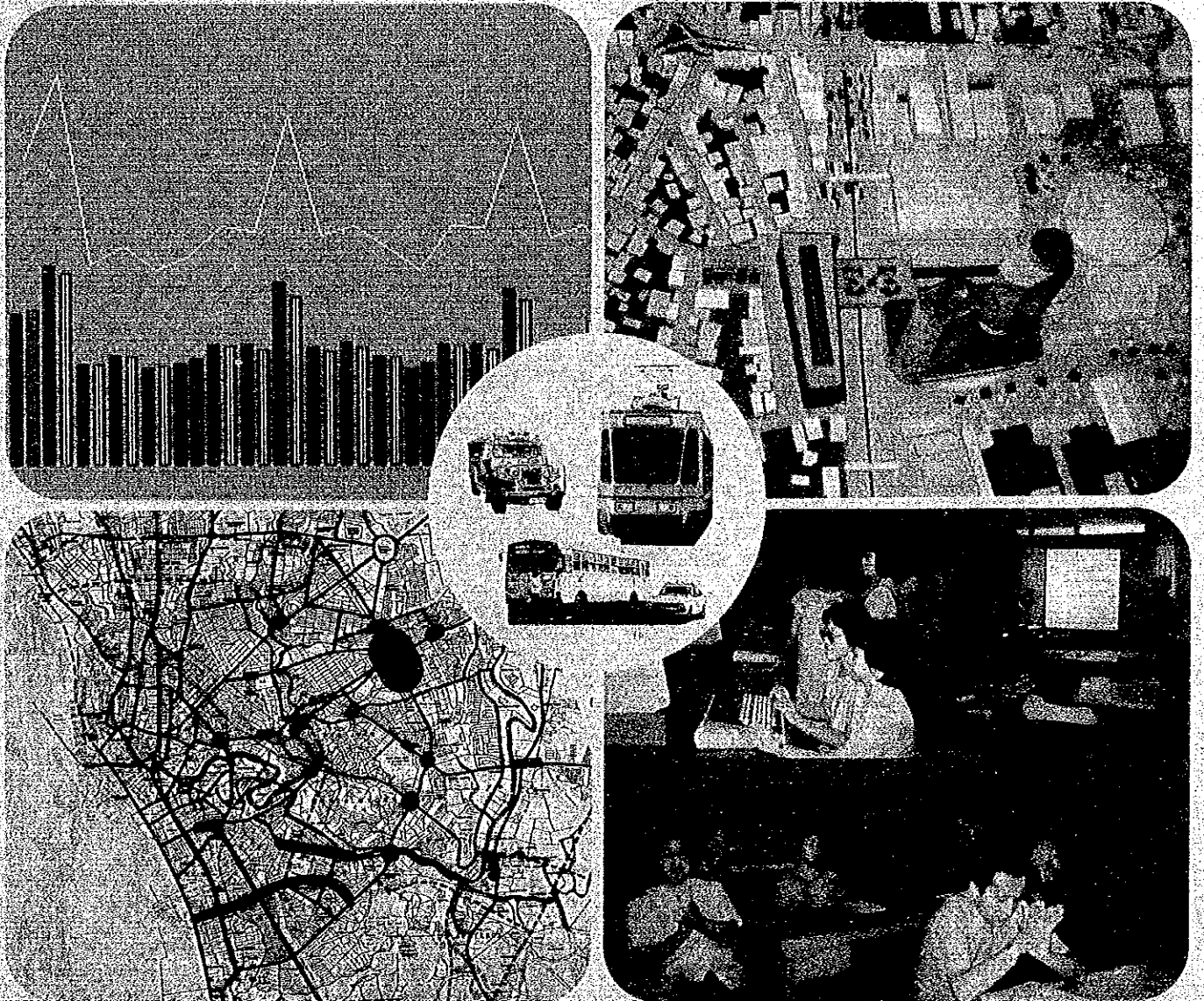


The Metro Manila Transportation Planning Study Phase II Final Report

TECHNICAL REPORT

Road Mode Interchange Area Study



SEPTEMBER 1985

JAPAN INTERNATIONAL COOPERATION AGENCY

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1.0 THE PROJECT SCOPE

1.1 RECTO ON METRO MANILA

The study area for the Recto Mode Interchange Area (Recto MIA) is situated in the interior of Manila, and bisected by the two major thoroughfares of C. M. Recto Avenue and Rizal Avenue. This area is a dense traditionally-developed district delimited by Divisoria in the west, Quiapo in the south, and Central Market in the north as well as the University Belt to the east.

