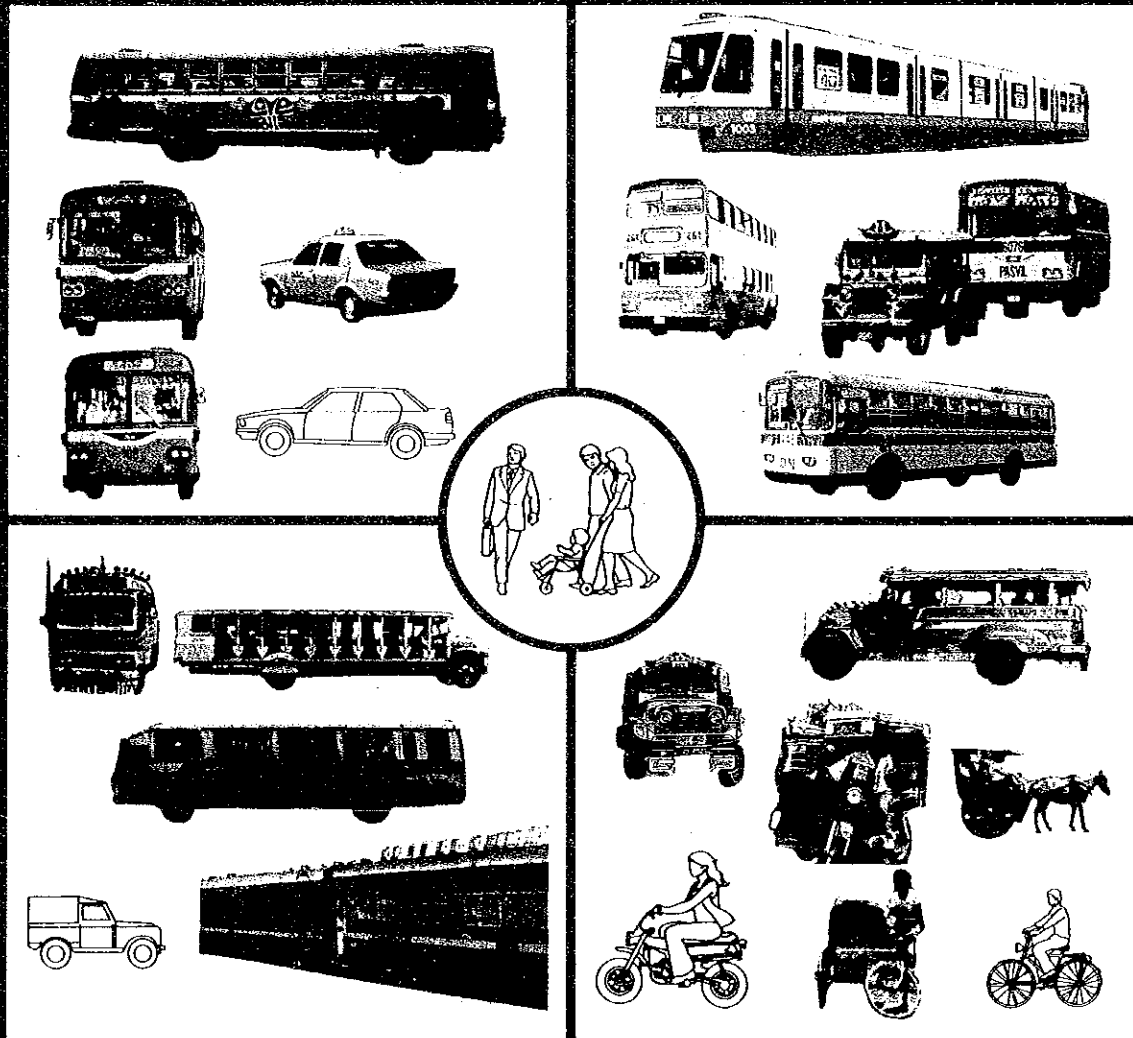


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 (JUMSUT)
 FINAL REPORT
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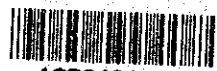
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**THE METRO MANILA
TRANSPORTATION PLANNING STUDY
(JUMSUT)**

FINAL REPORT

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PART III : Planning (III-B)

March 1984

JAPAN INTERNATIONAL COOPERATION AGENCY

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TABLE OF CONTENTS

	Page No.
Chapter 11. LRT ANALYSIS	
11.1 Introduction	11-1
11.2 Existing Bus/Jeepney Transport along the LRT Corridor	11-1
11.2.1 Existing Jeepney Route Structure in Relation to the LRT Corridor	11-1
11.2.2 Operating Characteristics of LRT-Related Bus/Jeepney Routes.	11-4
11.2.3 Passenger Traffic Flow and Distribution along the LRT Corridor	11-6
11.3 LRT Impact Analysis	11-8
11.3.1 Assumptions	11-8
11.3.2 LRT Traffic Volume and Ridership.	11-8
11.3.3 LRT Impact on Public Transport	11-8
11.3.4 LRT Impact on Road Traffic	11-11
11.3.5 Sensitivity Test on LRT Ridership	11-14
Chapter 12. PUBLIC TRANSPORT TERMINALS	
12.1 Introduction	12-1
12.2 Existing Public Transport Terminals	12-2
12.2.1 General	12-2
12.2.2 Existing Jeepney Terminals.	12-3
12.2.3 Bus Terminals	12-8
12.2.4 Tricycle Terminals.	12-9
12.2.5 PNR and LRT	12-11
12.3 Existing Public Transport Terminals by Area	12-14
12.3.1 General	12-14
12.3.2 Public Transport Terminals within C-2	12-14
12.3.3 Public Transport Terminals in the North (between C-2 and C-4).	12-21
12.3.4 Public Transport Terminals in the East (between C-2 and C-4).	12-24
12.3.5 Public Transport Terminals in the South (between C-2 and C-4).	12-23
12.3.6 Public Transport Terminals in the North (outside C-4)	12-39
12.3.7 Public Transport Terminals in the East (outside C-4)	12-43
12.3.8 Public Transport Terminals in the South (outside C-4)	12-44
12.4 Direction for Terminal Development.	12-50
12.4.1 Summary of the Existing Terminal Problems	12-50
12.4.2 Requirements for Strengthening Mode Interchange Function	12-51
12.4.3 Development Directions	12-53
12.4.4 Selected Key Mode Interchange Areas.	12-54

APPENDICES

LIST OF TABLES

Table No.		Page No.
11.1	Number of Bus/Jeepney Routes by Type in Relation with LRT.....	11-3
11.2	Intra-city Jeepney Routes by Route Length and by Route Type in Relation with LRT.....	11-4
11.3	LRT-Related Jeepney Transport Characteristics by Route Type.....	11-5
11.4	LRT-Related Bus Transport Characteristics by Route Type.....	11-6
11.5	Estimated LRT Traffic and Ridership (Without Rerouting).....	11-10
11.6	Impact of LRT on Metro Manila Public Transport System.....	11-10
11.7	Sources of LRT Passengers.....	11-11
11.8	Impact of LRT on Jeepney Routes.....	11-12
11.9	Impact of LRT on Bus Routes.....	11-12
11.10	LRT Passenger Traffic Under Different Time Values.....	11-14
11.11	Summary Results of Sensitivity Analysis.....	11-16
12.1	Summary of Jeepney Terminals.....	12-4
12.2	Jeepney Terminals by Type of Intermodal Relations.....	12-5
12.3	Classification of Existing Jeepney Terminals.....	12-7
12.4	Existing Bus Terminals/Turning Points.....	12-8
12.5	Existing Major Bus Terminals.....	12-9
12.6	Distribution of Tricycle Terminals/Service Areas.....	12-10
12.7	Development of Tricycle Terminals.....	12-11
12.8	Traffic at PNR Stations.....	12-12
12.9	Traffic at LRT Stations.....	12-12
12.10	Number of Public Transport Terminals Located Within C-2.....	12-14
12.11	Public Transport Terminals Within C-2.....	12-18
12.12	Public Transport Terminals Located in the North Area (between C-2 and C-4).....	12-21
12.13	Public Transport Terminals between C-2 and C-4 (North).....	12-23
12.14	Public Transport Terminals Located in the East Area (C-2/C-4).....	12-26
12.15	Public Transport Terminals C-2/C-4 (East).....	12-28
12.16	Public Transport Terminals Located in the South Area (between C-2 and C-4).....	12-33
12.17	Public Transport Terminals between C-2 and C-4 (South).....	12-36
12.18	Public Transport Terminals Located in the North Area (outside C-4).....	12-39
12.19	Public Transport Terminals outside C-4 (North).....	12-40
12.20	Public Transport Terminals Located in the East Area (outside C-4).....	12-43
12.21	Public Transport Terminals outside C-4 (East).....	12-44
12.22	Public Transport Terminals Located in the South Area (outside C-4).....	12-46
12.23	Public Transport Terminals outside C-4 (South).....	12-48

12.24	Summary of Current Problems Encountered	12-52
12.25	Selected Key Mode Interchange Areas in Relation with Various Impact Factors	12-56

LIST OF FIGURES

Figure No.		Page No.
11.1	Location of LRT	11-2
11.2	Bus/Jeepney Passenger Traffic Flow and Distribution along LRT Corridor	11-7
11.3	LRT Passenger Traffic Flow (Without Rerouting) – Morning Peak Hour	11-9
11.4	LRT Impact onto Jeepney/Bus Passenger Traffic on Road	11-13
11.5	Results of the Sensitivity Analysis in Terms of Number of LRT Passengers, LRT Revenue and Total Generalized Cost	11-16
12.1	Conceptual Understanding of “Passenger Transport Terminal”	12-2
12.2	Classification of Jeepney Terminals Located Within EDSA	12-6
12.3	Distribution of Public Transport Terminals (Jeepney, PNR, LRT) in Metro Manila	12-13
12.4	Distribution of Public Transport Terminals Within C-2	12-20
12.5	Distribution of Public Transport Terminals in the North (C-2 and C-4)	12-25
12.6	Distribution of Public Transport Terminals in the East (C-2 and C-4)	12-32
12.7	Distribution of Public Transport Terminals in the South (C-2 and C-4)	12-38
12.8	Distribution of Public Transport Terminals in the North (outside C-4)	12-42
12.9	Distribution of Public Transport Terminals in the East (outside C-4)	12-45
12.10	Distribution of Public Transport Terminals in the South (outside C-4)	12-49
12.11	Location of Key Mode Interchange Areas	12-57

Chapter 11. LRT ANALYSIS

CHAPTER II LRT ANALYSIS

11.1 INTRODUCTION

- This chapter highlights the current situation and characteristics of the public transport system in areas expected to be directly affected by the LRT upon its operation. It also presents the results of the analysis made on the impact of the LRT on the existing public transport operation, when it is completed.
- The LRT, also called METRORAIL, is an elevated light rail transport system now being constructed along Line No. 1. It links Monumento (North Terminal) in the north with Baclaran (South Terminal) along Rizal Avenue Extension, Rizal Avenue and Taft Avenue, which comes over approximately 14.5 kilometers. Line No. 1 is intersected by 18 stations located mainly at or near junctions of major roads where passenger traffic generation is high. Its characteristics are further explained as follows:
 - a) **Rolling Stock:** There will be an initial number of 32 trains of 2 coaches each. The cars are articulated, double-ended with a wide door on both sides. Each train has a loading capacity of 750 passengers, with 160 seated passengers and 590 standees.
 - b) **Operation:** Service hours are from 4 a.m. through 12 midnight with expected peak hours of from 6 to 9 a.m. and from 4 to 8 p.m. Headway is about 2-3 minutes and it will take approximately half an hour for the train to haul from the North Terminal to the South Terminal. The maximum attainable speed of the train is 60-kph.
 - c) **Line Capacity:** The capacity of Line No. 1 is approximately 18,000 passengers/hour/direction. It can be expanded to 33,000 ultimately by introducing a three-car-train to be operated at a shorter headway.
 - d) **Track and Power Supply:** A standard 1.44 meter rail gauge is adopted. The system will be powered by adjacent substations which can supply 600 to 750-volt direct current via a pantograph to the cars. These substations are located at approximately 2-km. intervals.
 - e) **Comfort and Safety:** The cars are not equipped with air conditions. They rely on good natural ventilation. The noise level of the system is only 20-30 decibels. These structures can withstand an intensity 8 on the Richter scale.

11.2 EXISTING BUS/JEEPNEY TRANSPORT ALONG LRT CORRIDOR

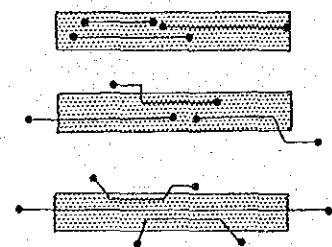
11.2.1 Existing Jeepney Route Structure in Relation to LRT Corridor

- The LRT corridor is basically defined as a package of roads consisting of Rizal Avenue Extension, Aurora Avenue, Rizal Avenue, Taft Avenue, and Mexico Road. The location is shown in Figure 11.1.
- With regards to the LRT corridor, the existing jeepney and bus routes in Metro Manila are classified into seven types as shown in the following:

Type I: Bus and jeepney routes of which whole stretches are located within the LRT corridor.

Type II: Bus and jeepney routes which pass the LRT corridor but one end is outside the corridor.

Type III: Bus and jeepney routes which pass the LRT corridor but both ends are outside the corridor.



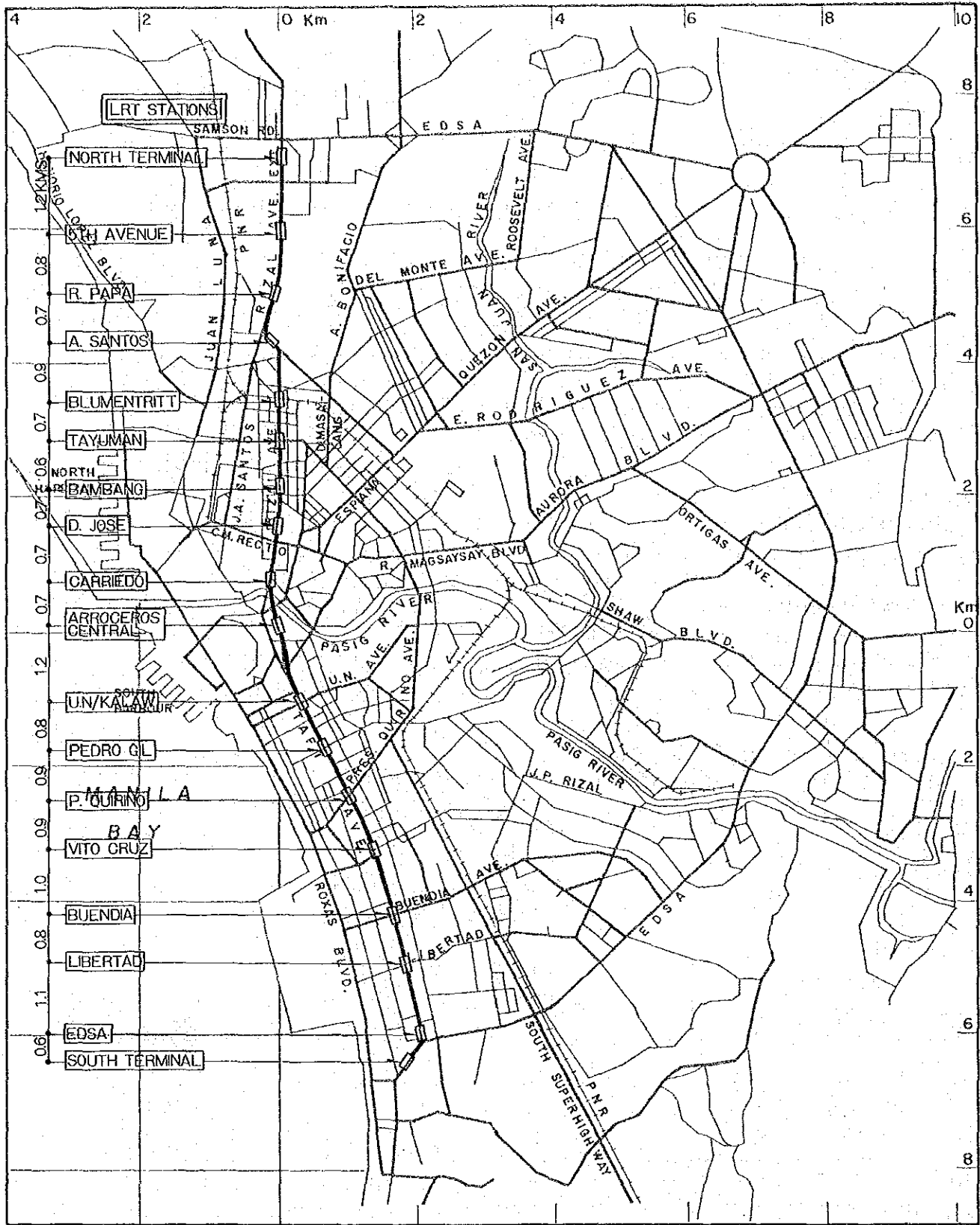
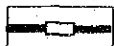


FIGURE 11.1 LOCATION OF LRT

 LRT

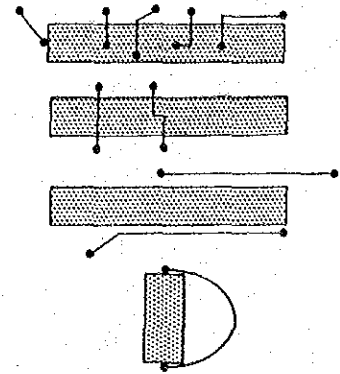


Type IV: Bus and jeepney routes which terminate in the LRT corridor but do not operate along the corridor.

