
- South Superhighway

c) Other Areas

Depending on the characteristics of the area, a variety of public transportation services should be considered.

Route Structure

Figure 2.10 shows the service frequency levels of jeepney and bus by zone. Figure 2.11 depicts the average number of transfers of jeepney and bus passengers going to work by zone. Even if the supply level of public transportation is high, there are cases where passengers are inconvenienced by the transfers they have to make. This is caused mainly by the jeepney and bus route structures which do not reflect the actual demand. This problem is typical in the following areas:

- The area along A. Bonifacio between Mayon and EDSA
- Balic-Balic area in Quezon City
- Kalentong area in Mandaluyong
- Pandacan area in Manila City
- Makati Commercial Center
- Magallanes Village in Makati

Public transportation routes need to be redesigned around these areas and a rerouting scheme, which makes them more convenient for passengers, introduced.

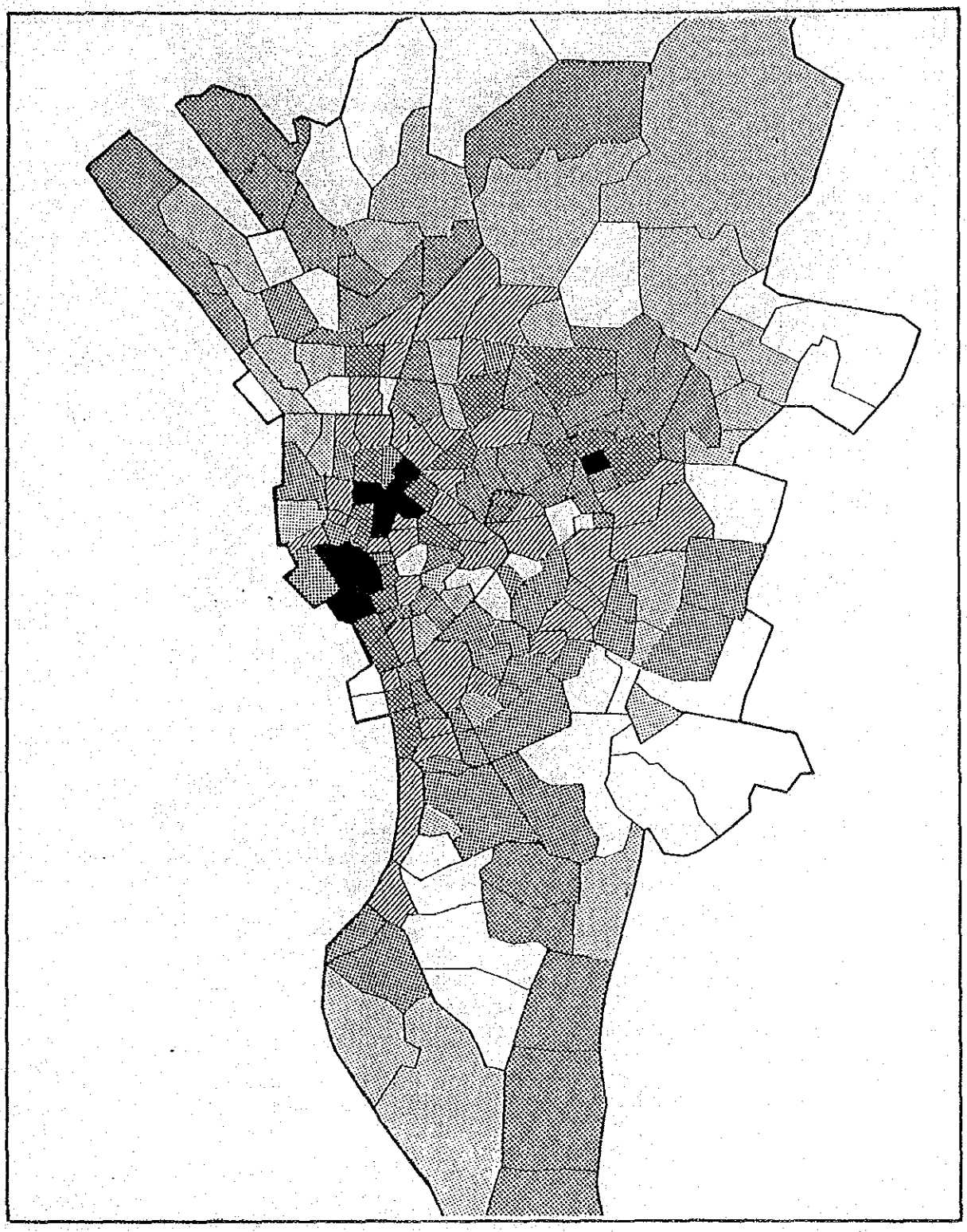
2.3 DEMAND/SUPPLY GAPS

2.3.1 Demand vs. Road Network

As described in detail in the JUMSUT II Technical Report "Transportation Demand Analysis", future traffic demand is projected to go up by about 17% in terms of number of trips during the period 1984-1990. On the supply side, several major transportation facilities are scheduled to be completed by then, and these are:

LRT : Baclaran - Arroceros - Monumento

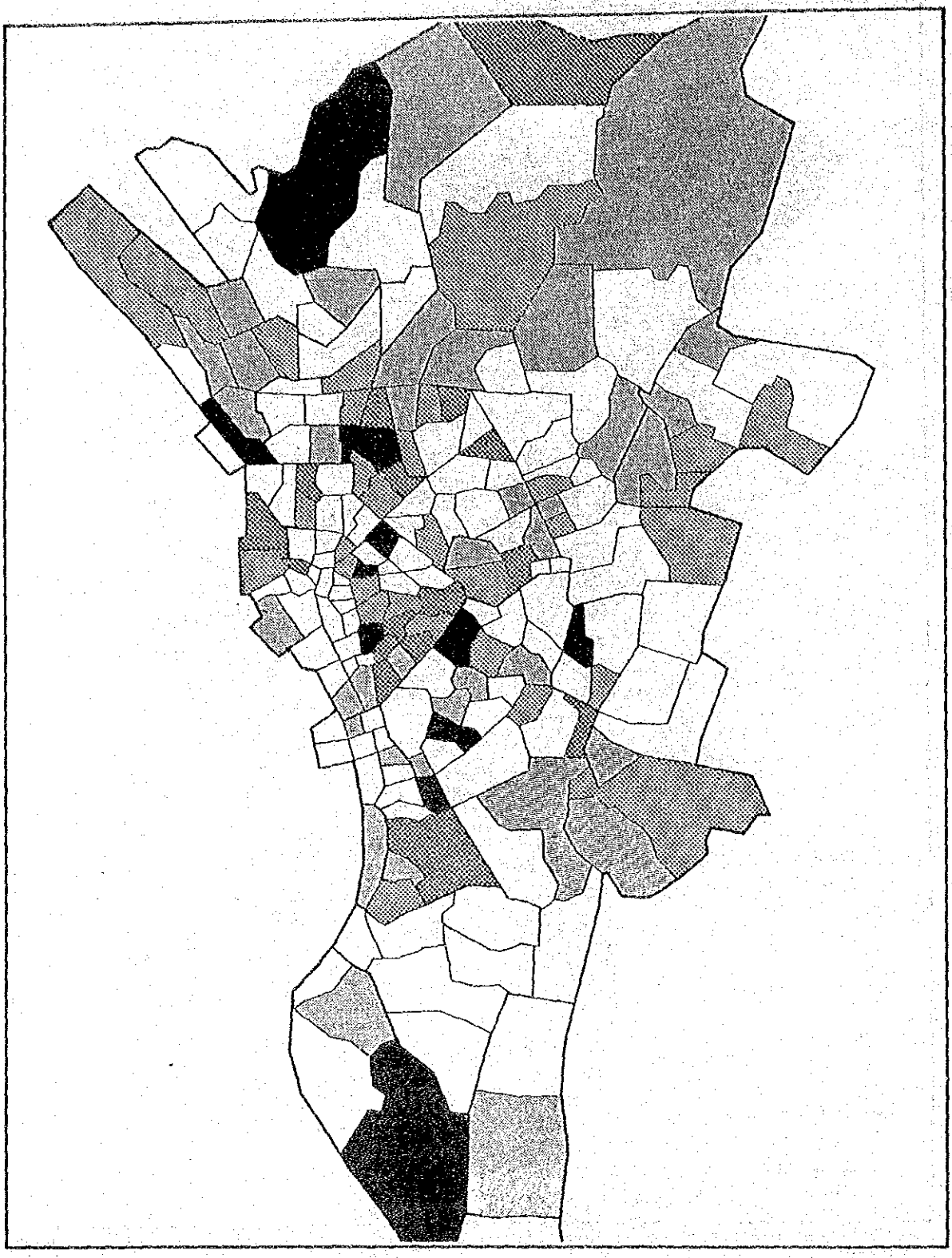
Roads : C-3 (Quezon Ave./R-10)
R-10 (Del Pan Bridge - EDSA)
Makati - Mandaluyong Road
R-1 Extension