Recto as a commercial destination has a large influence area which is predominantly the upper northern part of Metro Manila, as shown in Figure 1.1. A tabular comparison of Recto against the other well-known commercial complexes/areas is included in the same figure.

As an interchange area, Recto is host to a number of provincial and city bus terminals. Its proximity to several LRT stations makes it a potential catchment for LRT feeders. Moreover, it functions as the turning point for several public transport routes.

Recently, MMC has launched the Recto/Old Bilibid Area Redevelopment Project. Its implementation provides great opportunities for the revival of the inner-city CBD and the corresponding resolution of current and prospective transport problems.

1.2 BOUNDARY OF STUDY AREA

For planning and/or analytical reasons, the study area considers the impacts of Jose Abad Santos Street in the west, Sergio Loyola in the east, V. Fuguso in the north, and Gil Puyat in the south (see Figure 1.2). However, the detailed study on Recto MIA is confined to C.M. Recto Avenue, Rizal Avenue, V. Fuguso, Old Bilibid Prison and A. Mendoza.

1.3 JUMSUT II BRIEF ON RECTO

Because of the almost-central location of Recto, a significant volume of transport demand - particularly as public transport - arises. The major roads such as C. M. Recto, Quezon Boulevard, and Rizal Avenue have inherent traffic generation, not to mention the LRT station spin-offs. Large universities (e.g. UST, FEU, UE) create additional impetus. Better accessibility is the key to its future growth.

Two major factors would alter the traffic pattern in the area: in the short term, the commencement of the LRT operation and in the longer term, the redevelopment of the Old Bilibid Land. In the latter category, the Line No. 2 might be included. Dramatic chan-

ges in traffic pattern is foreseen. The development of an adequate public transportation terminal in the Old Bilibid site would have dual benefits - the improvement of the public transportation service in the Recto area itself and the mitigation of traffic congestions in the CBD.

In recognition of the future pre-eminence of Recto as a major mode interchange area in Manila, JUMSUT II adopted the following objectives:

- a) to analyze the changes in the pattern of public transportation as a result of the LRT operation and OBA development
- b) to identify and examine measures for smooth vehicle traffic flow and improved pedestrian environment
- c) to develop realistic transport plans consistent with the schedule of proposed urban development.

Based on the abovementioned premises and initial assessment of the area, the transport plans will consist of the following elements:

- a) Route rearrangements to adapt to the LRT operation and the OBA redevelopment.
- b) Redefinition of role of A. Mendoza service road with a view to increase access between the Quezon Avenue corridor and the Recto area through better utilization of the service road.
- c) Facilities for pedestrian flow to cater to the intermodal transfers and obviate on-street movements.
- d) Ancillary transportation facilities around the D. Jose LRT Station.
- e) Corresponding terminal and parking needs of OBA redevelopment for public and private vehicles.