Type V: Bus and jeepney routes which cross the LRT corridor.

Type VI: Bus and jeepney routes located outside the LRT corridor.

Type VII: Bus routes located outside the LRT corridor but operate along EDSA with a connection to LRT.



- Generally speaking, Types I, II and III are the routes which will compete with and be directly affected by the LRT. Types IV and V are those which will complement the LRT. Type VI is the route which will not be affected by the LRT. However, Type VII, being a particular type for buses passing EDSA, will be affected by the LRT for longer trip movements in a competitive manner.
- Accordingly, the existing bus and jeepney routes can be classified as shown in Table 11.1. Out of 640 intra-city jeepney routes, 32 percent or 205 routes are Types I, II and III and 30 percent or 195 are Types IV and V. Out of 104 inter-city jeepney routes, only 14 percent are Types II and III and 39 percent are Types IV. From the 149 intra-city bus routes, 30 percent fall under Types II and III and 15 percent in Types IV and V; while out of the 48 inter-city bus routes, 48 percent fall under Types II and III and 46 percent under Types IV and V. Roughly 40-60 percent of existing bus and jeepney routes relate to the LRT. The coverage of these existing LRT-related bus and jeepney routes extends to most of the major corridors in Metro Manila.
- As shown in Table 11.2, LRT-related intracity jeepney routes are fairly long. Even those which are totally located within the LRT corridor (Type I) have an average route length of 11.7 kilometers. Routes of Types II and III, which are also competitively operated, have a long average route length of 13 to 14 kilometers.

Table 11.1
Number of Jeepney/Bus Routes by Type
in Relation with LRT

Mode	Type			Sub-total (I+II+III)	Type		Sub-total (IV+V)	Type		Total
	I	II	III		IV	V		VI	VII	
INTRA-CITY										
Jeepney	24	146	35	205	106	89	195	240	0	640
Ordinary Bus	0	5	29	34	7	10	17	25	40	117
Premium Bus	0	6	5	11	4	1	5	9	7	32
Subtotal	24	157	69	250	117	100	217	275	47	789
INTER-CITY										
Jeepney	0	11	4	15	40	0	40	49	0	104
Ordinary Bus	0	11	9	20	16	6	22	5	0	47
Premium Bus	0	0	0	0	0	0	0	1	0	1
Subtotal	0	22	13	35	56	6	62	55	0	152

Table 11.2
Intra-City Jeepney Routes by Route Length and
by Route Type in Relation with LRT

Route Length (Kms.)	Route Type						Total
	I	II	III	IV	V	VI	
0.1 – 2.5	2	0	0	16	1	30	49
2.6 – 5.0	0	5	0	25	11	62	103
5.1 – 7.5	0	4	2	11	8	56	81
7.6 – 10.0	4	14	2	11	13	29	73
10.1 – 15.0	11	57	21	28	29	41	187
15.1 – 20.0	7	54	9	11	22	16	119
20.1 – 25.0	0	9	1	3	5	4	22
25.1 – 30.0	0	2	0	0	0	0	2
30.1 & over	0	1	0	1	0	2	4
Total	24	146	35	106	89	240	640
Average Route Lengths (kms.)	11.7	14.4	13.3	8.8	12.1	7.5	10.4

11.2.2 Operating Characteristics of LRT-Related Bus/Jeepney Routes

- Tables 11.3 and 11.4 present the summary of information on the operating characteristics of jeepney and bus routes by type in relation to the LRT.
- Characteristics of jeepney operation are as follows:

Type I: Has an average hourly frequency of 37/route and approximately 1,620 units are running daily or 1,900 units (1,620 x 1/0.85; utilization ratio) are allocated. They carry 310,000 passengers/16 hours with a relatively long average trip length of 5.2 kilometers along the LRT corridor. Average load factor is as high as 61.4 percent.

Type II: Has an average hourly frequency of 16/route and approximately 4,700 units are running daily or 5,500 units are allocated. They carry 879,000 passengers/16 hours with an overall average trip length of 5.5 kilometers. Average load factor is also high at 60.9 percent.

Type III: Has an average hourly frequency of 24/route and approximately 2,060 units are running daily or 2,400 units are allocated. They carry 340,000 passengers/16 hours with an overall average trip length of 6.0 kilometers. Average load factor of 59.3 percent is also relatively high.

Type IV: Has the highest average hourly frequency of 56/route and approximately 9,980 units are running daily or 11,700 units are allocated. They carry more than two million passengers/16 hours with a relatively short trip length of 4.8 kilometers. The passengers will not directly be affected by the LRT and the routes will provide complementary feeder services to the LRT with a good level of frequency.

Type V: Will play a similar role as Type IV by providing good feeder services to the LRT with an average hourly frequency of 32/route. Approximately 3,450 units are running daily or 4,100 units are allocated. They carry 852,000 passengers/16 hours with an average trip length of 4.2 kilometers.

- Characteristics of bus operations can be similarly given as follows:

Type I: Do not exist.

Type II: Has an average hourly frequency of only 5.1 with 371 units running daily. They carry 109,000 passengers/16 hours with an average trip length of 9.9 kilometers. Load factor is 48.8 percent.

Type III: Has an average hourly frequency of 8.2 with 880 units running daily. They carry 401,000 passengers/16 hours with a relatively short trip length of 6.3 kilometers. Average load factor is 60.8 percent.

Type IV: Has an average hourly frequency of 9.4 with 856 units running daily. They carry 276,000 passengers/16 hours with an average trip length of 13.1 kilometers. Average load factor is 58.0 percent.

Type V: Has an average hourly frequency of 5.8 with 385 units running daily. They carry 145,000 passengers/16 hours with an overall average trip length of 8.8 kilometers. Average load factor is 53.6 percent.

Table 11.3
LRT-Related Jeepney Transport
Characteristics by Route Type

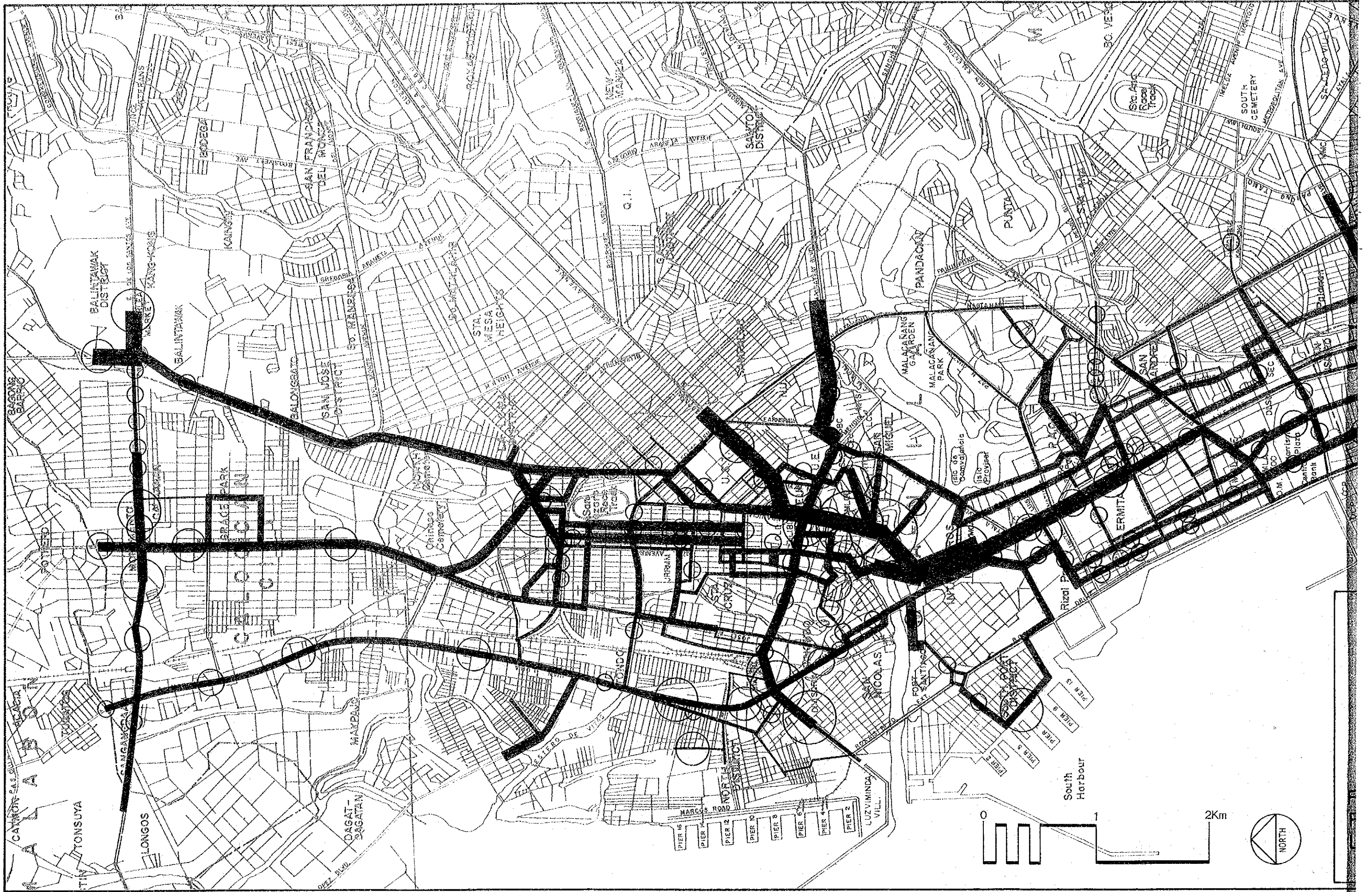
Item	Route Type						Total
	I	II	III	IV	V	VI	
Number of Routes	24	157	39	146	89	289	744
Ave. Route Length (Kms.)	11.7	19.7	14.5	13.5	12.1	10.0	12.4
No. of Units Running	1,622	4,696	2,055	9,971	3,449	13,734	35,527
Total Vehicle-Kms. (000)	166	513	219	1,237	405	1,658	4,198
Total Seat Kms. (000)	2,588	2,975	3,446	19,099	6,402	25,604	65,113
Frequency (Total)							
Morning Peak Hour	1,116.3	2,993.3	1,056.7	10,066.6	3,409.0	16,898.8	35,540.7
Ave. Off Peak Hour	836.8	2,323.8	864.8	7,357.7	2,564.2	12,562.9	26,510.1
Evening Peak Hour	856.3	2,594.3	980.7	9,158.9	2,992.0	16,156.5	32,738.7
16-Hour Total	14,308.0	40,114.0	14,786.0	131,348.0	44,910.0	224,984.0	470,450.0
Ave. Load Factor (%)							
Morning Peak Hour	59.1	58.6	59.3	52.6	55.8	52.8	54.3
Ave. Off Peak Hour	61.6	59.5	56.6	49.7	53.5	47.7	54.1
Evening Peak Hour	67.5	65.7	63.2	57.2	63.2	54.6	58.4
16-Hour Total	61.4	60.9	59.3	52.2	55.5	50.2	53.5
Total No. of Pass/Day (000)	310	879	340	2,078	852	3,432	7,891
Total Pass-Kms/Day (000)	1,590	4,854	2,043	9,696	3,555	12,845	34,868
Ave. Trip Length (Kms.)	5.2	5.5	6.0	4.8	4.2	3.8	4.4
Ave. No. of Pass/Veh/16 hrs.	191	187	165	208	247	250	222
Ave. No. of Round Trips/Veh/16 hrs.	4.4	2.8	3.7	4.8	10.2	12.5	9.0
Ave. Vehicle-Kms/Veh/16 hrs.	102	109	107	208	117	121	118
Ave. Travel Speed (KPH)	11.2	13.0	12.4	4.6	12.6	16.1	14.9
Ave. Turn-around Time/Trip (min.)	62	59	71	34	43	28	36

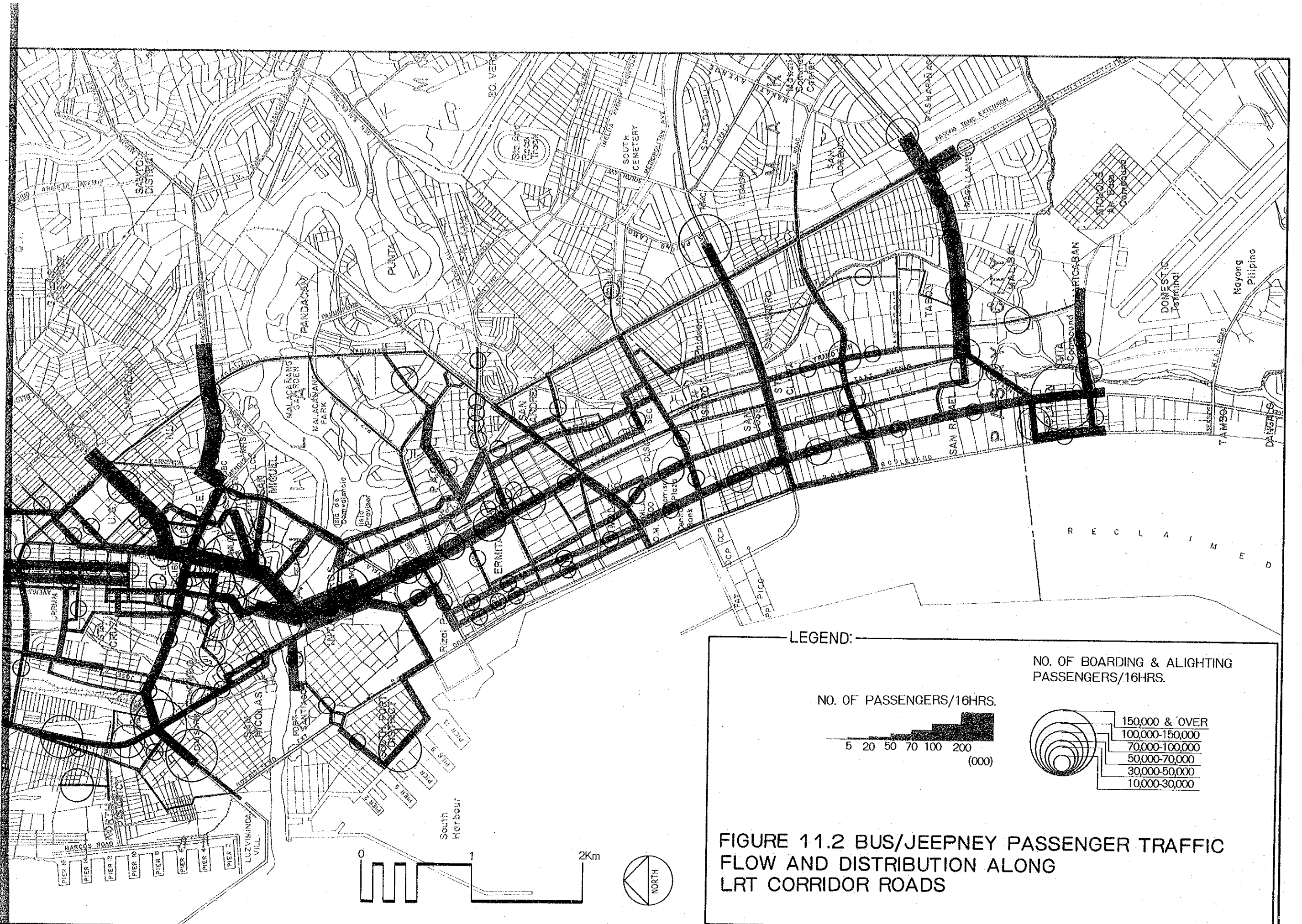
Table 11.4
LRT-Related Bus Transport
Characteristics by Route Type