LEGEND:

- less than 5,000
- 5,000 - 10,000
- 10,001 - 20,000
- 20,001 - 30,000
- 30,001 - 50,000
- 50,001 and above

Figure 2.10
Public Transportation
24-Hour Frequency Level
(Both Directions)



LEGEND:

- less than 1.0
- 1.0 - 1.2
- 1.2 - 1.6
- 1.6 - 1.8
- 1.8 and above

Figure 2.11
Average Number of Transfers
by Area (To Work)

In order to determine the current and future demand-supply gaps in public transportation by corridor, a series of traffic assignments was carried out for the existing as well as the future road network using the 1984 and 1990 OD tables. In assessing the results, imaginary mini-screenlines were set up as shown in Figure 2.12. Using these mini-screenlines, the demand/supply gaps were determined by corridor (which consists of a number of major roads) as follows:

A. Present Actual Traffic Situation

Figure 2.13 presents the actual traffic situation in terms of volume/capacity ratio for each screenline above defined. It should be noted, however, that the capacity used in the model is that of major roads excluding sidestreets. Therefore, where sidestreets are abundant the true volume/capacity ratio decreases to some extent. This will be examined in section 4.3 for problematic roads.

In general, most of the major roads in Metro Manila have reached or are reaching its capacity. Traffic congestion is already spread out all over Metro Manila, indicating that traffic problems are severe and chronic for some individual road sections.

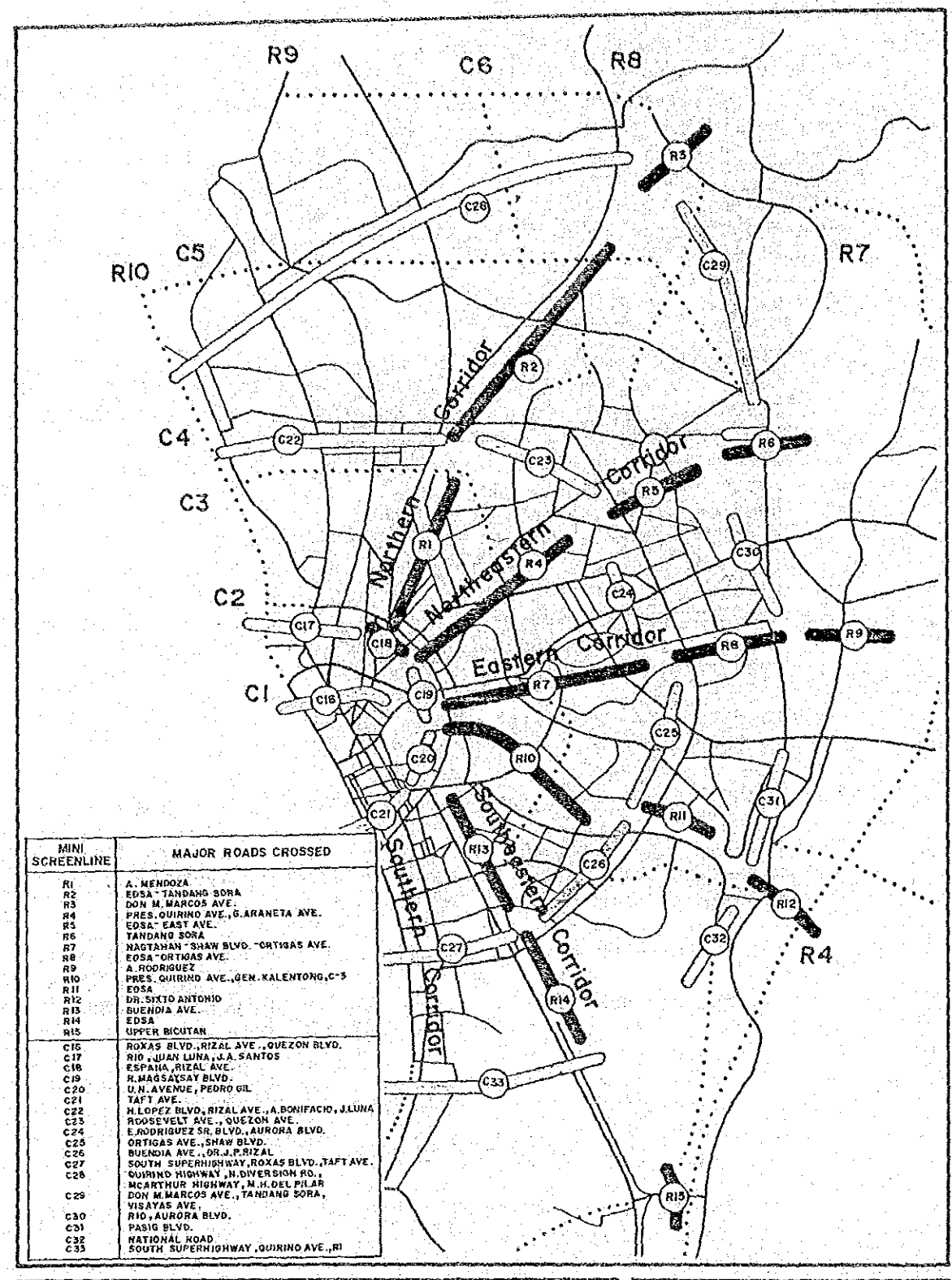
Road capacity is limited in the eastern and southern corridors in both the radial and circumferential direction.