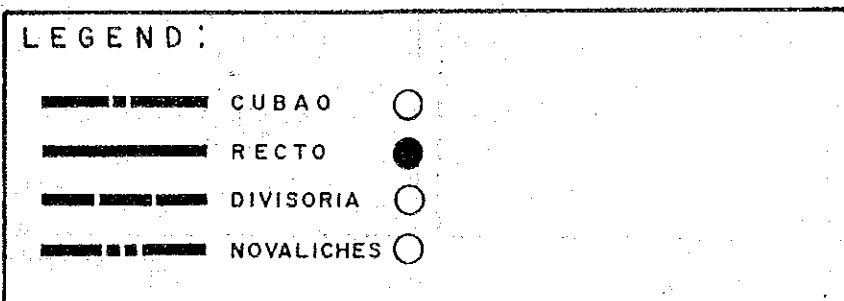
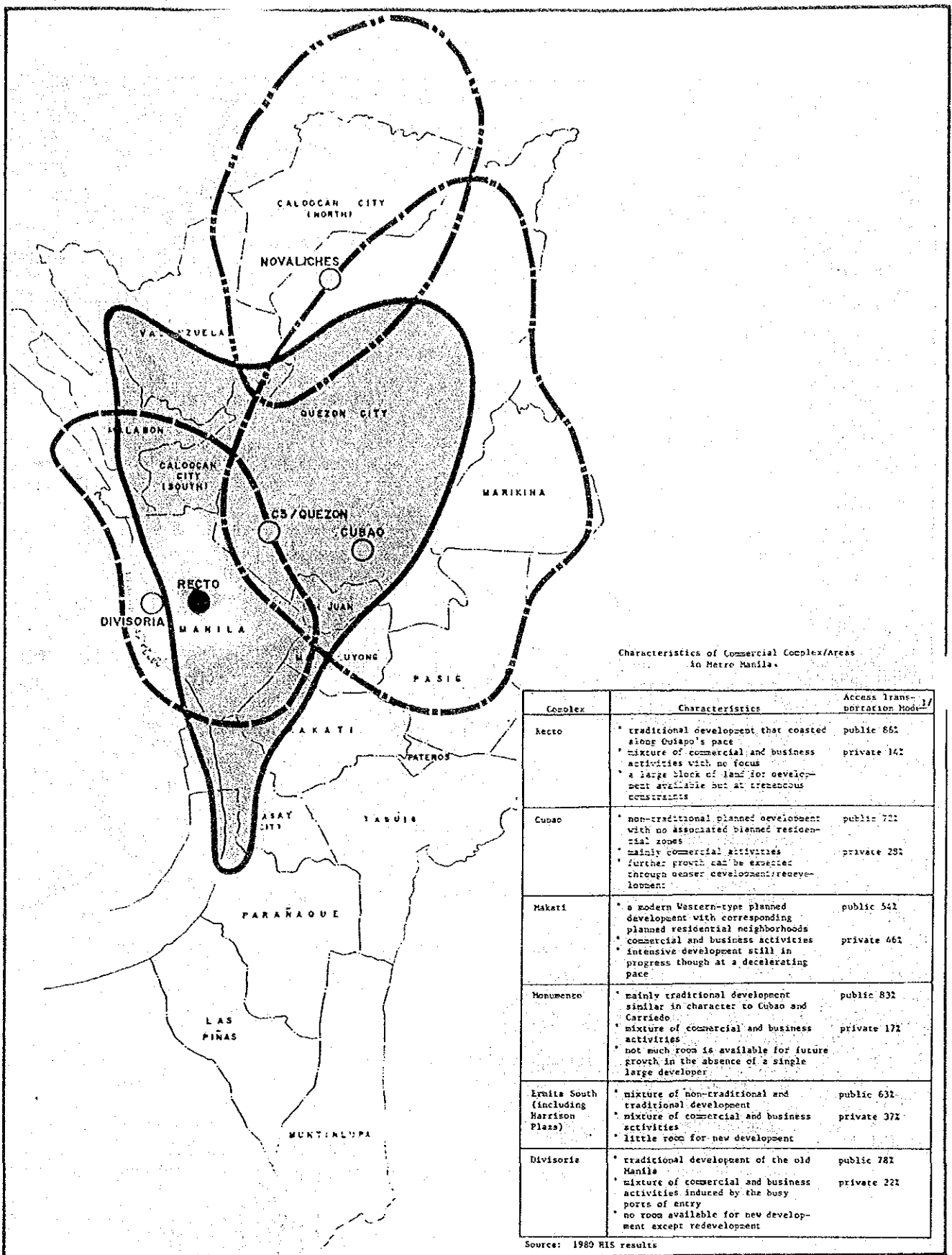