Item	Route Type							Total
	I	II	III	IV	V	VI	VII	
Number of Routes	—	22	43	27	17	41	47	197
Ave. Route Length (Kms.)	—	26.9	22.8	29.7	24.1	26.4	26.1	25.8
No. of Units Running	—	371	880	856	385	871	2,548	5,911
Total Vehicles-Kms. (000)	—	42.8	75.1	127.3	41.1	91.6	365.7	743.6
Total Seat Kms. (000)	—	2,189	4,193	6,226	2,390	5,221	22,031	42,249
Frequency (Total)								
Morning Peak Hour	—	145.0	430.0	346.0	110.0	281.0	881.3	2,193.3
Ave. Off Peak Hour	—	99.4	317.6	220.6	92.4	188.4	697.0	1,615.4
Evening Peak Hour	—	117.3	375.3	261.3	101.0	237.3	851.7	1,944.0
16-Hour Total	—	1,788.0	5,620.0	4,040.0	1,564.0	3,466.0	12,196.0	28,674.0
Ave. Load Factor (%)								
Morning Peak Hour	—	46.0	63.7	59.7	50.0	55.1	67.8	61.8
Ave. Off Peak Hour	—	50.0	58.3	58.0	52.0	43.3	48.4	50.6
Evening Peak Hour	—	50.5	66.6	59.2	65.0	61.6	71.6	66.2
16-Hour Total	—	48.8	60.8	58.0	53.6	49.4	57.3	56.1
Total No. of Pass/Day (000)	—	109	401	276	145	269	1,226	2,426
Total Pass-Kms/Day (000)	—	1,068	2,549	3,612	1,282	2,580	12,622	23,713
Ave. Trip Length (Kms)	—	9.9	6.3	13.1	8.8	9.6	10.3	9.8
Ave. No. of Pass/Veh/16 hrs.	—	293	456	323	376	308	481	411
Ave. No. of Round Trips/ Veh/16 Hrs	—	2.4	3.2	2.4	2.1	2.0	2.7	2.4
Ave. Vehicle-Kms/Veh/16 hrs.	—	115.4	85.3	148.8	106.7	105.1	143.5	125.8
Ave. Travel Speed (KPD)	—	19.8	13.6	21.2	16.7	18.8	20.4	19.0
Ave. Turn-around Time/Trip (min.)	—	73	59	89	95	84	76	76

11.2.3 Passengers Traffic Flow and Distribution in LRT Corridor

- Figure 11.2 shows the jeepney/bus passenger traffic flow in and around the LRT corridor. The heaviest traffic flow is seen in Plaza Lawton where passenger volume reaches up to 800 thousand passengers (16 hours, both directions). Quezon Boulevard, Espana, Taft Avenue, Rizal Avenue Extension, A. Bonifacio, Harrison, Buendia, EDSA, and C. M. Recto also show a heavy passenger traffic flow. It should be noted, however, that Rizal Avenue and the southern half of Taft Avenue were closed during the field survey due to the construction of LRT. Instead, the streets running parallel to those roads, including Oroquieta, F. Huertas, T. Mapua, and Leveriza, show a heavy traffic flow.
- Figure 11.2 also illustrates the distribution of passengers boarding and alighting in the corridor. Major sources of jeepney/bus passengers are noted in Quiapo, Divisoria, Monumento, Blumentritt, Pier, Plaza Lawton, T.M. Kalaw, Pedro Gil, Libertad, Pasay Rotonda, and Baclaran.





LEGEND:

NO. OF BOARDING & ALIGHTING PASSENGERS/16HRS.

NO. OF PASSENGERS/16HRS.

5 20 50 70 100 200 (000)

150,000 & OVER
100,000-150,000
70,000-100,000
50,000-70,000
30,000-50,000
10,000-30,000

FIGURE 11.2 BUS/JEEPNEY PASSENGER TRAFFIC FLOW AND DISTRIBUTION ALONG LRT CORRIDOR ROADS

11.3 LRT IMPACT ANALYSIS

11.3.1 Assumptions

- The impact of the LRT was assessed on the assumption that it will be opened on the existing jeepney and bus transport system without any change in route configuration and fare structure. The TRANSTEP model and other data for EDP discussed in Chapter 8 were mainly used for this exercise.
 - The LRT operation characteristics were assumed as follows:
 - a) vehicle capacity : two-car train with loading capacity of 750 passengers per train
 - b) headway : 2.5 minutes
 - c) line capacity : 18,000 passengers/hr/direction^{1/}
 - d) LRT fare : P1.00 flat
- ^{1/}the initial capacity of 18,000 is expected to increase up to 33,000 ultimately with the introduction of the three-car-train with a headway of 2.0 minutes.

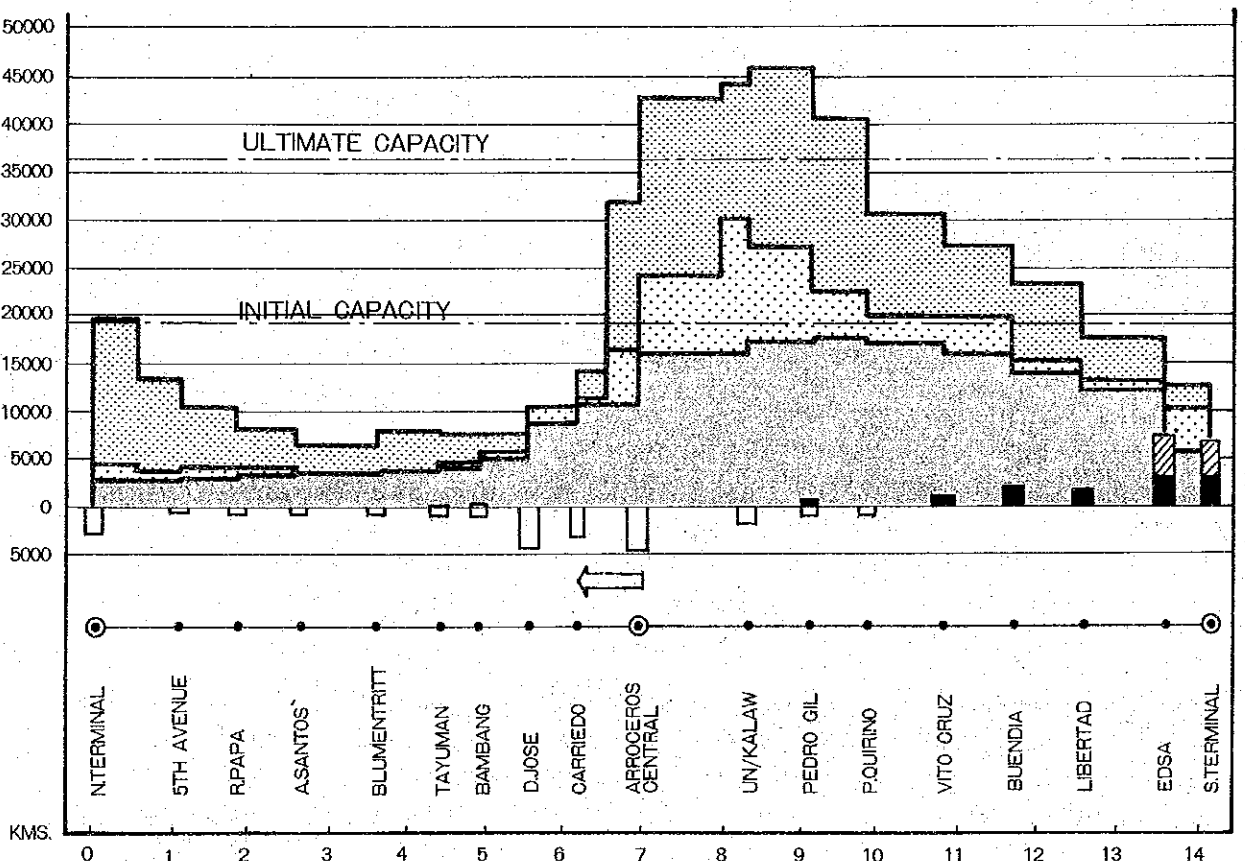
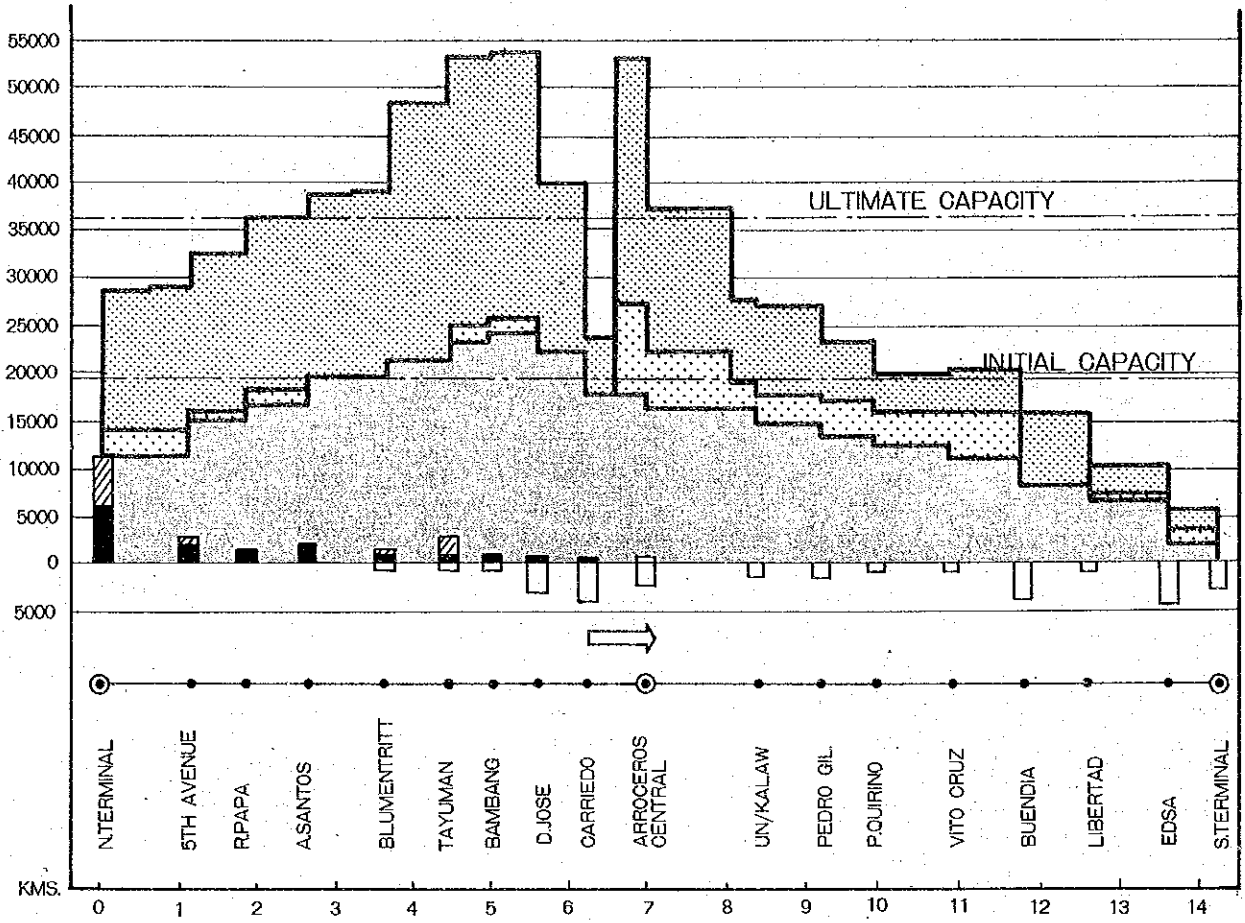
11.3.2 LRT Traffic Volume and Ridership

- The LRT route (Monumento – Baclaran via Rizal Avenue and Taft Avenue) was placed into the existing jeepney/bus route network, and, using the TRANSTEP model, passenger loadings/unloadings were simulated.
- The number of LRT passengers was estimated at 49 thousand for both directions for the morning peak hour. The average trip length calculated is 7.3 kilometers.
- The LRT passenger traffic flow by section is shown in Table 11.5 and Figure 11.3. The following can be pointed out as passenger demand characteristics:
 - a) Significant directional difference in traffic flow is observed. Considerably more traffic from North to South is expected.
 - b) Traffic density is high between Blumentritt and Vito Cruz (more than 30,000 passengers/hour/both directions).
 - c) Sections with traffic density (both directions) of less than 15,000 passengers are observed only between Monumento and 5th Avenue and between EDSA and Baclaran.
 - d) Along the north section, there is a significant difference in traffic flow by direction, while along the south section, passenger loading is almost the same for both directions.
 - e) Along the north section (South bound) between J. A. Santos and Carriedo, it is estimated that the LRT traffic will exceed the initial capacity of 18,000 passengers/hour.

11.3.3 LRT Impact on Public Transport

- Table 11.6 shows the impact of the LRT on the existing public transport operation. These can be summarized as follows:
 - a) Demand for jeepney/bus in terms of passenger-kilometers will decrease by about 8 percent. Buses will be more affected (-14 percent) than jeepneys (-5 percent).
 - b) The total number of passengers will grow by about 1 percent, reflecting the increase in number of transfers.
 - c) Meanwhile, public transport users will receive a benefit of 4 percent reduction in travel time as a whole.

FIGURE 11.3 LRT PASSENGER TRAFFIC FLOW (WITHOUT REROUTING) -MORNING PEAK HOUR





 TRANSFER BOARD ALIGHT
 JPY BUS LRT

Table 11.5
Estimated LRT Traffic and Ridership
(Without Rerouting)

Station	Direction : North → South			Direction : South → North			Both Directions		
	No. of Alighting Pass.	No. of Boarding Pass.	No. of Pass. Carried	No. of Alighting Pass.	No. of Boarding Pass.	No. of Pass. Carried	No. of Alighting Pass.	No. of Boarding Pass.	No. of Pass. Carried
N. Terminal	0	11,993	11,993	2,818	0	2,818	2,818	11,993	14,811
5th Avenue	0	3,019	15,012	378	0	3,196	378	3,019	18,208
R. Papa	0	1,810	16,822	189	0	3,385	189	1,810	20,207
A. Santos	0	2,790	16,822	228	0	3,613	228	2,790	23,225
Blumentritt	232	1,721	19,612	750	0	4,363	982	1,721	25,464
Tayuman	327	3,006	21,101	685	387	4,661	1,012	3,393	28,441
Bambang	355	1,146	23,780	943	459	5,145	1,298	1,605	29,716
D. Jose	3,252	936	24,571	4,240	230	9,155	7,492	1,666	31,410
Carriedo	4,391	402	22,255	2,825	309	11,671	7,216	711	29,937
Atroceros	2,116	690	16,840	4,866	69	16,468	6,982	759	33,308
Central									
U.N/Kalaw	1,692	162	15,310	1,801	250	18,019	3,493	412	33,329
Pedro Gil	1,717	442	14,035	847	484	18,382	2,564	926	32,417
P. Quirino	856	15	13,194	37	876	17,543	893	891	30,737
Vito Cruz	1,047	22	12,169	0	938	16,605	1,047	960	28,774
Buendia	4,048	0	8,121	0	1,648	14,957	—	1,648	23,078
Libertad	830	0	7,291	0	1,843	13,114	830	1,843	20,405
EDSA	4,771	0	2,520	0	7,077	6,037	4,771	7,077	8,557
S. Terminal	2,520	0	—	0	6,037	—	2,520	6,037	—
Total	28,152	28,152	—	26,609	26,609	—	48,761	48,761	—

Table 11.6
Impact of LRT on Metro Manila
Public Transport System

Case		Jeepney	Bus	LRT	Total
Without LRT	No. of Passengers (000)	506	168	—	674
	Passenger-Kms (000)	2,941	1,371	—	4,312
	Passenger-Hrs. (000)	155	64	—	219
	Fare Paid (P000)	464	204	—	668
With LRT	No. of Passengers (000)	479(-5%)	156(-7%)	49	684(+1%)
	Passenger-Kms (000)	2,791(-5%)	1,183(-14%)	357	4,331(+0%)
	Passenger-Hrs (000)	144(-7%)	55(-14%)	12	211(-4%)
	Fare Paid (P000)	444(-4%)	178(-13%)	49	671(+0%)

- Table 11.7 shows the sources of LRT passengers. Majority will come from jeepney in terms of number of passengers and from bus in terms of passenger-kilometers. They will use the LRT because they will be attracted by the reduction in travel time inspite of the transfers they have to make.