B. Distortion of the Present Traffic Demand Distribution

Figure 2.14 shows the existing gaps between travel demand and actual traffic volume. Judging from this figure, the current traffic pattern is distorted as follows:

1) The present traffic pattern inside C-2 appears to be well balanced. Around C-4, however, the northern, northeastern and southern corridors seem to have suppressed demand than what the current traffic volume shows. Thus, the southeastern corridor (including Ortigas Avenue, Shaw Boulevard, J. P. Rizal, Buendia, and Ayala) is deemed to be overutilized by the detour traffic. Similarly, outside C-4, Ortigas Avenue and Shaw Boulevard exhibit abnormally high volume due to detour traffic.

2) In the circumferential directions, C-4 and its outside parallel roads are used extensively at present, not because of inherent demand but because of detour traffic. In the absence of C-3, demand is higher than the actual traffic on C-2 and some circumferential roads along the planned route of C-3.



MINI SCREENLINE	MAJOR ROADS CROSSED
R1	A. MENDOZA
R2	EDSA - TANDANG SORA
R3	DON M. MARCOS AVE.
R4	PRES. QUIRINO AVE., G. ARANETA AVE.
R5	EDSA - EAST AVE.
R6	TANDANG SORA
R7	NAGTAHAN - SHAW BLVD. - ORTIGAS AVE.
R8	EDSA - ORTIGAS AVE.
R9	A. RODRIGUEZ
R10	PRES. QUIRINO AVE., GEN. KALENTONG, C-5
R11	EDSA
R12	DR. SIXTO ANTONIO
R13	BUENDIA AVE.
R14	EDSA
R15	UPPER BICUTAN
C15	ROXAS BLVD., RIZAL AVE., QUEZON BLVD.
C17	R10, JUAN LUNA, J.A. SANTOS
C18	ESPANA, RIZAL AVE.
C19	R. MAGSAYSAY BLVD.
C20	U.N. AVENUE, PEDRO GIL
C21	TAFT AVE.
C22	H. LOPEZ BLVD., RIZAL AVE., A. BONIFACIO, J. LUNA
C23	ROOSEVELT AVE., QUEZON AVE.
C24	E. RODRIGUEZ SR. BLVD., AURORA BLVD.
C25	ORTIGAS AVE., SHAW BLVD.
C26	BUENDIA AVE., DR. J. P. RIZAL
C27	SOUTH SUPERHIGHWAY, ROXAS BLVD., TAFT AVE.
C28	QUIRINO HIGHWAY, N. DIVERSION RD., MCARTHUR HIGHWAY, M. H. DEL PILAR
C29	DON M. MARCOS AVE., TANDANG SORA, VISAYAS AVE.
C30	R10, AURORA BLVD.
C31	PASIG BLVD.
C32	NATIONAL ROAD
C33	SOUTH SUPERHIGHWAY, QUIRINO AVE., R1