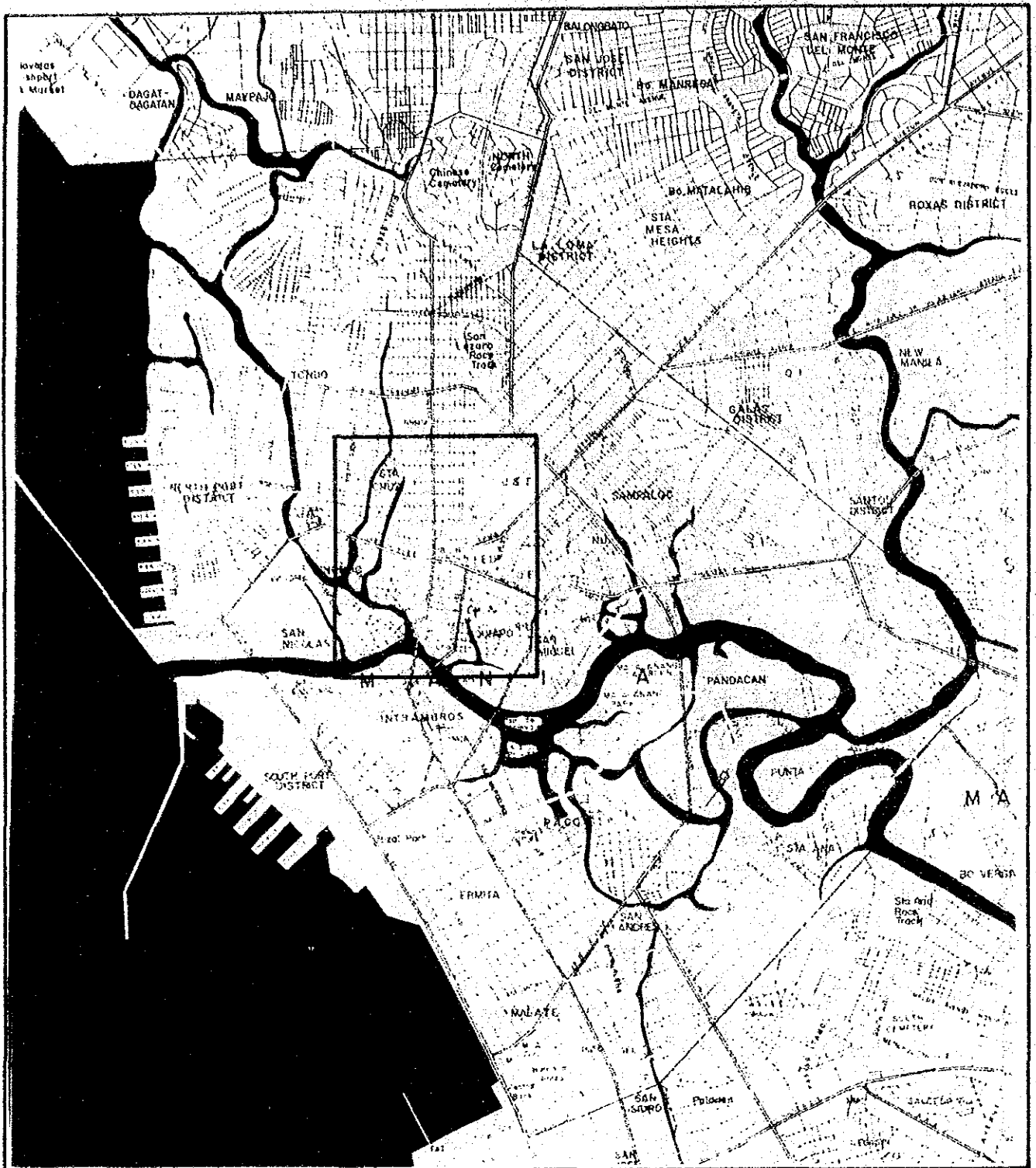