Table 11.7
Sources of LRT Passengers

	No. of Passengers	%	Passenger- Kms (000)	%
Diverted from Jeepney	26,395	(54)	150	(42)
Diverted from Bus	11,827	(24)	188	(53)
Generated	10,539	(22)	19	(5)
Total	48,761	(100)	357	(100)

- Although the number of LRT passengers is estimated to be approximately 7 percent of total public transport passenger demand, the LRT affects the existing bus and jeepney operation in a different way depending upon the extent of the competitive relationship and location of the routes. This is shown in Tables 11.8 and 11.9.
 - a) The more closely related to the LRT corridor the routes are, the more adversely affected they are by the LRT. As clearly indicated, type I routes are affected more than type II routes, which are affected more than type III routes. However, feeder type routes (types IV, V, and a part of VII) are, in general, benefited by the LRT.
 - b) The longer the bus or jeepney routes run parallel to the LRT corridor, the more they are adversely affected by the LRT. This is indicated by the fact that the bus is affected more than the jeepney even though their routes belong to the same type.
- The number of jeepney and bus units running daily is estimated at 35,500 and 5,900, respectively. Assuming that the needs for vehicle units are in proportion to passenger-kilometers required, approximately 1,800 jeepney units and 800 bus units will be relocated as a whole.

11.3.4 LRT Impact on Road Traffic

- Figure 11.4 shows the LRT impact on jeepney/bus passenger traffic by road section. The following can be pointed out:
 - a) The LRT corridor shows a decrease of jeepney/bus passenger traffic by about 20-50 percent. It is especially notable in the south corridor.
 - b) Parallel corridors including Harrison, South Super Highway, J. A. Santos, and Dimasalang/A. Bonifacio also show a considerable decrease by about 5-40 percent.
 - c) The roads feeding into the LRT corridor generally show an increase of 5-30 percent.
 - d) EDSA, which is used as a feeder road only between Balintawak and Monumento and between Pasay Rotonda and South Super Highway, shows a decrease of approximately 10 percent, reflecting the passengers' shift from EDSA to the LRT.
- Generally speaking, with the completion of the LRT, approximately 30 to 50 percent of the buses and jeepneys will be removed from the corridor.
- Although it seems that the reduction in public transport vehicles is quite large, the traffic situation will not be improved very much due to the following reasons:
 - a) reduction in road traffic capacity due to LRT facilities
 - b) increase in road traffic congestion around LRT stations
 - c) actualization of suppressed demand both in private and public transport.

Table 11. 8
Impact of LRT on Jeepney Routes

Route Type	Corridor Used (Other than LRT Corridor)	No. of Passengers		Passenger – Kms	
		Without LRT	With LRT (Ratio)	Without LRT	With LRT (Ratio)
I	—	46,210	36,579 (0.79)	190,305	103,575 (0.54)
II	McArthur	7,798	6,663 (0.85)	68,940	57,201 (0.83)
	Harrison	1,208	345 (0.29)	7,306	1,199 (0.16)
	A. Bonifacio	4,728	4,307 (0.91)	27,136	17,242 (0.64)
	J.A. Santos	2,008	1,523 (0.76)	9,651	7,992 (0.83)
	Pier South	3,512	2,339 (0.67)	16,560	7,459 (0.45)
	EDSA (North)	28,244	24,043 (0.85)	96,538	78,319 (0.81)
	España	28,147	23,240 (0.83)	187,087	158,827 (0.85)
	Jones Br.	9,424	7,285 (0.77)	38,687	20,480 (0.53)
	V. Cruz	1,647	1,647 (1.00)	1,904	1,004 (1.00)
	Subtotal	86,716	71,392 (0.82)	453,809	350,623 (0.77)
III	McArthur	17,810	15,089 (0.85)	129,812	101,871 (0.78)
	A. Bonifacio	5,514	4,006 (0.73)	19,543	14,752 (0.75)
	España	57,238	55,506 (0.97)	360,986	404,916 (1.12)
	Jones Br.	609	421 (0.69)	1,904	1,207 (0.63)
Subtotal	81,171	75,022 (0.92)	512,245	522,746 (1.02)	
IV	—	110,672	116,848 (1.06)	697,477	789,745 (1.13)
V	—	41,900	44,261 (1.06)	121,914	124,349 (1.02)
VI	—	139,967	135,239 (0.97)	965,289	899,839 (0.93)
TOTAL		505,736	479,341 (0.95)	2,941,039	2,790,877 (0.95)

Table 11.9
Impact of LRT on Bus Routes

Route Type	Corridor Used (Other than LRT Corridor)	No. of Passengers		Passengers – Kms	
		Without LRT	With LRT (Ratio)	Without LRT	With LRT (Ratio)
II	España	5,598	2,676 (0.48)	40,525	22,987 (0.57)
	Quirino Ave.	1,792	940 (0.52)	25,417	12,784 (0.50)
	S.S. Hi-way	8,661	5,848 (0.68)	163,521	59,734 (0.37)
	Roxas Blvd.	—	—	—	—
	Buendia	758	887 (1.17)	7,813	40,419 (1.33)
	A. Bonifacio	6,037	5,266 (0.87)	45,300	37,197 (0.82)
	Subtotal	22,846	15,617 (0.68)	282,576	143,121 (0.51)
III	Dimasalang	3,168	2,491 (0.79)	28,134	18,843 (0.67)
	P. Gil	10,207	10,014 (0.98)	43,572	42,538 (0.98)
	Buendia	11,704	7,473 (0.64)	64,161	46,071 (0.72)
	U.N. Ave.	4,570	4,762 (1.04)	13,130	13,562 (1.03)
	McArthur	590	136 (0.23)	5,258	1,781 (0.34)
	N. Div. Rd.	4,448	4,441 (1.00)	31,628	32,976 (1.04)
	España	385	300 (0.78)	5,377	3,537 (0.66)
	Quirino Ave.	4,023	2,484 (0.62)	39,496	25,516 (0.65)
	Jones Br.	12,023	12,027 (1.00)	34,449	33,839 (0.98)
Subtotal	51,118	44,128 (0.86)	265,205	218,763 (0.82)	
IV	—	5,640	6,061 (1.07)	40,488	42,720 (1.06)
V	—	15,807	15,667 (0.99)	72,813	74,434 (1.02)
VI	—	14,618	15,195 (1.04)	241,711	229,848 (0.95)
VII	—	57,837	59,371 (1.03)	467,991	474,551 (1.01)
TOTAL		167,866	156,039 (0.93)	1,370,784	1,183,437 (0.86)

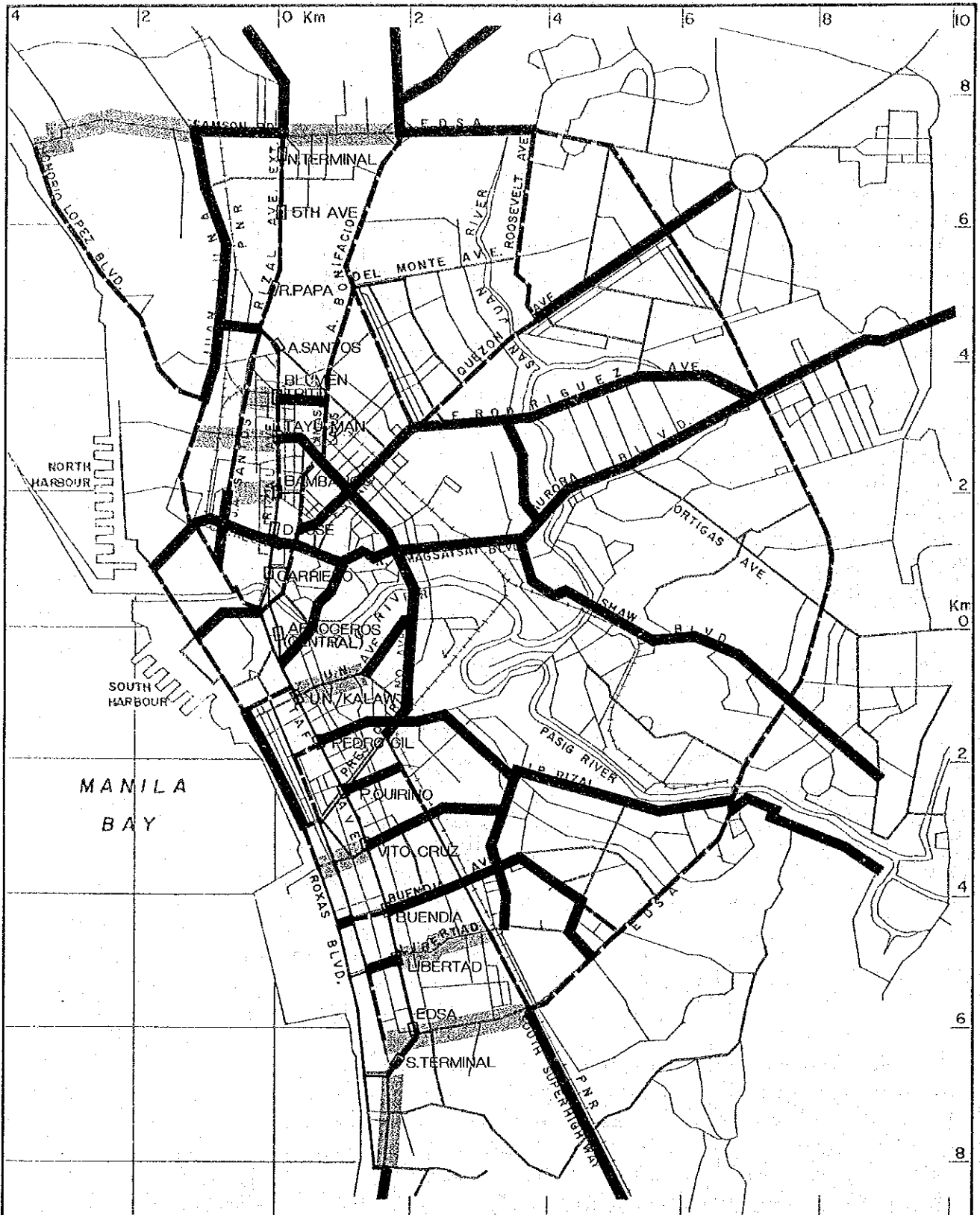
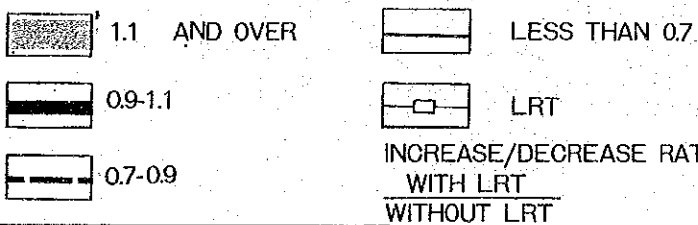


FIGURE 11.4 LRT IMPACT ONTO JEEPNEY/BUS PASSENGER TRAFFIC ON ROAD



11.3.5 Sensitivity Test on LRT Ridership

1) General

- LRT ridership of public transport passengers will be affected by several factors such as (a) competitive bus and jeepney operations both in route and their fare level and structure, (b) LRT fare level and structure against the ones of bus and jeepney, (c) assumed time value of public transport passengers, and (d) assumed resistance of passengers' access to LRT stations.
- Of the above, (c) and (d) are considered relatively critical factors which need to be determined carefully in traffic forecast using TRANSTEP.

2) Passenger Time Value and Accessibility to LRT

- Time value is defined as the value of time expressed in monetary terms determined by public transport passengers when they travel. A passenger selects a travel route to reach his destination wherein the sum of fare and all other costs including access, wait, loading and unloading, transfer and travel time, and comfort, is minimized. The higher the time value is, the more the passenger is conscious of time rather than fare. Since LRT is a grade-separated transport system free from road traffic congestion, the level of time value will affect the LRT ridership. The results of the sensitivity tests are summarized in Table 11.10 below.

Table 11.10
LRT Passenger Traffic Under
Different Time Values^{1/}

Time Value	LRT Passenger Traffic Volume Ratio
Low Assumption (P1.0/Hr)	100
Medium Assumption (P1.7/Hr)	116
High Assumption (P3.0/Hr)	136

^{1/}basic assumptions of the test:

- free competition with existing buses/jeepneys
- LRT fare of P1.0 flat against present bus/jeepney fare (P0.65/5km + P0.13/km)

- It is considered that one of the factors disadvantageous to attracting passengers to the LRT are the staircases at stations which Metro Manila public transport passengers are not accustomed to. Assuming that access/transfer costs of LRT will increase to such an extent that they share approximately 20 percent of the total cost, the LRT passenger traffic level will decrease by approximately 50 percent. Although it seems that the above assumption of 20 percent is too high, it may be concluded that the accessibility to LRT will be one of the critical factors needed to be duly taken into account.

3) Implication of LRT Fare Level and Structure

- An exercise was made on the interactions among several interrelated factors such as fare level, number of passengers, expected revenue, and total cost of public transport passengers for the LRT. An increase in the LRT fare level directly leads to a decrease

in the number of LRT passengers. However, it is not necessarily the case between LRT fare level and LRT fare revenue.

- TRANSTEP was run on the basis of the following assumptions of relevant inputs:
 - a) Time Value : ₱1.70/hour
 - b) Bus/Jeepney : rerouted (Plan B: selected only for the purpose of this exercise. See 8.2.2 of Chapter 8)
 - c) Bus/Jeepney fare : existing (₱0.65/5 kms. + ₱0.13/km.)
 - d) Access to LRT : penalized (in such a way that an LRT passenger will pay an average of 10 percent of the total cost of a trip to have access to LRT).
 - e) LRT Fare : flat fare of ₱0.65, ₱0.80, ₱1.00, ₱1.10, ₱1.25 and ₱1.50

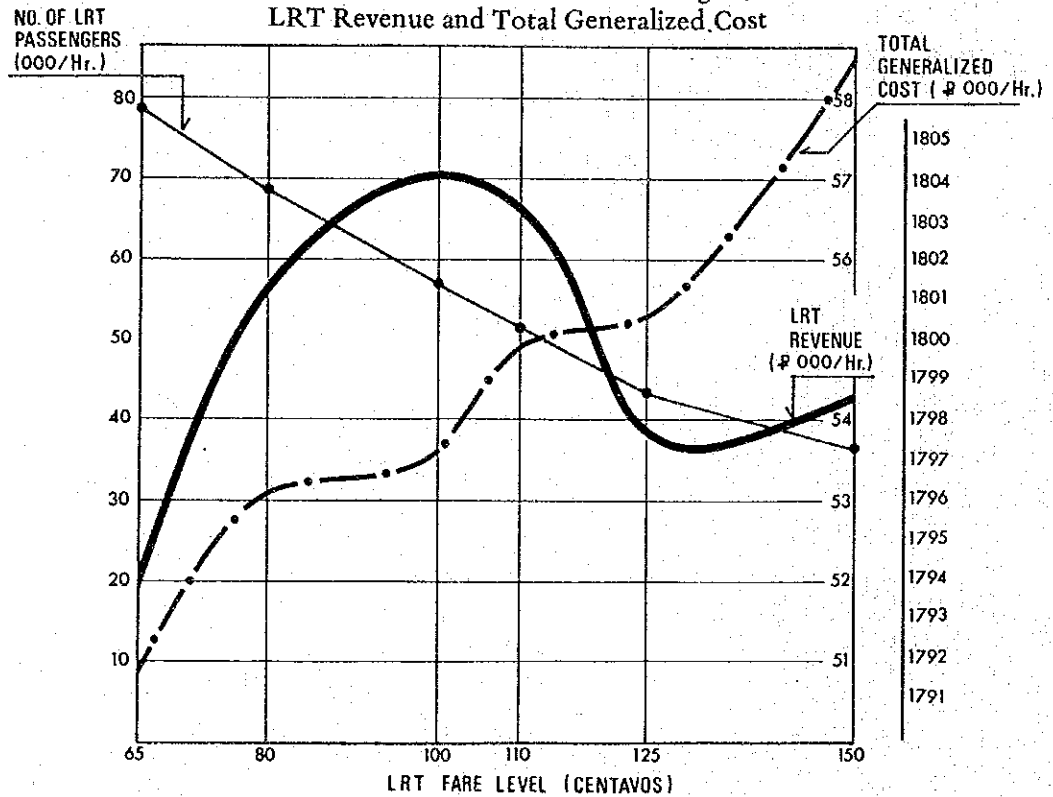
For each output, the following were compared:

- a) LRT fare level
 - b) Number of LRT passengers
 - c) Expected LRT revenue
 - d) Total generalized cost : (Total time cost and fare spent by all public transport passengers for the entire Metro Manila)
- The results are summarized in Table 11.11 wherein figures are shown in both absolute terms and differences between the case for an LRT flat fare of ₱1.00 and each of the other cases. The results are also illustrated in Figure 11.5. Major findings made are as follows:
 - a) **LRT Passenger Traffic:** The number of LRT passengers decreases as the fare increases. It seems, however, that the rate of decrease in LRT passenger traffic becomes less between the LRT fare of ₱1.25 and ₱1.50. This implies that there is a certain amount of public transport demand which will be benefited even if the LRT fare is high.
 - b) **LRT Revenue:** The estimated LRT revenue increases with the increase in the LRT flat fare from ₱0.65 to ₱1.00. It reaches its peak at ₱1.00 flat as shown in Figure 11.5. However, as the LRT fare increases further, the LRT revenue decreases but will start increasing gradually after a ₱1.25 flat fare. This is so because the rate of decrease in LRT ridership becomes smaller after ₱1.25 flat fare due to the existence of a certain amount of stable LRT demand as mentioned above.
 - c) **Total Generalized Cost:** Generalized cost is defined as the total amount of cost of transportation paid by public transport (LRT, bus and jeepney) passengers wherein time cost is converted into monetary terms at a conversion rate of ₱1.70 per hour. This cost increases as the LRT fare increases. However, the rate of increase is high between ₱0.65 and ₱0.80, ₱1.00 and ₱1.10 and ₱1.25 and over, as shown in Figure 11.5.
 - d) **Conclusion:** If the cost of LRT operation does not vary much depending upon the LRT passenger traffic volume, it is indicated that the LRT fare of ₱1.00 flat will give the maximum LRT revenue with the minimum increase in total generalized cost.