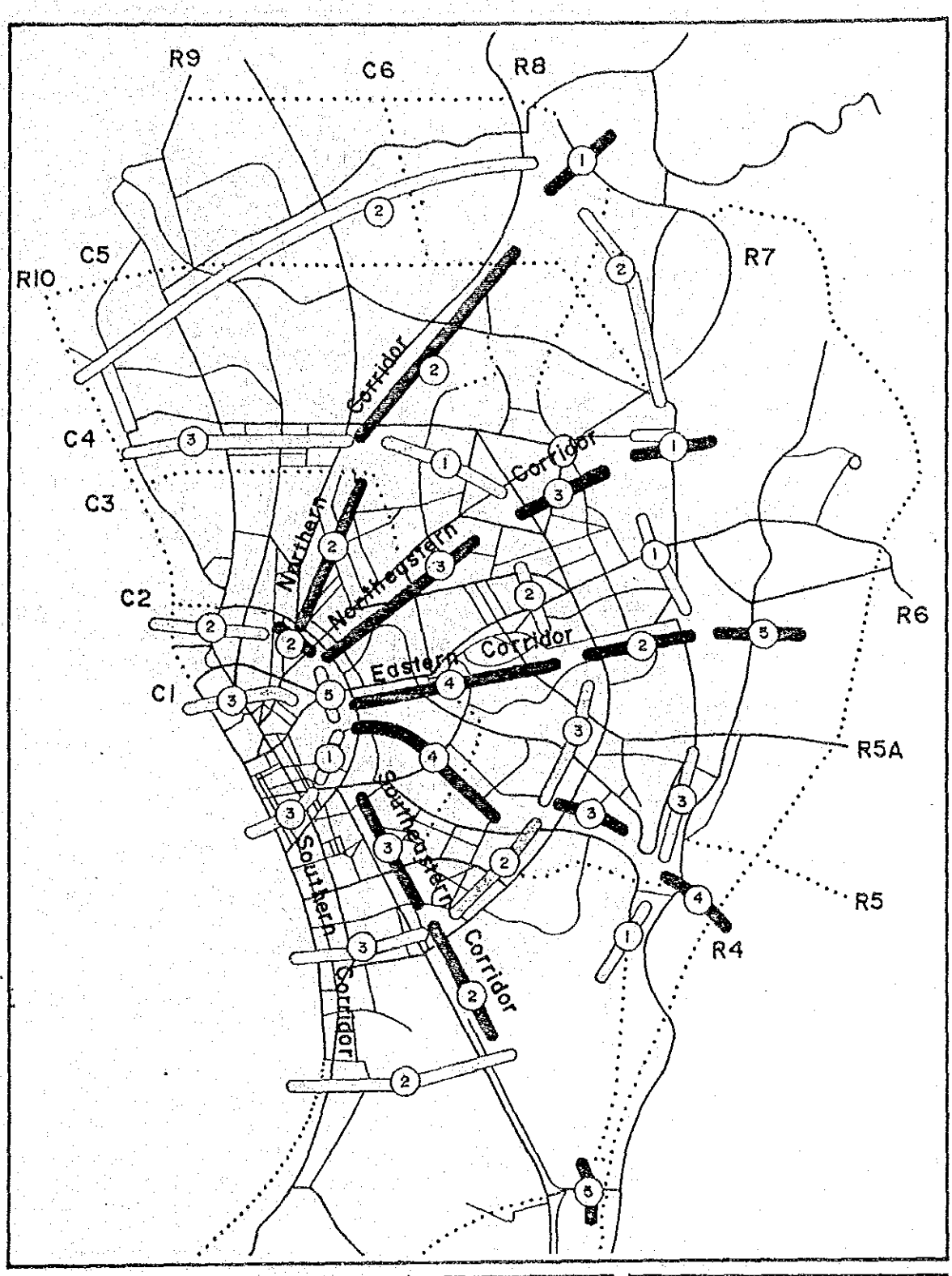
LEGEND :