Figure 1.1
Catchment Area of Selected
Major Commercial and
Business Complex/Area



LEGEND:

 **STUDY AREA**

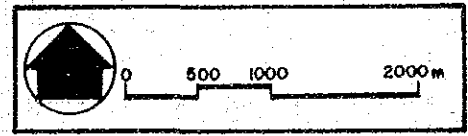


Figure 1.2
Study Area

2.0 THE PRESENT SITUATION

2.1 LAND USE AND SOCIO-ECONOMIC CHARACTERISTICS

2.1.1 Land Use

The Recto study area is characterized by mixed land uses, i.e., residential, commercial, institutional and a minimal portion for park/open space and utilities (see Figure 2.1).

The southwest portion of C. M. Recto and Quezon Boulevard intersection is predominantly high density commercial zones. In the northeast portion are the large educational institution and residential buildings. Southeast of this intersection is a mixture of different land-uses with irregular pattern, while the northwest is characterized by a mixture of high density residential, high and medium density commercial, as well as institutional areas, layed out on a grid pattern. The largely-open space of Old Bilibid Prison Compound dominates the northwest quadrant with an area of about 6.5 hectares.

The site of a possible mode interchange facility is bounded by C. M. Recto, Rizal Avenue, and V. Fuguso where high density commercial (on the roadsides) and medium-density institutional blocks (at the center) are. Landmarks are the Old Bilibid Prison and the Fabella hospital.