Table 11.11
Summary Results of Sensitivity Analysis

LRT Fare (flat)	Number of LRT Passengers			LRT Revenue			Total Generalized Cost	
	Inc/Decrease			Inc/Decrease			Inc/Decrease	
	₱000/hr.	000/hr.	Ratio	₱000/hr.	000/hr.	Ratio	₱000/hr.	₱000/hr.
₱0.65	79.8	+22.7	140	51.9	-5.2	91	1791.6	-5.4
₱0.80	69.5	+12.4	122	55.6	-1.5	97	1796.2	-0.8
₱1.00	57.1	0	100	57.1	0	100	1797.0	0
₱1.10	51.5	- 5.6	90	56.7	-0.4	99	1799.8	+2.8
₱1.25	43.0	-14.1	75	53.8	-3.3	94	1800.5	+3.5
₱1.50	36.1	-21.0	63	54.2	-2.9	95	1807.1	+10.1

Figure 11.5
Results of the Sensitivity Analysis
in Terms of Number of LRT Passengers,
LRT Revenue and Total Generalized Cost



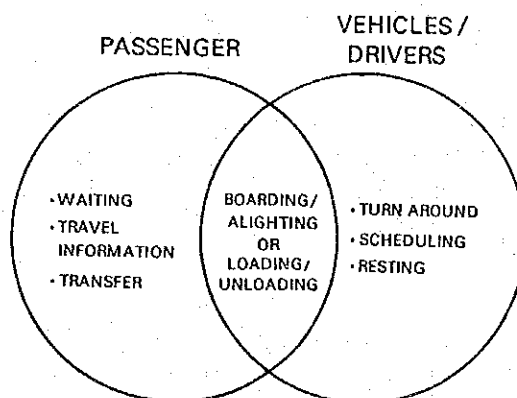
- Dual fare was also tested to tap the short trip passengers along both ends of the LRT section (between Monumento and Blumentritt and between Baclaran and P. Quirino) where passenger traffic is low. The result of the analysis indicates that dual fare is quite effective in maximizing the available capacity such that:
 - a) number of passengers will increase by about 36 to 44 percent
 - b) average load factor will increase by about 10 to 15 percent, while maximum volume capacity ratio will not increase
 - c) estimated revenue will increase by about 15 to 24 percent.

Chapter 12.
PUBLIC TRANSPORT TERMINALS

CHAPTER 12 PUBLIC TRANSPORT TERMINALS

12.1 INTRODUCTION

- The word “terminal” for public transport passenger is used and understood in various ways. It may mean a system with comprehensive facilities and functions or it may just be a designated on-road space without any facilities. It may be an area or facility or any section of the road where passengers are loaded/unloaded or it may refer to a turning point where vehicles simply turn-around to get back to their respective origins.
- However, the term “passenger transport terminal” can be simply defined as an area with the fundamental function of properly meeting the passengers’ boarding/alighting or vehicles’ loading/unloading requirements. Passengers further require waiting and transfer areas as well as travel information services while vehicles (drivers) require turn-around, scheduling and parking facilities. Services needed by passengers should be provided by “terminals”, while those required by vehicles could be met outside of the “terminals”.



- Metro Manila’s urban transport system, as discussed in the preceding chapters, almost totally relies on road transport and will continue to rely on it even after the completion of the LRT. More specifically, jeepneys and buses are the ones which provide basic services to the public. However, facilities which will support the public transport operation have not necessarily been well provided. Historically, the government plays a minimal role in the development of the “terminal” either in terms of facilities or locations. This role is basically assumed by the private sector or is a result of reciprocal actions between the public and private sectors. Since the terminal itself is not financially viable, operators avoided, as much as possible, capital expenditures for terminal facilities by using the streets, gas stations and vacant lots as terminals. At the same time, they are located close to passenger generating sources.
- The current practice for boarding/alighting of public transport passengers in Metro Manila is done mainly on road spaces. This traditional method of boarding/alighting passengers is considered as one of the most effective and inexpensive solutions. However, due to the ever increasing transport demand in the face of limited transport capacities, the method began to lose its advantages in many locations and instances. Serious congestions are observed throughout the day in many terminal areas due to constant loading/unloading of passengers by vehicles. These congestions are reaching the level that will affect not only the terminal area but also the road network, thus bringing about an increase in travel costs of passengers and in operating costs of vehicles, both for public as well as private modes.

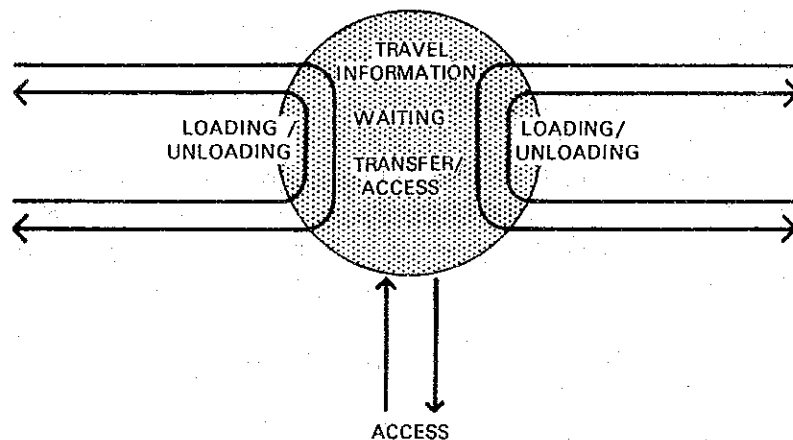
- Since the terminals do not have any fixed facilities but mere designated on-road spaces, it is often difficult to pinpoint their locations because they are moved from one place to another in the course of time. Sometimes, their locations are split into several areas owing to the constraints in spaces. During the field survey, it was found out that several locations with different terminal names are in fact the same. This confuses the control of the routes.
- In view of the above, this chapter seeks to arrive at possible solutions for the improvement of the public transport system particularly through the improvement of terminals/terminal areas. The specific objectives of this task are as follows:
 - 1) To identify the characteristics and roles of existing public transport terminals/terminal areas based on the conduct and analysis of the field surveys.
 - 2) To identify the possible improvement/development directions.

12.2 EXISTING PUBLIC TRANSPORT TERMINALS

12.2.1 General

- The concept of “passenger transport terminal” is illustrated in Figure 12.1. It can be defined as an area (functionally) or facility (physically) which provides the aforementioned fundamental services/functions. “Terminal” does not necessarily mean the physical facilities.

Figure 12.1
Conceptual Understanding of
“Passenger Transport Terminal”



- However, an actual “terminal” may look and function in many different ways and in more complicated manners depending upon:
 - if the terminal serves:
 - a) both inter-urban and intra-urban services, or
 - b) only the intra-urban or inter-urban service.
 - if the terminal serves:
 - a) only one mode of transport, or
 - b) more than one mode of transport.

- if the terminal is located in a:
 - a) busy urban center, or
 - b) suburban area.
- if the terminal is located in:
 - a) one limited area, or
 - b) along a road section or spread over an area.
- if the terminal is situated in an:
 - a) on-road space, or
 - b) off-road space.
- if the terminal is situated at:
 - a) the ends of the routes or
 - b) the middle of the route.
- Normally, there are no fixed facilities but rather only designated on-road spaces, off-road vacant lots or portions of gas stations used as terminals. On the other hand, as typically seen in the case of some provincial bus operators, there are off-road terminals in the real sense. They provide shelter, berths, passenger waiting facilities, parking lots, information service and shopping facilities. Although railway stations are often important passenger transport terminals, only the Tutuban station of PNR provides the proper function and facilities. Due to its insignificant role, the rest of the PNR stations are merely platforms.

12.2.2 Existing Jeepney Terminals

- At the start of this study, jeepney terminals have been defined as locations where jeepney routes start/end. In this sense, the “terminals” directly imply “turning points”. All of the 270 terminals were identified and surveyed (229 are in Metro Manila and 41 are outside of Metro Manila). The results are shown in JUMSUT Supporting Document No. 7. Considering the location and actual utilization of the terminals in Metro Manila, those which can be regarded as the same were classified together. Accordingly, the total number of terminals in Metro Manila has been reduced to 184, while those outside Metro Manila (41 terminals) remained the same.
- Table 12.1 summarizes the characteristics of jeepney terminals. Out of 184 jeepney terminals located in Metro Manila, 21 are within C-2, 80 are found between C-2 and C-4 and 83 are outside C-4 areas.
- Intermodal relations of jeepney terminals are shown in Table 12.2 The characteristics are as follows:
 - a) Many of the terminals relate to other public transport modes including tricycle, bus, PNR, and LRT. The typical combination according to their numbers are;
 - City jeepney + tricycle : 68
 - City jeepney alone : 36
 - City jeepney + City bus + tricycle : 26
 - City jeepney + City bus : 18
 - City jeepney + Provincial jeepney + City bus : 10
 - City jeepney + City bus + Provincial bus : 7
 - b) Most of the major terminals relate to several modes as in the cases of Monumento, Baclaran, Pasay Rotonda, Libertad, Lawton, Divisoria, Cubao, etc.

- c) However, terminals located within C-2 do not relate much with other modes, while those in the rest of Metro Manila interrelate considerably with other modes, particularly the bus and tricycle.
- d) Four terminals relate with the PNR, while five relate with the LRT.
- Only 35 terminals or 19 percent of the total number in Metro Manila are provided with off-road spaces. These are the 12 terminals within C-4 and the 23 outside of C-4. No terminals within C-2 are provided with off-road space.
 - Of the total 16.1 million (per 16 hours) jeepney passengers, 41 percent or 6.9 million utilize the terminals. The remaining 59 percent use other road sections. The average number of boarding and alighting passengers per terminal is 68,500/16 hours within C-2, 38,400 between C-2 and C-4 and 23,400 outside of C-4.

Table 12.1
Summary of Jeepney Terminals

Area	Number of Terminals/ Turning Points	Number of Boarding/Alighting Passenger (000)/16 Hrs.		% of Terminal Passengers (1)/(2)×100
		At Terminal/ Turning Point (1)	Whole Area (2)	
Within C-2	21	1,439	4,932 ^{1/} 4,138 ^{1/}	34.8
C-2/C-4	(North)	29	2,312	51.7
	(East)	29	2,787	45.7
	(South)	22	3,334	35.7
Sub-total	80	3,035	8,433 6,873	44.2
Outside C-4	(North)	36	2,036	46.2
	(East)	21	2,652	26.0
	(South)	26	2,664	43.0
Sub-total	83	1,946	7,353 5,155	37.7
Metro Manila Sub-total	184	6,420	20,718 16,146	40.0
Outside Metro Manila	(North)	16	207	70.3
	(East)	11	148	55.2
	(South)	14	174	78.2
Sub-total	41	219	350 280	69.6
Total	224	6,839	21,492 16,718	40.9