- RADIAL DIRECTION
- CIRCUMFERENTIAL DIRECTION
- (R1) SCREENLINE

Source : JUMSUT II

Figure 2.12
Location of
Mini-Screenlines
and Corridors

JUMSUT II



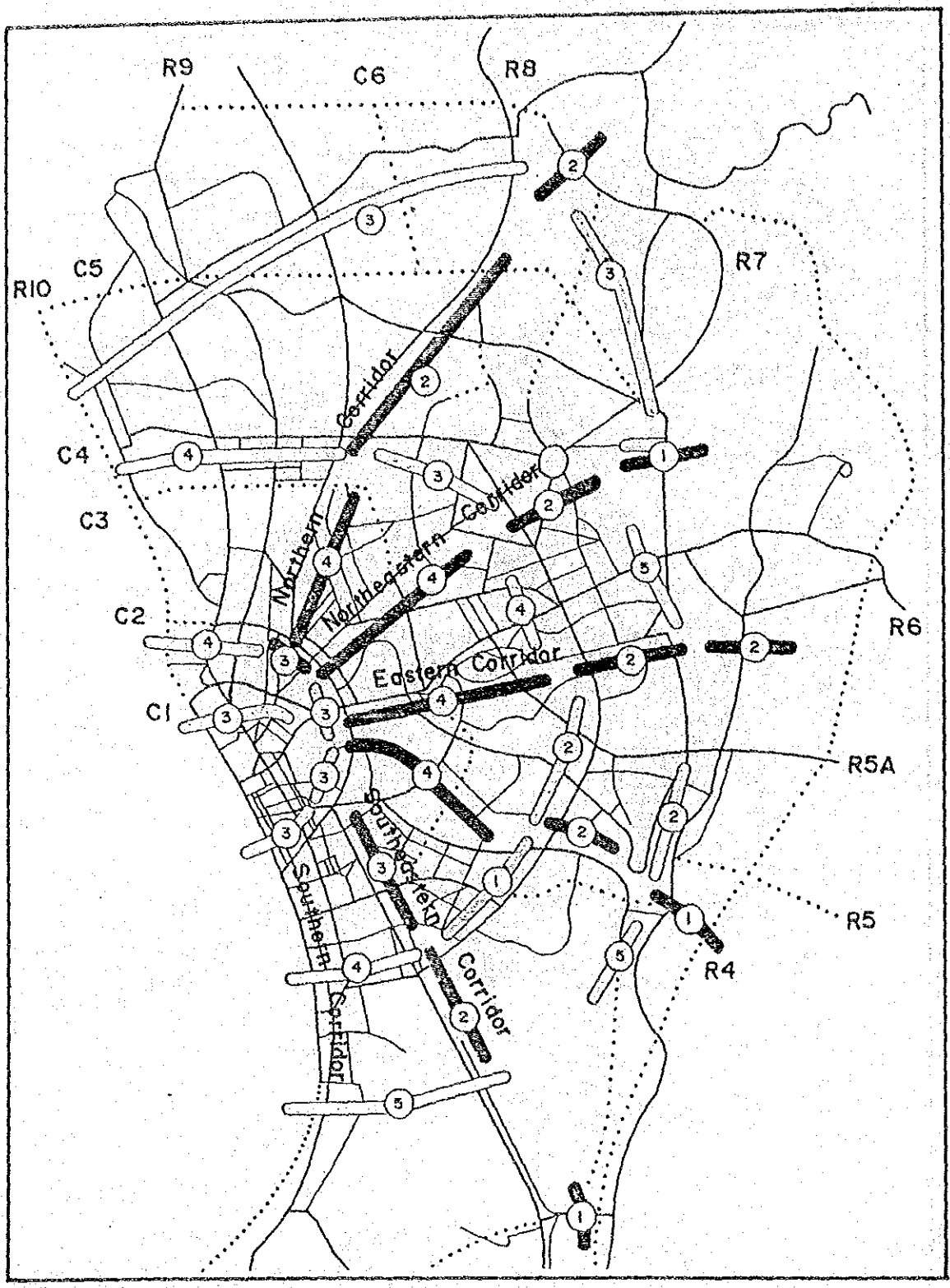
LEGEND:

DEGREE	VOLUME / CAPACITY RATIO
①	~0.75
②	0.76 ~ 1.00
③	1.01 ~ 1.25
④	1.26 ~ 1.50
⑤	1.51 ~

SOURCE : JUMSUT II

Figure 2.13
Present Traffic Situation

JUMSUT II



LEGEND :

DEGREE	1980 DEMAND / 1980 ACTUAL TRAFFIC VOLUME
①	~ 0.50
②	0.51 ~ 0.89
③	0.90 ~ 1.09
④	1.10 ~ 1.49
⑤	1.50 ~

SOURCE : JUMSUT II

Figure 2.14
Gap Between Travel Demand and Actual Traffic Volume, 1984

JUMSUT II