The two major thoroughfares, i.e., C. M. Recto and Rizal Avenue, are dotted by a number of recreational establishments (such as movie houses and cocktail lounges), eateries, and retail establishments catering to the middle-income group and to students.

2.1.2 Socio-Economic Characteristics

The study area is part of what is known as the old CBD of Manila. What distinguishes Recto from other business and commercial centers is its schools which generate/attract a daytime student population of 266,900.

The area in question encompasses seven HIS zones with a total population of 122,020 or an equivalent density of 2,460 persons/hectare. It has a total daytime population of 396,000 or an equivalent density of 10,150 persons/hectare. The ratio of daytime to nighttime population in Recto is 3.2, indicative of business and commercial intensity. Work places were estimated to be around 83,900. The average household resident in the area has an income of P1,350/month.

The average car-ownership rate is very low at 12%, which also means dependency on public modes of transportation. The total number of trips registered in the area reached 1,793,000 per day - 85.6% of which is public and 14.6% private. The socio-economic profile for seven zones is shown in Table 2.1.

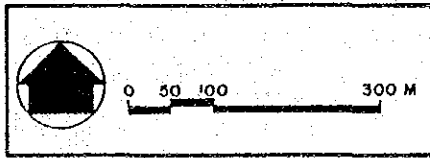
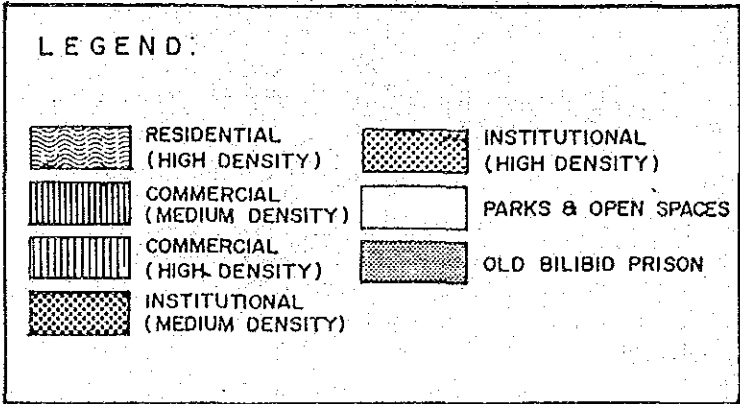
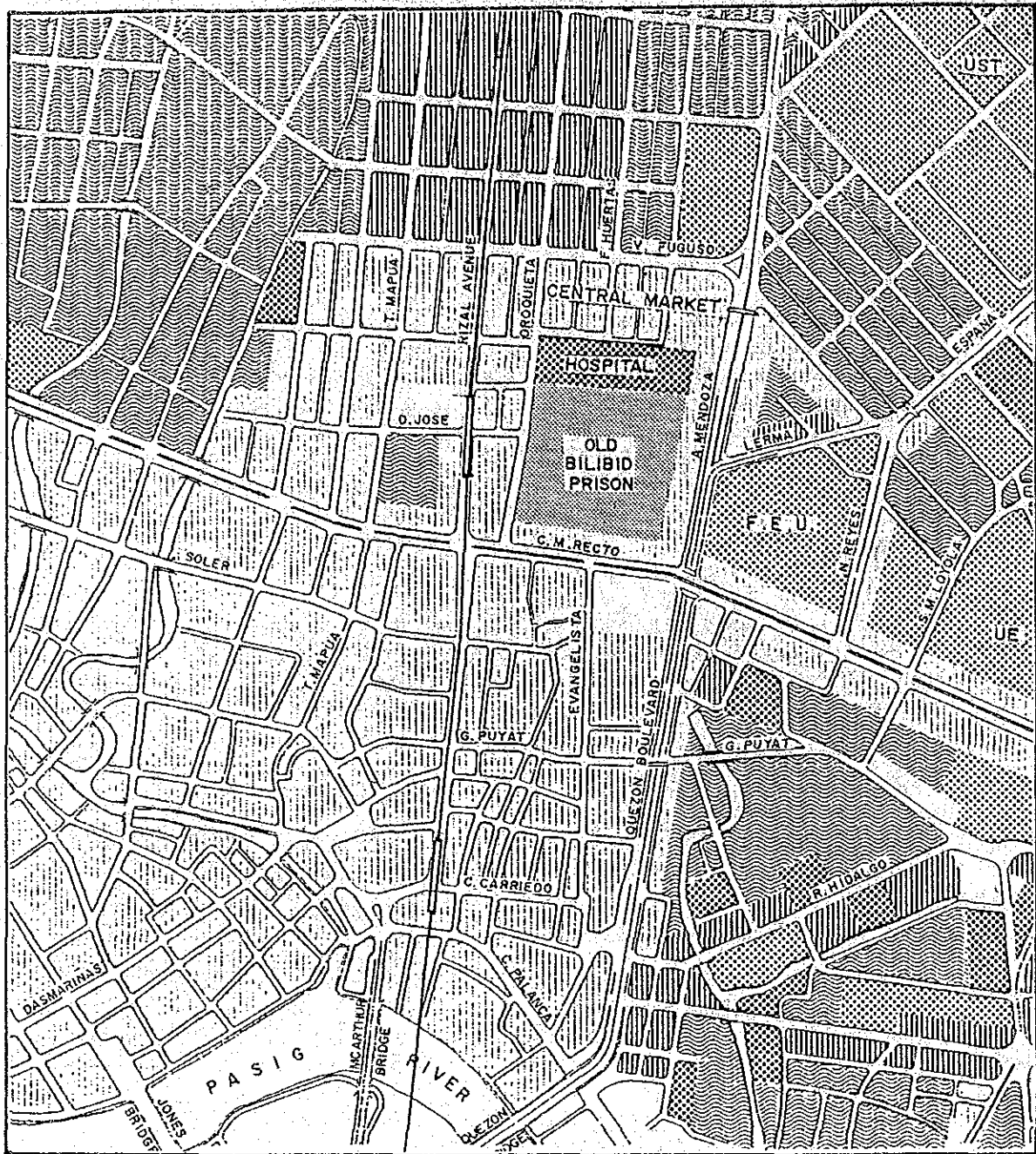