Source: JUMSUT Public Transport Survey

^{1/} Upper Column: Total number of bus and jeepney passengers

Lower Column: Number of jeepney passengers

Table 12.2
Jeepney Terminals by Type of Intermodal Relations

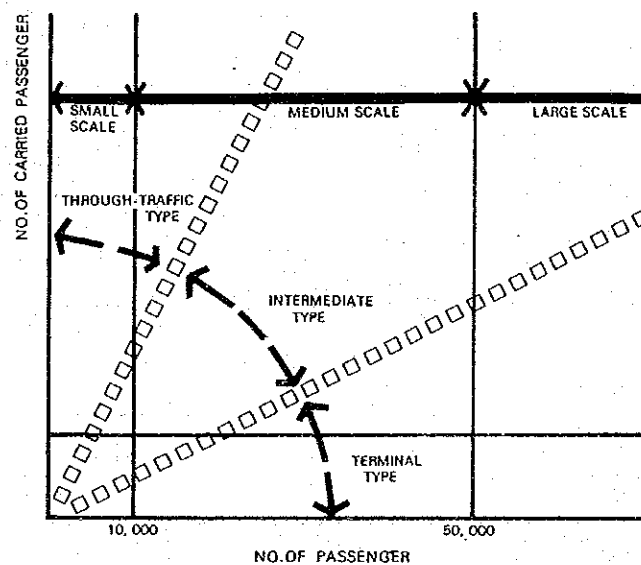
Terminal Type	Number of Terminals by Area ^{1/}				Representative Terminals ^{1/}															
	Within C-2	Between C-2/C-4	Outside C-4	Total																
<table border="1"> <tr><td>Jeepney</td><td colspan="2">Bus</td><td>LRT</td><td>PNR</td></tr> <tr><td>City</td><td>Prov</td><td>City</td><td>Prov</td><td></td></tr> <tr><td>●</td><td></td><td></td><td></td><td></td></tr> </table>	Jeepney	Bus		LRT	PNR	City	Prov	City	Prov		●					11 (1)	40 (20)	53 (47)	104 (68)	Binondo, Vito Cruz/Harrison, Nichols, (Paco, Frisco, Proj. 6, Murphy)
Jeepney	Bus		LRT	PNR																
City	Prov	City	Prov																	
●																				
<table border="1"> <tr><td>Jeepney</td><td colspan="2">Bus</td><td>LRT</td><td>PNR</td></tr> <tr><td>City</td><td>Prov</td><td>City</td><td>Prov</td><td></td></tr> <tr><td>●</td><td>●</td><td></td><td></td><td></td></tr> </table>	Jeepney	Bus		LRT	PNR	City	Prov	City	Prov		●	●				2 (-)	1 (1)	-	3 (1)	Recto,(Stop and Shop)
Jeepney	Bus		LRT	PNR																
City	Prov	City	Prov																	
●	●																			
<table border="1"> <tr><td>Jeepney</td><td colspan="2">Bus</td><td>LRT</td><td>PNR</td></tr> <tr><td>City</td><td>Prov</td><td>City</td><td>Prov</td><td></td></tr> <tr><td>●</td><td>●</td><td>●</td><td></td><td></td></tr> </table>	Jeepney	Bus		LRT	PNR	City	Prov	City	Prov		●	●	●			1 (-)	3 (2)	7 (7)	11 (9)	Quiapo,(Libertad, Pasig)
Jeepney	Bus		LRT	PNR																
City	Prov	City	Prov																	
●	●	●																		
<table border="1"> <tr><td>Jeepney</td><td colspan="2">Bus</td><td>LRT</td><td>PNR</td></tr> <tr><td>City</td><td>Prov</td><td>City</td><td>Prov</td><td></td></tr> <tr><td>●</td><td>●</td><td>●</td><td>●</td><td></td></tr> </table>	Jeepney	Bus		LRT	PNR	City	Prov	City	Prov		●	●	●	●		1 (-)	1 (-)	-	2 (-)	Divisoria, Cubao
Jeepney	Bus		LRT	PNR																
City	Prov	City	Prov																	
●	●	●	●																	
<table border="1"> <tr><td>Jeepney</td><td colspan="2">Bus</td><td>LRT</td><td>PNR</td></tr> <tr><td>City</td><td>Prov</td><td>City</td><td>Prov</td><td></td></tr> <tr><td>●</td><td></td><td>●</td><td></td><td></td></tr> </table>	Jeepney	Bus		LRT	PNR	City	Prov	City	Prov		●		●			-	23 (10)	20 (16)	43 (26)	Espana, Rotonda, Banaue/ Quezon Avenue, Ayala Shoemart
Jeepney	Bus		LRT	PNR																
City	Prov	City	Prov																	
●		●																		
<table border="1"> <tr><td>Jeepney</td><td colspan="2">Bus</td><td>LRT</td><td>PNR</td></tr> <tr><td>City</td><td>Prov</td><td>City</td><td>Prov</td><td></td></tr> <tr><td>●</td><td></td><td>●</td><td>●</td><td></td></tr> </table>	Jeepney	Bus		LRT	PNR	City	Prov	City	Prov		●		●	●		1 (-)	8 (3)	1 (-)	10 (3)	Quezon Avenue/EDSA , (Boni, Pinatubo)
Jeepney	Bus		LRT	PNR																
City	Prov	City	Prov																	
●		●	●																	
<table border="1"> <tr><td>Jeepney</td><td colspan="2">Bus</td><td>LRT</td><td>PNR</td></tr> <tr><td>City</td><td>Prov</td><td>City</td><td>Prov</td><td></td></tr> <tr><td>●</td><td>●</td><td>●</td><td>●</td><td></td></tr> </table>	Jeepney	Bus		LRT	PNR	City	Prov	City	Prov		●	●	●	●		-	2 (1)	2 (1)	4 (2)	Baclaran, Pasay Rotonda, (Monumento)
Jeepney	Bus		LRT	PNR																
City	Prov	City	Prov																	
●	●	●	●																	
<table border="1"> <tr><td>Jeepney</td><td colspan="2">Bus</td><td>LRT</td><td>PNR</td></tr> <tr><td>City</td><td>Prov</td><td>City</td><td>Prov</td><td></td></tr> <tr><td>●</td><td></td><td></td><td>●</td><td></td></tr> </table>	Jeepney	Bus		LRT	PNR	City	Prov	City	Prov		●			●		1 (-)	-	-	1 (-)	P. Faura/l. Guinto
Jeepney	Bus		LRT	PNR																
City	Prov	City	Prov																	
●			●																	
<table border="1"> <tr><td>Jeepney</td><td colspan="2">Bus</td><td>LRT</td><td>PNR</td></tr> <tr><td>City</td><td>Prov</td><td>City</td><td>Prov</td><td></td></tr> <tr><td>●</td><td></td><td>●</td><td>●</td><td></td></tr> </table>	Jeepney	Bus		LRT	PNR	City	Prov	City	Prov		●		●	●		1 (-)	-	-	1 (-)	San Andress
Jeepney	Bus		LRT	PNR																
City	Prov	City	Prov																	
●		●	●																	
<table border="1"> <tr><td>Jeepney</td><td colspan="2">Bus</td><td>LRT</td><td>PNR</td></tr> <tr><td>City</td><td>Prov</td><td>City</td><td>Prov</td><td></td></tr> <tr><td>●</td><td></td><td>●</td><td>●</td><td>●</td></tr> </table>	Jeepney	Bus		LRT	PNR	City	Prov	City	Prov		●		●	●	●	1 (-)	-	-	1 (-)	Lawton
Jeepney	Bus		LRT	PNR																
City	Prov	City	Prov																	
●		●	●	●																
<table border="1"> <tr><td>Jeepney</td><td colspan="2">Bus</td><td>LRT</td><td>PNR</td></tr> <tr><td>City</td><td>Prov</td><td>City</td><td>Prov</td><td></td></tr> <tr><td>●</td><td>●</td><td></td><td></td><td>●</td></tr> </table>	Jeepney	Bus		LRT	PNR	City	Prov	City	Prov		●	●			●	1 (1)	-	-	1 (1)	(Blumentritt)
Jeepney	Bus		LRT	PNR																
City	Prov	City	Prov																	
●	●			●																
<table border="1"> <tr><td>Jeepney</td><td colspan="2">Bus</td><td>LRT</td><td>PNR</td></tr> <tr><td>City</td><td>Prov</td><td>City</td><td>Prov</td><td></td></tr> <tr><td>●</td><td></td><td>●</td><td></td><td>●</td></tr> </table>	Jeepney	Bus		LRT	PNR	City	Prov	City	Prov		●		●		●	-	1 (1)	-	1 (1)	(Zobel Roxas)
Jeepney	Bus		LRT	PNR																
City	Prov	City	Prov																	
●		●		●																
<table border="1"> <tr><td>Jeepney</td><td colspan="2">Bus</td><td>LRT</td><td>PNR</td></tr> <tr><td>City</td><td>Prov</td><td>City</td><td>Prov</td><td></td></tr> <tr><td>●</td><td>●</td><td></td><td></td><td>●</td></tr> </table>	Jeepney	Bus		LRT	PNR	City	Prov	City	Prov		●	●			●	-	1 (1)	-	1 (1)	(Sta. Mesa)
Jeepney	Bus		LRT	PNR																
City	Prov	City	Prov																	
●	●			●																
<table border="1"> <tr><td>Jeepney</td><td colspan="2">Bus</td><td>LRT</td><td>PNR</td></tr> <tr><td>City</td><td>Prov</td><td>City</td><td>Prov</td><td></td></tr> <tr><td>●</td><td></td><td></td><td></td><td>●</td></tr> </table>	Jeepney	Bus		LRT	PNR	City	Prov	City	Prov		●				●	1 (-)	-	-	1 (-)	Dagupan/C. M. Recto
Jeepney	Bus		LRT	PNR																
City	Prov	City	Prov																	
●				●																
Total	21	80	83	184																

Source: JUMSUT Public Transport Survey

^{1/} Figures and names in parentheses indicate those served by tricycles

- The existing 184 terminals/terminal areas were further classified based on their type, size of traffic and broadly categorized land use. The criteria used are:
 - a) **Large-scale Terminals:** are selected according to the following criteria:
 - i) Number of boarding/alighting passengers: more than 100,000/16 hours.
 - ii) Frequency: more than 20,000/16 hours/direction.
 - iii) Number of routes: more than 30
 - iv) Terminals are located on strategic points of the public transport network.
 Fifteen terminals/terminal areas fall under this category.
 - b) **The terminals located within EDSA:** are classified into nine types according to the number of boarding and alighting passengers at terminals and the number of on-board passengers at terminals (through-traffic) as shown in Figure 12.2. Their sizes are classified into three, namely: medium-large for the number of boarding and alighting passengers of more than 50,000/16 hours, medium between 10,000 and 50,000/16 hours and small with less than 10,000/16 hours. Another category is the mixture of terminating/originating passengers and passing-through passengers. Terminals which have twice as many through passengers as terminating passengers are defined as “through-traffic type”, while those which have only half of terminating passengers are “terminal type”.

Figure 12.2
Classification of Jeepney Terminals
Located within EDSA



- c) **The terminals located outside EDSA:** are also classified into nine types according to their land use which is considered to be a determining factor. Land use characteristics are classified into three: “residential”, “local community center”, and “subdivision”. Local community center includes town proper, commercial center, school business district, factory, etc. Their sizes correspond to those already defined in the “Terminals within EDSA”. The results are shown in Table 12.3.

Table 12.3
Classification of Existing Jeepney Terminals

1. Large-scale Terminals

Monumento, Blumentritt, Divisoria, Pier, Quiapo, Vito Cruz, Libertad, Pasay Rotonda, Baclaran, Cubao, Sta. Mesa/Stop & Shop, JRC/Kalentong, Crossing, Guadalupe, Ayala
--

2. Terminals Inside EDSA (C-4)

Function/Size	Medium-Large	Medium	Small
1. Terminating	Gastambide, Recto/Quezon Blvd., Paco (L. Guinto/P. Gil), Boni/EDSA/Pinatubo	Bangkusay, North Harbor, San Miguel, Lealtad, Punta, Hulo, Little Baguio/Once, Santol, Pandacan (Beata) Evangelista (P. Rtda.)	Paltok, A. Mabini/P. Burgos, Lardizabal/M. dela Fuente, Gate 5/EDSA, CCP, Dian, Cabrera, Salcedo Vill., Unimart
2. Intermediate	Binondo, Balintawak, Muñoz Mkt., Pantranco	A. Rivera/Bambang, Dagupan/Tayuman, Paco Church, T.M. Kalaw, Balut, P. Guevatra/Tayuman, Banaue/Quezon Ave., Dapitan/Mayon, EDSA/West Ave., La Loma, Retiro, Talayan Vill., Sangandaan, North Bay Blvd., Bacood, España/M. dela Fuente, Blumentritt/San Perfecto, San Juan, 1st West Crame, M. de la Cruz, Amorsolo, Bel-Air/Buendia/EDSA, Capt. M. Reyes	Manuguit, Obero, A. Bonifacio/Biglang-Awa, Banaue/Del Monte, Proj. 7, West Ave./Quezon Ave., Nagtahan/Sta. Mesa Rtda., Namayan, Tropical Hut, ABS/CBN Legaspi Vill., Makati(TP)/P. Burgos
3. Passing Through	Plaza Sta. Cruz, España Rtda., Quezon Institute, Del Pan	Pritil Mkt/Herbosa, San Andres, Dimasalang, Del Monte/A. Bonifacio, Quezon Ave./EDSA, Maypajo, Balic-Balic, Sta. Mesa Mkt., Kamagong	Del Pan Bridge, Bustillos, Remedios, Frisco, Sta. Ana Frisco, Sta. Ana Tulay/New Panaderos, Roxas District, Sta. Ana (Church)

3. Terminals Outside EDSA (C-4)

Function/Size	Medium-Large	Medium	Small
1. Residential Area Based	Sucat/SSH (Muntinlupa), Almanza	Quirino Highway/T. Sora, Bagong Barrio, Malanday, Malinta, Gasak, Calumpang, Malibay/C. Jose, Bagbaguin	Bagumbong, EDSA/G. de Jesus, Karuhatan, Dampalit, Hulo (Malabon), Pineda, Proj. 2 & 3, Pinaglabanan, Sgt. Mariano, Pasig (San Joaquin), Bagumbayan, Tipas
2. Local Community Centre-Based	Navotas (TP)/Naval/G. Luna, Pasig (TP) Palengke, Kabilhasnan, Parañaque (TP), Alabang, Las Piñas (TP), Zapote	Commonwealth/T. Sora, Novaliches (TP), Zabarte, Baesa/PUC, Malabon (TP), Letre, Katipunan/Aurora Blvd., QMC/Quezon City Hall/PHHC, Libis/Gentex, Murphy, Marikina (TP), U.P., Pasig (Rosario), Ft. Bonifacio (Gate 3), Muntinlupa (TP)	La Mesa Dam, Kaybigan, Malolos Ave./N. Diversion Rd., Tala, Philcoa, Victorina Ave., Polo V. Luna, Meralco, Riza Prov'l. Capitol, Ikot (within UP), Ugong, Kayamanan, Pateros (TP) Bicutan, FTI/GMTFM, Napindan, Taguig (TP)
3. Subdivision Based	Fatima Village, Tullahan/BBB	Lagro, Proj. 6, Road 14, Fairview, Proj. 4, Parang, Nichols	Proj. 8 (GSIS Village), Pagasa, Novaliches (Amparo), Novaliches (B.F. Homes), Novaliches (Camarin) Novaliches (Urduja), EDSA/SSH (Magallanes), Sta. Queteria, SSS Village, Baltac Subdivision, Forbes Park, Merville Subdivision, Moonwalk Village

12.2.3 Bus Terminals

- Bus terminals/turning points are summarized in Table 12.4 and their locations are shown in Figure 12.3. Generally speaking, although all of them have their own vehicle terminals, city buses normally use on-road spaces as passenger terminals. On the other hand provincial buses mostly use off-road terminal spaces and many of them even have their own space and facilities.
- Table 12.5 shows major bus terminals selected on the basis of the traffic volume: 16 hours frequency of more than 500 and above and 16 hours boarding and alighting passengers of 15,000 and above. The largest bus terminals/terminal areas are Monumento and Baclaran followed by Quiapo, Lawton, Alabang, MIA, and Divisoria. The most comprehensive provincial bus terminal is that owned by Victory Liner at Monumento. The terminal is provided with complete waiting sheds, berths, waiting facilities, shops as well as smooth interface facilities with city jeepneys and taxis.
- Most of the off-road bus terminals (mostly of provincial buses) were acquired and developed by the operators themselves. Their locations are scattered and they are individually small. Although most of them are located along major thoroughfares, adverse traffic impacts due to the provincial bus terminal traffic is not so significant. This is because of their relatively low frequency as compared to that of city buses and jeepneys.

Table 12.4
Existing Bus Terminals/Turning Points

Type of Bus	Terminal Type	Within C-2	Between C-2-C-4	Outside C-4	Total	
Ordinary Bus	on-road	5	8	19	32	
	off-road	0	0	3	3	
		gan station	0	2	2	4
		vacant lot (rented)	0	0	1	1
		vacant lot (owned)	0	2	8	10
	with facility (owned)	0	2	8	10	
	Sub-total	5	12	33	50	
Double-Decker	on-road	0	2	1	3	
Limited Bus	on-road	1	2	1	4	
	off-road	0	1	0	1	
		vacant lot (rented)	0	0	1	1
	with facility (owned)	0	0	1	1	
	Subtotal	1	5	3	9	
Love Bus	on-road	2	5	4	11	
	off-road	0	2	1	3	
		vacant lot (rented)	0	0	1	1
	with facility (owned)	0	0	1	1	
	Subtotal	2	7	6	15	
Mini-bus	on-road	5	1	4	10	
	off-road	1	0	2	3	
		vacant lot (rented)	0	1	0	1
		vacant lot (owned)	0	1	0	1
	with facility (owned)	0	1	0	1	
	Sub-total	6	3	6	15	
Provincial Bus	on-road	1	1	0	2	
	off-road	4	2	1	7	
		vacant lot (rented)	2	0	0	2
		vacant lot (owned)	3	14	4	21
	with facility (owned)	3	14	4	21	
	Subtotal	10	17	5	32	
TOTAL		24	44	53	121	

Source: JUMSUT Public Transport Survey

Table 12.5
Existing Major Bus Terminals

Terminal Name	Service	Location	Type of Terminal Facilities ^{1/}	No. of Routes	Frequency 16 hrs.	Estimated No. of Boarding/Alighting Passengers/16 Hrs.
Divisoria	mixed	within C 2	on/off (D)	50	1,590	35,265
Quiapo	intra-city	within C 2	on	15	2,407	60,883
D. Jose	inter-city	within C 2	on	2	539	13,471
Lawton	inter-city	within C 2	off (B)	17	1,096	57,833
Monumento	mixed	C2-C4(north)	on/off (B, D)	29	3,421	107,530
Pandacan	mixed	C2-C4(south)	on	3	384	306
Buendia (SSH)	intra-city	C2-C4(south)	on	27	1,692	3,660
MMC (Buendia)	intra-city	C2-C4(south)	on	24	738	786
Novaliches	intra-city	outside C4 (north)	on	8	707	19,179
Tenejeros	intra-city	outside C4 (north)	off (C,D)	5	125	4,319
Cubao	mixed	outside C4 (east)	on/off (B, D)	26	1,842	24,829
UP Balara	intra-city	outside C4 (east)	on	19	847	2,924
Guadalupe	intra-city	outside C4 (south)	on	1	493	19,616
Ayala (EDSA)	intra-city	outside C4 (south)	on	4	405	21,529
MIA	intra-city	outside C4 (south)	on	11	678	38,494
Baclaran	mixed	outside C4 (south)	on	26	6,086	104,142
Alabang	intra-city	outside C4 (south)	off (B)	14	1,097	49,381

Source: JUMSUT Public Transport Survey

^{1/} "on means on-road space; while "off", off-road space letters in parentheses represent the following: A (gas station), B (vacant lot: rental), C (vacant lot: owned), and D (with facility: owned)

12.2.4 Tricycle Terminal

- JUMSUT identified 193 tricycle service areas and 276 terminals as shown in Table 12.6. Figure 12.3 shows that the tricycle service areas are spread all over Metro Manila, excluding the areas within C-2. It is pointed out in the MMUTIP study conducted in 1980/81 that only 182 tricycle terminals existed then. The number of terminals increased not only outside of the C-4 areas where bus and jeepney service coverage is relatively less extensive, but also in many of the areas within C-4.
- The tricycle service roughly covers 1/3 of Metro Manila with approximately 17,000 operating units. Table 12.7. shows the pace of the development for tricycle terminals in Metro Manila. It is striking to note that they have been expanding continuously since 1960.
- The characteristics of the tricycle operation can be summarized as follows:

- a) Tricycle normally operates for approximately 16-20 hours between 6 am to 10 pm.
 - b) Tricycle makes 10-40 commercial trips per day per vehicle. The average is presumably 25 trips/day/vehicle.
 - c) It carries two to four passengers at a time. The average is considered to fall in between two and three.
 - d) Service area of tricycle is usually residential. It plays the role of connecting vast residential areas with the adjoining commercial facilities and jeepney/bus stops nearby.
- The current role of the tricycle as a supplemental mode in the total public transport system is considerably significant. The tricycle service is characterized by a door-to-door or close-to-destination type of service, flexibility in the choice of way, availability of seats and personal atmosphere. Operating hours are long enough and the fare level seems reasonable. The particular advantage of the tricycle on-road development viewpoint is that the impact of tricycle operation to the road surface is very minimal due to its light axle load.

Table 12.6
Distribution of Tricycle Terminals/
Service Areas

Municipality	No. of Terminals	No. of Service Areas	Total Covered Areas		No. of Operating Vehicles	Terminal Area	
			Ha	(%) ^{1/}		On Road	Off-Road
City of Manila	16	10	690	(18)	895	16	—
Pasay City	3	2	440	(32)	240	3	—
Makati	13	7	560	(19)	1,135	13	—
Mandaluyong	11	3	570	(51)	909	10	1
San Juan	1	1	370	(67)	50	1	—
Quezon City	65	49	4,870	(29)	3,572	51	14
Caloocan City	26	18	1,850	(33)	1,937	24	2
Valenzuela	18	14	2,120	(45)	855	9	9
Malabon	14	6	670	(29)	785	13	1
Navotas	10	4	360	(34)	320	9	1
Marikina	15	11	1,750	(45)	854	8	7
Pasig	9	9	1,070	(33)	1,147	8	1
Pateros	6	2	260	(100)	450	6	—
Taguig	15	5	970	(29)	1,222	15	—
Parañaque	21	19	1,900	(50)	957	18	3
Muntinlupa	14	14	1,700	(36)	910	12	2
Las Pinas	19	19	2,180	(52)	793	14	5
Total M. Manila	276	193	22,300	(35)	17,031	230	46

Source: JUMSUT public transport survey

^{1/} Percentage of areas served by tricycle to total areas of each respective municipality.

Table 12.7
Development of Tricycle Terminals

Areas	up to 1960	61-65	66-70	71-75	76-80	81-83	Total
Between C2 and C4:							
North	8	11	7	5	6	2	39
East	2	2	17	12	5	7	45
<u>South</u>	<u>1</u>	<u>0</u>	<u>2</u>	<u>2</u>	<u>3</u>	<u>0</u>	<u>8</u>
Subtotal	11	13	26	19	14	9	92
Outside C4:							
North	7	3	17	12	23	14	76
East	3	6	12	2	8	8	39
<u>South</u>	<u>4</u>	<u>1</u>	<u>19</u>	<u>16</u>	<u>26</u>	<u>3</u>	<u>69</u>
Subtotal	14	10	48	30	57	25	184
Total	25	23	74	49	71	34	276
Metro Manila							

Source: JUMSUT public transport survey

12.2.5 PNR and LRT

- PNR has stations located along the north, south and east lines of Metro Manila. These are the Caloocan and Tutuban stations along the north line; San Lazaro, Laong-Laan, España, Sta. Mesa, Pandacan, Paco, Vito Cruz, Buendia, Pio Del Pilar, EDSA, FTI, Bicutan, Sucat, Alabang and Muntinlupa along the south line. The south line carries most of the PNR commuter traffic while the north line is limited only to those along the section near Manila. The east line carries a negligible volume of traffic. The boarding/alighting passengers surveyed in 1981 by PNR Commuter Study are shown in Table 12.8
- The major modes of access to these stations are mainly the jeepneys. However these PNR stations are not directly served by the jeepney routes. Passengers normally have to walk between the stations and the nearby jeepney routes. Several stations such as Vito Cruz, Bicutan, Sucat, Alabang and Muntinlupa are also served by tricycles.
- There are 18 LRT stations currently being constructed. They are all elevated, therefore, people have to climb up the stairs approximately 20 feet above the existing road surface. The LRT stations are listed with an estimated passenger traffic in Table 12.9.

Table 12.8
Traffic at PNR Stations

Line	Station	Distance (kms.)	No. of Boarding/ Alighting Passengers/Day	Major Modes of Access to Stations
South	Manila	—	3,319	Jeepney
	San Lazaro	2.73	5,139	Jeepney
	Laong-Laan	1.04	1,717	Jeepney
	España	0.75	3,097	Jeepney
	Sta. Mesa	1.97	5,905	Jeepney
	Pandacan	1.30	2,122	Jeepney
	Paco	1.61	2,703	Jeepney
	Vito Cruz	1.66	1,181	Jeepney, Tricycle
	Buendia	1.06	2,910	Jeepney
	Pio del Pilar	1.13	1,866	Jeepney
	EDSA	1.10	3,016	Jeepney, Bus
	FTI	4.05	1,057	Jeepney
	Bicutan	2.60	3,222	Jeepney, Tricycle
	Sucac	4.01	1,387	Jeepney, Tricycle, Bus
	Alabang	3.68	1,259	Jeepney, Tricycle, Bus
Muntinlupa	3.32	325	Jeepney, Tricycle, Bus	
North	Manila	—	3,319	Jeepney, Tricycle, Bus
	Caloocan	5.80	2,133	Jeepney

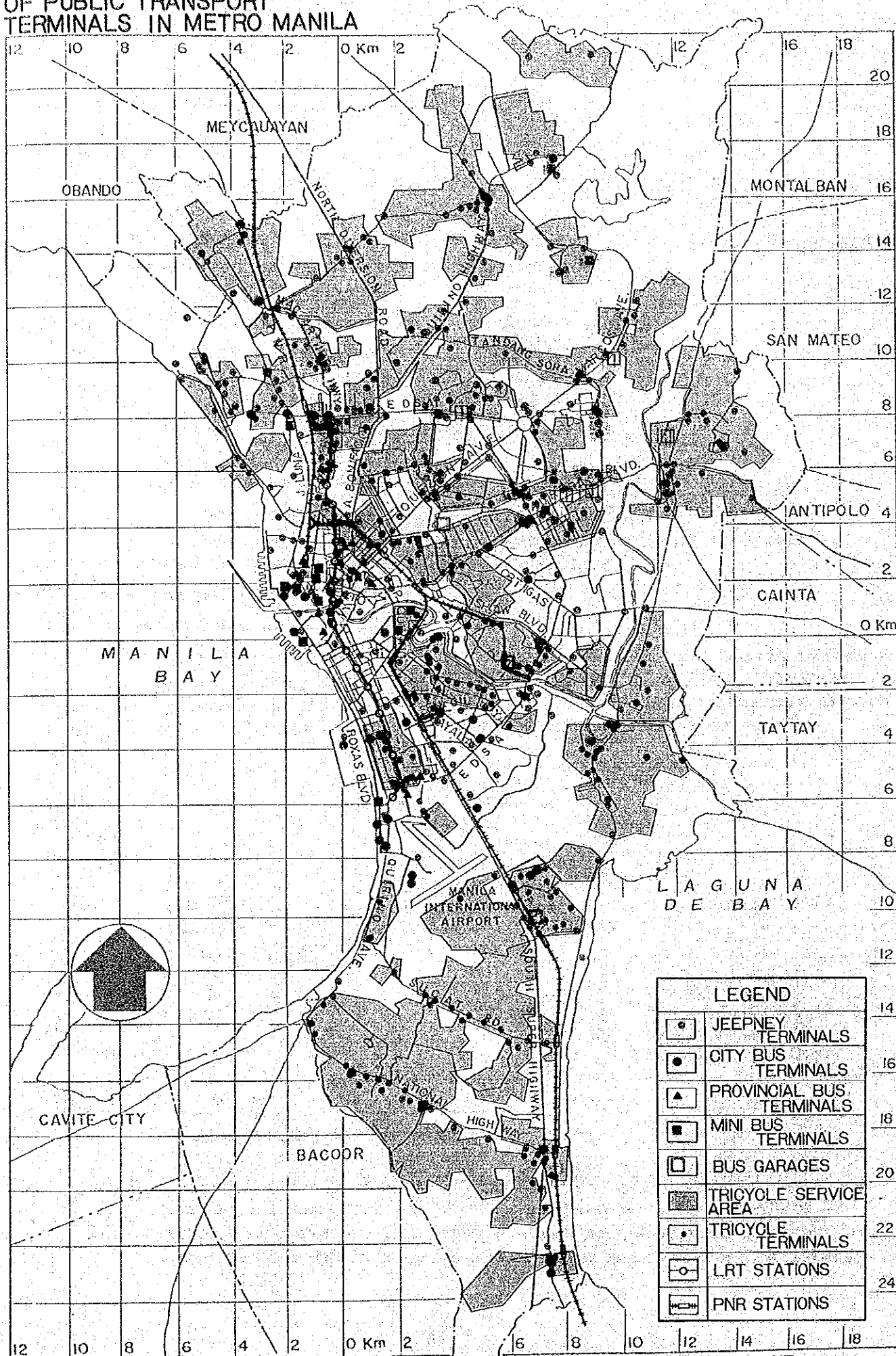
Source: PNR Commuter Study, 1982 MOTC.

Table 12.9
Traffic at LRT Stations

Station	Distance (kms.)	No. of Boarding/ Alighting Pass- engers/Day	Major Modes of Access to Station
North Terminal		160,000	Bus, Jeepney, Tricycle
5th Avenue	1.2	42,700	Bus, Jeepney, Tricycle
R. Papa	0.8	27,400	Bus, Jeepney
A. Santos	0.7	39,800	Bus, Jeepney
Blumentritt	0.9	34,900	Bus, Jeepney, Tricycle, PNR
Tayuman	0.7	50,800	Bus, Jeepney
Bambang	0.6	35,000	Bus, Jeepney
D. Jose	0.7	111,600	Bus, Jeepney
Carriedo	0.7	95,800	Bus, Jeepney
Arroceros (Central	0.7	94,000	Bus, Jeepney
U.N./Kalaw	1.2	45,7000	Bus, Jeepney
Pedro Gil	0.8	40,000	Bus, Jeepney
P. Quirino	0.9	19,900	Bus, Jeepney
Vito Cruz	0.9	31,100	Bus, Jeepney
Buendia	1.0	63,200	Bus, Jeepney
Libertad	0.8	37,300	Bus, Jeepney, Tricycle
EDSA	1.1	128,800	Bus, Jeepney, Tricycle
South Terminal	0.6	90,600	Bus, Jeepney

Source: JUMSUT estimate

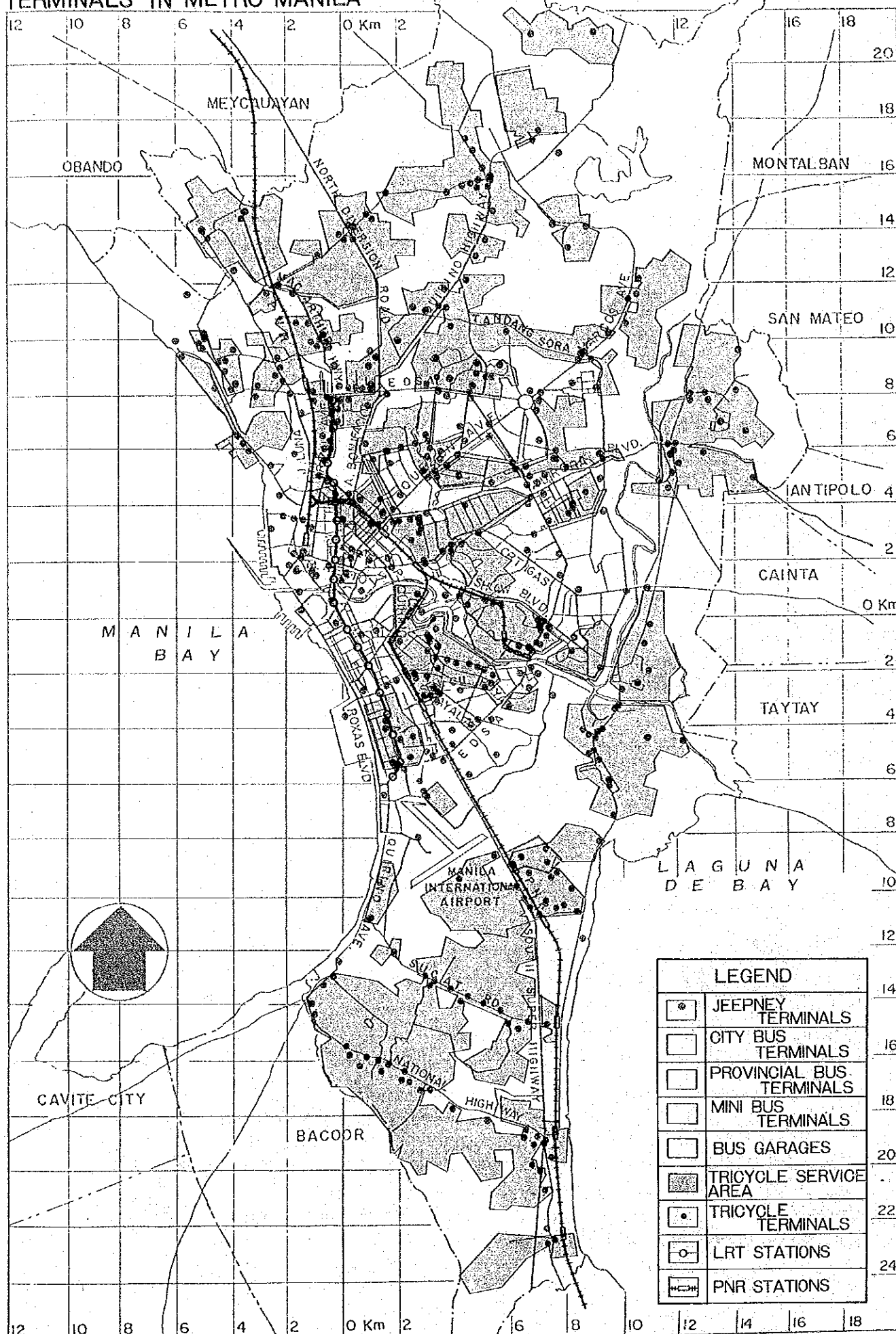
FIGURE 12.3 DISTRIBUTION OF PUBLIC TRANSPORT TERMINALS IN METRO MANILA



LEGEND	
	JEEPNEY TERMINALS
	CITY BUS TERMINALS
	PROVINCIAL BUS TERMINALS
	MINI BUS TERMINALS
	BUS GARAGES
	TRICYCLE SERVICE AREA
	TRICYCLE TERMINALS
	LRT STATIONS
	PNR STATIONS

SOURCE: JUMSUT PUBLIC TRANSPORT SURVEYS

FIGURE 12.3 DISTRIBUTION OF PUBLIC TRANSPORT TERMINALS IN METRO MANILA



SOURCE: JUMSUT PUBLIC TRANSPORT SURVEYS

12.3 EXISTING PUBLIC TRANSPORT TERMINAL BY AREA

12.3.1 General

- This section explains more in detail the characteristics and conditions of existing public transport terminals by area in Metro Manila.
- The whole Metro Manila was subdivided into seven areas, considering the present transport network configuration and area characteristics. They are:
 - a) Area within C-2 (included)
 - b) Area between C-2 and C-4 (included): further consists of:
 - North : area surrounded by C-2, C-4 and A. Bonifacio
 - East : area surrounded by C-2, C-4, A. Bonifacio (excluded) and J.P. Rizal
 - South : area surrounded by C-2, C-4 and J.P. Rizal (excluded)
 - c) Area outside C-4: further consists of:
 - North : area surrounded by C-4 and Marcos Highway
 - East : area surrounded by C-4, Pasig river and Marcos Highway (excluded)
 - South : area surrounded by C-4 and Pasig river

12.3.2 Public Transport Terminals Within C-2

1) Overall Characteristics

- There are 74 terminal areas as summarized in Table 12.10. Approximately two million boarding/alighting passengers use these terminals. The jeepney plays a dominant role, followed by the bus. The PNR and tricycle play only very limited roles. LRT is expected to be used by approximately 500,000 passengers when it becomes operational.