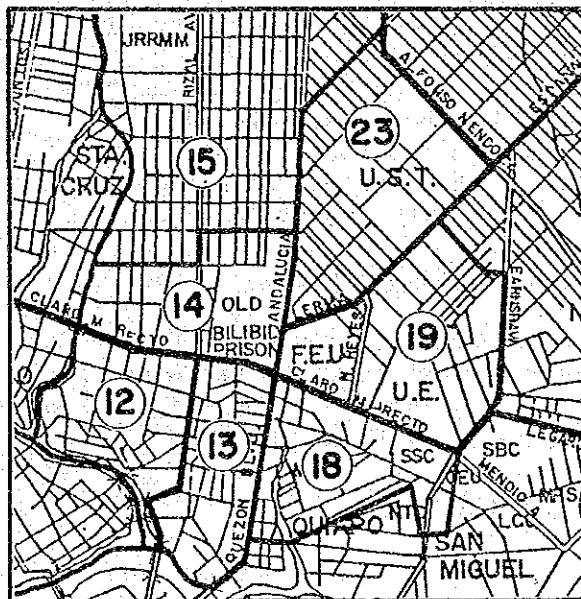
Figure 2.1
Existing Land Use

Table 2.1
 Characteristics of Recto
 Mode Interchange Area

		HIS 202 Zone ^{1/}						
		12	13	14	15	18	19	23
SOCIO-ECONOMIC	Population	8,230	5,520	11,300	49,400	11,240	22,670	13,660
	Daytime Population	24,030	63,270	23,100	47,580	42,090	149,950	46,380
	No. of Students in Daytime	6,200	38,800	9,300	13,200	31,800	131,500	36,100
	No. of Employment by Workplace	15,140	22,030	9,730	14,360	6,450	10,730	5,550
	Population Density (Person/ha.)	230	240	300	560	340	500	290
	Daytime Population Density (Per/ha.)	660	2,790	610	540	1,260	3,300	990
	Average Household Income (₱/mo.)	1,730	3,170	770	1,030	770	910	1,070
	Car Owning Rate(%)	15	32	5	7	5	4	13
	TRAFFIC	No. of Trips	125,292	351,015	117,264	177,951	166,502	635,213
Public		96,197	312,676	98,369	145,227	152,171	561,738	159,583
(%)		76.8	89.1	83.9	81.6	91.4	88.4	69.6
Private		29,095	38,339	18,895	32,724	14,331	73,475	69,557
(%)		23.2	10.9	16.1	18.4	8.6	11.6	30.4

Source: JUMSUT I

^{1/} Zone boundaries are outlined below:



2.2 ROAD SYSTEM AND TRAFFIC

2.2.1 Road Network

The primary road network consists of C. M. Recto, A. Mendoza - Quezon Boulevard, and Lerma - España. C. M. Recto traverses west to east; perpendicular to A. Mendoza - Quezon Boulevard. Lerma and España are really one street extending northward from A. Mendoza. The secondary road network forms a gridiron pattern with different orientations. The roads in the study area are as follows and depicted in Figure 2.2:

Primary Roads:

a) C. M. Recto (6 lanes, 2-way)

C. M. Recto is an integral part of C-1. It is vital in that it singularly serves east-west vehicular movements around it and out of the Recto area. Utilization is primarily by public transport, comprising 60% of total traffic volume. Throughout the length of the road are found dense, unplanned commercial and institutional blocks.

Daily traffic volume is 30 thousand with an average volume capacity ratio of 0.6. This low ratio, rather than a measure of unused capacity, reflects the numerous bottlenecks in its entire stretch - from Divisoria at one end to Legarda at the other.

b) A. Mendoza (8 lanes, 2-way)

This road serves the north-south traffic and the northern extension of Quezon Boulevard. It is also one of the most congested roads in Metro Manila with a daily traffic volume of 66 thousand and volume capacity ratio of 0.9. The intersection of C. M. Recto and A. Mendoza is grade separated. By design, left-turn movements to C. M. Recto from A. Mendoza southbound is not possible. This road offers the practical turning point for northbound PU vehicles at the end of their routes and desiring to turn back to their southern service areas.

c) Lerma (8 lanes, 2-way)

The diagonal extension of Quezon Boulevard to the northeast, Lerma connects to España to form segments of R-7. The daily traffic volume is 43 thousand with volume capacity ratio of 0.6.

d) España (8 lanes, 2-way)

España serves the southwest-northeast vehicular movements in conjunction with Lerma. This is not only an HOV-corr-

dor but also a vital route for private vehicles from Quezon City to Quiapo. Daily traffic volume is 60 thousand with volume capacity ratio of 0.8.

Secondary Roads:

a) Rizal Avenue (4 lanes, 2-way)

Before the LRT Line 1 construction, Rizal Avenue functioned as a primary road with 6 lanes serving the north-south traffic. It will be constricted once the LRT line is completed.

Rizal Avenue is another HOV corridor with minimal private vehicles volume. An increase in transferring passengers within the study area is foreseen with the operation of the D. Jose LRT station.

Current traffic volume is 33 thousand with a volume capacity ratio of 0.9.

b) N. Reyes (Morayta)(4 lanes, 2-way)