Table 12.10
Public Transport Terminals
Located Within C-2

Mode	Number of Terminals	Estimated No. of Boarding/Alighting Passengers/16 hrs.	Remarks
Jeepney	34	1,256,400	
Bus	33	210,800	
PNR	2	6,000	Paco, Tutuban
LRT	8	492,800	Tayuman, Bambang, D. Jose Carriedo, Central, T. M. Kalaw, P. Gil and P. Quirino
Total	74	1,966,000	

Source: JUMSUT Public Transport Survey

- The locations of the terminals are shown in Figure 12.4. With due consideration of their locations and interactions, the terminals are grouped as shown in Table 12.11. Although these terminals are grouped, passengers who board and alight within these areas account for only 34 percent of the total. This means 66 percent of the passengers

still use the road spaces outside of the terminal areas. This is particularly true along several roads such as España, C.M. Recto, Rizal Avenue, Legarda, etc. In fact, the whole area covering Quiapo, Sta. Cruz, Recto, Binondo, and Divisoria areas is considered a huge terminal area.

- On-road spaces are mostly used as terminals with the exception of some terminals for the provincial buses. A typical off-road terminal which has the most complete figure is the Tutuban station wherein berths, waiting sheds and smooth transfer facilities are provided for provincial bus and railway passengers. Ample off-road spaces are provided for by the Lawton provincial bus terminal. Some provincial buses based in Laang-Laan/Dimasalang areas own not only off-road spaces but also their own facilities.
- On the other hand, jeepneys totally rely on existing road spaces and facilities on both main roads and side streets. With the limited capacities of the roads and the densely concentrated demand, particularly in the north of the Pasig river, the terminal areas are so congested that it always take a considerable time to pass through these areas. The congestions in the terminal areas affect the whole road system in this section. The whole stretch of the western end of C.M. Recto in Divisoria has been turned to a huge terminal area. The same is also true in the service lanes of Quezon Boulevard in Quiapo and Recto.
- Jeepney terminals in the south of Pasig look different. This is partly due to the existence of wider roads and partly due to the relatively low concentration of passenger – traffic demand. The problems are considered to be much less than those in the north of the Pasig river.
- Existing conditions of terminals/terminal areas and problems encountered were further looked into. These problems are enumerated for the respective areas mentioned hereafter.

2) Quiapo Area; (See Appendix 12.1-A)

- This area has three city jeepney and three city bus terminals to serve approximately 210,000 jeepney passengers and 61,000 bus passengers (total of boarding and alighting) per 16 hours, respectively. The 54 bus and jeepney routes generate more than 160 thousand in and out of the vehicular traffic.
- Existing terminal spaces are totally on-road spaces including the service roads of Quezon Boulevard, Evangelista, Quiapo underpass, Hidalgo, and Arlegui. Limited pedestrian facilities are provided, including a bus bay, a sidewalk, a pedestrian overpass and an underpass across Quezon Boulevard.
- Existing traffic bottlenecks are seen in Quezon Boulevard, Hidalgo, Arlegui, Evangelista, Quiapo (Ilalim), and the intersection of C.M. Recto/Evangelista. The major problems encountered in these areas are as follows:
 - a) Serious congestion at Quiapo underpass due to the sizeable turn-around vehicles.
 - b) Serious congestions due to the long queueing jeepneys along Hidalgo.
 - c) Lack of passenger loading/unloading spaces along Quezon Boulevard.
 - d) Lack of sidewalk capacity along Evangelista.
- At Carriedo, an LRT station is under construction. A problem is foreseen on how to provide a good link between the LRT station and the jeepney terminals or jeepney routes when the LRT becomes operational.

- 3) **Divisoria Area:** (See Appendix 12.1-B)
- This is also one of the largest traffic generating areas where 95 bus and jeepney routes are concentrated and approximately 250,000 boarding/alighting passengers are counted daily. This area is also served by the north bound provincial bus and jeepney.
 - Existing terminal spaces are totally on-road spaces except for the Tutuban Station (PNR). The roads used are C.M. Recto, Asuncion, J. Luna, Dagupan, and P. Rada. The terminal activities, together with intensive commercial activities, occupy the whole road spaces making the whole area look like a huge terminal complex.
 - Major problems encountered in the Divisoria area can be summarized as follows:
 - a) C.M. Recto, which is otherwise considered to form an important portion of C-1 ring road, is totally being used by jeepneys and buses which terminate in this area and is hardly able to cater to the through-traffic.
 - b) Terminal areas have been so widely spread out that the distance between two terminals is almost 900 meters.
 - c) Although the right-of-way of the existing C.M. Recto is wide (40 to 50 meters), many of the spaces are occupied by sidestreet vendors as well as squatters, which considerably contribute to the narrowing of the road spaces.
 - d) Congestions are amplified by the mixture of calcesas, pedestrians, push carts, parking vehicles, and queuing jeepneys on road spaces.
- 4) **Recto Area:** (See Appendix 12.1-C)
- Recto is characterized by the on-road jeepney terminal along the busy Quezon Boulevard, although there are also two provincial bus terminals. Approximately 120,000 jeepney passengers, boarding and alighting, use the service roads of Quezon Blvd., between Central Market and C.M. Recto.
 - Major problems encountered in this area are:
 - a) Serious congestions along the service roads of Quezon Boulevard due to the loading/unloading and queuing of jeepneys which also cause the reduction in traffic capacity of C.M. Recto/Quezon Boulevard junctions.
 - b) Lack of passenger loading/unloading space along Quezon Boulevard. Therefore, passengers use the carriageways or even the median strips.
 - c) At D. Jose, an LRT station is currently under construction. When completed, a smooth link between the station and terminal area needs to be considered.
- 5) **Laong-Laan/Dimasalang Area:**
- Seven provincial bus terminals are scattered in this area. Each company operates a few routes. With less than 100 frequencies a day and the availability of their own facilities and spaces, no significant problem is seen.
- 6) **Lawton Area:** (See Appendix 12.1-D)
- This terminal is also a combination of city jeepney terminals (at City Hall) and three provincial bus terminals (at Victoria, Magallanes and Post Office). Approximately 90 thousand jeepney passengers and 58,000 provincial bus passengers board and alight in this area. Lawton is one of the largest bases for the south-bound provincial bus.
 - Terminal facilities in this area are relatively well-provided and the problems on traffic congestion are lesser compared to the other areas. However, the following points will have to be considered:

- a) Lack of waiting sheds and facilities in the bus terminals
 - b) Lack of passenger loading/unloading spaces in front of City Hall
 - A central LRT terminal is currently being constructed along Arroceros street. When completed, it will provide a smooth link between the LRT station and the existing bus and jeepney terminal areas essential for both the LRT and, particularly, the intra-city jeepney.
- 7) T.M. Kalaw Area: (See Appendix 12.1-E)
- This area includes city and provincial jeepney terminals along T.M. Kalaw and a city jeepney terminal at L. Guinto/P. Faura. Due to the existence of good roads and relatively less passenger traffic, there are no significant problems currently encountered.
 - However, when the LRT station is completed, a smooth link between the jeepney terminal at T.M. Kalaw and the station needs to be considered.
- 8) Pier Area:
- There are three terminals in the area, a terminal for: (1) city jeepneys; (2) provincial jeepneys; (3) provincial buses. The most significant one is the city jeepney terminal. This area is a traffic generating area as well as a good turning point because of its available side streets. A total of 42 routes terminate thereat with a traffic volume of 16,000 frequencies per day and 112 thousand boarding/alighting passengers.
 - Significant problems identified are:
 - a) Large one-way turning circuit, which is inconvenient to passengers.
 - b) Mixture with cargo traffic threatens the safety and interrupts the smooth flow of public transport passengers.
- 9) Pedro Gil Area: (See Appendix 12.1-F)
- This terminal comprises several jeepney terminals currently serving 103,000 boarding and alighting jeepney passengers. Leon Guinto, Pedro Gil, Kansas, and Escolta are used for on-road terminal spaces. These roads are mainly side streets, except for Pedro Gil.
 - A current problem in this area is observed along Pedro Gil, wherein loading/unloading activities of passengers and vehicles are mixed with commercial activities and through-traffic along Pedro Gil. Lack of passenger waiting space along Leon Guinto can be counted as a problem.

Table 12.11
Public Transport Terminals Within C-2

Terminal Name	City/ Provincial	No. of Routes	Traffic/Day		Off/On Road	Mode
			Two-way Frequency	Boarding/ Alighting Passengers		
1. Quiapo Area:						
- Quiapo (Arlegui/Hidalgo)	City	6	10,200	40,500	on	Jpy.
- Quiapo (Echague/Halim)	City	30	53,400	134,900	on	Jpy.
- Quiapo (Raon)	City	3	14,800	34,900	on	Jpy.
- Quiapo (Quezon Blvd.)	City	3	39	900	on	Bus
- Quiapo (Quezon Blvd.)	City	1	84	100	on	Bus
- Quiapo (Quezon Blvd.)	City	11	2,284	59,900	on	Bus
- Carriedo		-	-	-	-	LRT
Subtotal		54	80,807	271,200		
2. Divisoria Area:						
- Divisoria (Asuncion)	City/Prov'l.	25/2	19,300	140,100	on	Jpy.
- Divisoria (J. Luna)	City/Prov'l.	12/1	11,100	49,500	on	Jpy.
- Divisoria (P. Rada)	City	8	5,000	11,500	on	Jpy.
- San Nicolas	City	1	-	-	on	Jpy.
- Dagupan/C. M. Recto	City	1	3,100	15,500	on	Jpy.
- Divisoria (C. M. Recto)	City	12	605	21,400	on	Bus
- Divisoria (C. M. Recto)	Prov'l.	10	223	1,811	on	Bus
- Divisoria (C. M. Recto)	Prov'l.	5	219	11,537	on	Bus
- Divisoria (PNR Station)	Prov'l.	15	61	400	off	Bus
- Divisoria (J. Luna)	Prov'l.	3	207	100	on	Bus
- Tutuban		-	-	-	-	PNR
Subtotal		95	39,815	251,800		
3. Recto Area:						
- Recto (Quezon Blvd.)	City/Prov'l.	16/4	53,500	121,000	on	Jpy.
- Rizal Ave/C. M. Recto	Prov'l.	5	156	-	off	Bus
- D. Jose	Prov'l.	2	539	13,500	on	Bus
- Bambang		-	-	-	-	LRT
Subtotal		23	54,195	134,500		
4. Binondo Area:						
- Binondo	-	-	6,200	31,300	on	Jpy.
- Plaza de la Barca	City	2	12,500	20,900	on	Jpy.
- Escolta	City	5	275	2,100	on	Bus
Subtotal		7	18,975	54,300		
5. Sta. Cruz Area:						
- Plaza Sta. Cruz	City	4	26,600	53,100	on	Jpy.
- Sta. Cruz	City	4	113	9,500	on	Bus
Subtotal		8	26,713	62,600		
6. Del Pan Bridge						
	-	-	1,600	2,000	on	Jpy.
7. Pier Area:						
- Pier (South)	City/Prov'l.	40/2	16,000	110,300	on	Jpy.
- Pier (Chicago)	Prov'l.	1	180	1,900	on	Bus
- Pier (Chicago)	Prov'l.	1	2	-	on	Bus
Subtotal		42	16,182	112,200		
8. Lawton Area:						
- Lawton/City Hall	City	1	57,600	90,900	on	Jpy.
- Lawton (Victoria)	Prov'l.	8	219	700	off (B)	Bus
- Lawton (Magallanes)	Prov'l.	3	443	36,700	off (B)	Bus
- Lawton (Post Office)	Prov'l.	6	434	20,500	off (B)	Bus
- Central		-	-	-	-	LRT
Subtotal		18	58,696	148,800		
9. T. M. Kalaw Area:						
- T.M. Kalaw	City/Prov'l.	22/2	6,700	32,300	on	Jpy.
- T.M. Kalaw/UN		-	-	-	-	LRT
Subtotal		22/2	6,700	32,300		

(Table 12.11 Cont'd.)

Terminal Name	City/ Provincial	No. of Routes	Traffic/Day		Off/On Road	Mode
			Two-way Frequency	Boarding/ Alighting Passengers		
10. P. Gil Area:						
– Paco (Kansan-P. Gil)	City	2	6,900	28,700	on	Jpy.
– Paco (L. Quinto-P. Gil)	City	8	5,400	65,900	on	Jpy.
– P. Faura – L. Quinto	City	3	2,700	8,600	on	Jpy.
– P. Gil	—	—	—	—	—	LRT
Subtotal		13	15,000	103,200		
11. Paco Area:						
– Paco (Church)	City	2	300	1,200	on	Jpy.
– Paco Station	—	—	—	—	—	PNR
Subtotal		2	300	1,200		
12. San Andres Area:						
– San Andres	City	10	8,600	11,800	on	Jpy.
– Remedios	City	1	4,400	2,300	on	Jpy.
– P. Quirino	—	—	—	—	—	LRT
Subtotal		11	13,000	14,100		
13. Pandacan (Zamora)	City	2	306	19,200	on	Bus
14. San Miguel	City	1	4,200	14,600	on	Jpy.
15. Bustillos	City	3	3,700	3,300	on	Jpy.
16. Gastambide Area:						
– Gastambide	City	1	4,100	22,900	on	Jpy.
– I. de los Reyes-P. Paredes	City	23	4,900	23,300	on	Jpy.
– Morayta (N. Reyes)	City	1	4,100	33,900	on	Jpy.
– D. Jose	—	—	—	—	—	LRT
Subtotal		25	13,100	80,100		
17. Laong-Laan/Dimasalang Area:						
– Laong Laan	Prov'l.	1	12	—	off (D)	Bus
– Laong Laan (V.G. Cruz)	Prov'l.	3	24	—	off (D)	Bus
– Dimasalang (G. Flores)	Prov'l.	2	22	—	off (D)	Bus
– Dimasalang (Dos Castillas)	Prov'l.	1	17	—	off (D)	Bus
– Earnshaw	Prov'l.	—	—	—	off (B)	Bus
– Earnshaw (S. H. Loyola)	Prov'l.	2	3	—	off (B)	Bus
– Espana/G. Forbes	Prov'l.	—	—	—	off (D)	Bus
– Legarda	Prov'l.	1	4	—	off (B)	Bus
– San Antonio/Earnshaw	Prov'l.	—	—	—	off (D)	Bus
– F. Cayco/F. Fajardo	Prov'l.	—	—	—	off (C)	Bus
– Legarda	Prov'l.	—	—	—	off (C)	Bus
– Dapitan (UST)	Prov'l.	—	—	—	off (D)	Bus
– Dimasalang	Prov'l.	1	10	—	off (D)	Bus
Subtotal						
18. P. Guevarra/Tayuman Area:						
– P. Guevarra/Tayuman	City	2	5,900	15,900	on	Jpy.
– Tayuman	—	—	—	—	—	LRT
Subtotal		2	5,900	15,900		
19. Tondo Area:						
– A. Rivera/Bambang	City	2	900	1,000	on	Jpy.
– Bangkusay	City	1	4,100	67,500	on	Jpy.
– Velasquez	City	1	4,100	—	on	Jpy.
– Dagupan/Tayuman	City	1	3,800	16,100	on	Jpy.
– North Harbor/Pier (North)	City	5	2,400	25,100	on	Jpy.
– Pritil Market/Herbosa	City	2	6,500	25,600	on	Jpy.
Subtotal		12	17,700	135,300		
20. Recto (Masangkay)	Prov'l.	2	229	9,500	on	Bus
21. Asturias	City	3	348	1,100	on	Bus

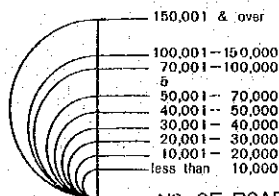
Source: JUMSUT Public Transport Survey



FIGURE 12.4 DISTRIBUTION OF PUBLIC TRANSPORT TERMINALS WITHIN C-2

LEGEND

- JEEPNEY TERMINAL
- INTRA-CITY BUS TERMINAL
- INTER-CITY BUS TERMINAL
- LRT STATION
- PNR STATION
- ▲ TRICYCLE TERMINAL



NO. OF BOARDING/ ALIGHTING PASS. (16HRS.)