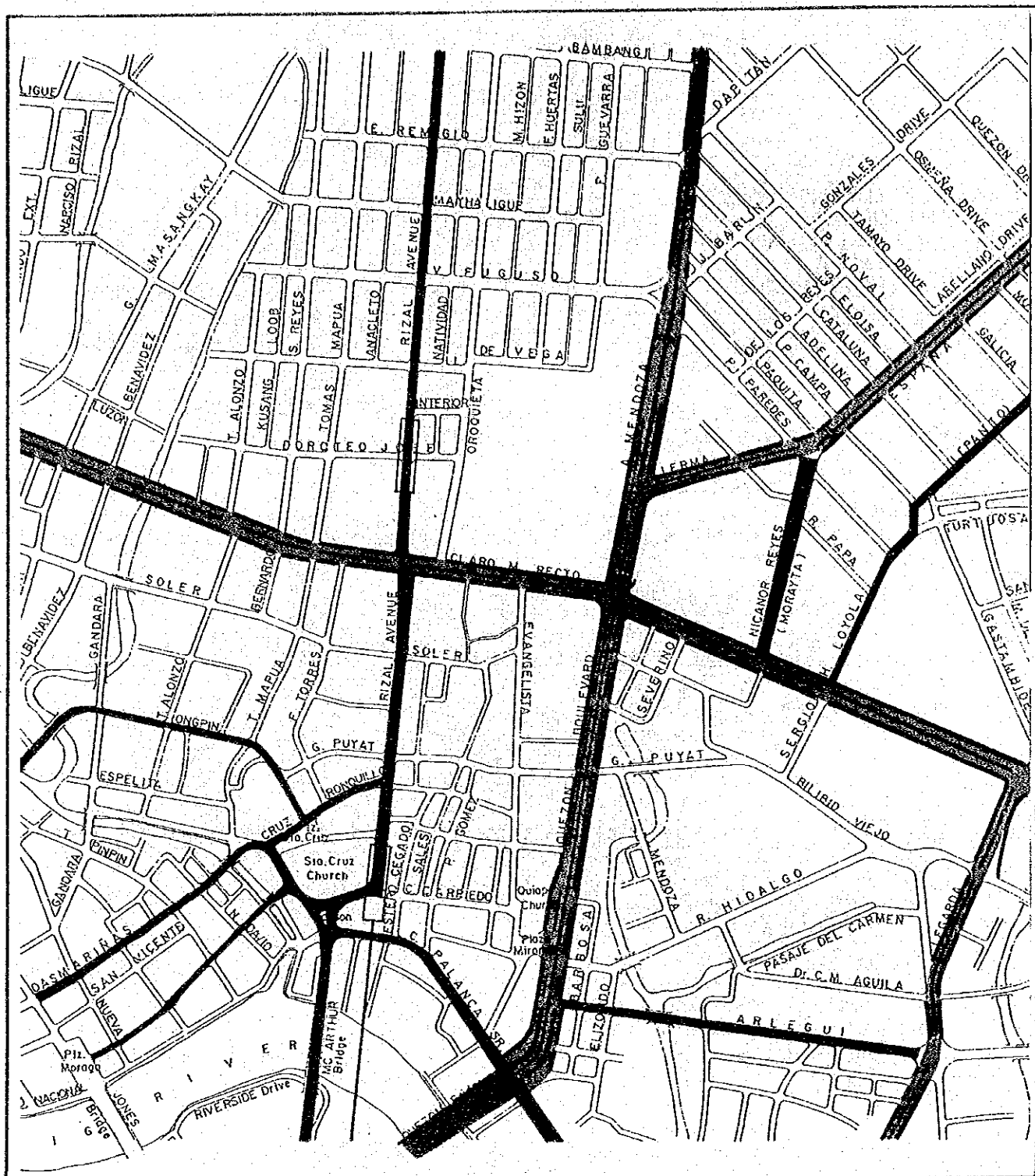
Even with a short road length of 300 meters, N. Reyes is the important link connecting C. M. Recto and España. the grade separation at the intersection of A. Mendoza and Lerma render C. M. Recto inaccessible from España-Quezon Avenue except via N. Reyes.

Daily traffic volume is 17.5 thousand with an estimated volume capacity ratio of 0.5 rendered low by numerous on-street parking. Utilization is primarily by public transport comprising approximately 85% of total traffic volume.


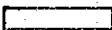

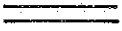
Other Local Roads:

The road network in the Recto Study Area is amplified by the following important local roads:

- Evangelista, parallel to and between Rizal Avenue and Quezon Boulevard, approaches Recto Avenue from the South.
- Oroquieta, touching C. M. Recto from the north, parallel to and between Rizal Avenue and A. Mendoza.
- D. Jose, parallel to C. M. Recto and perpendicular to Oroquieta and Rizal Avenue.



LEGEND:

- | | | | |
|---|----------------|---|-------------|
|  | PRIMARY ROAD |  | LRT STATION |
|  | SECONDARY ROAD | | |
|  | LOCAL ROAD | | |

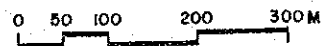
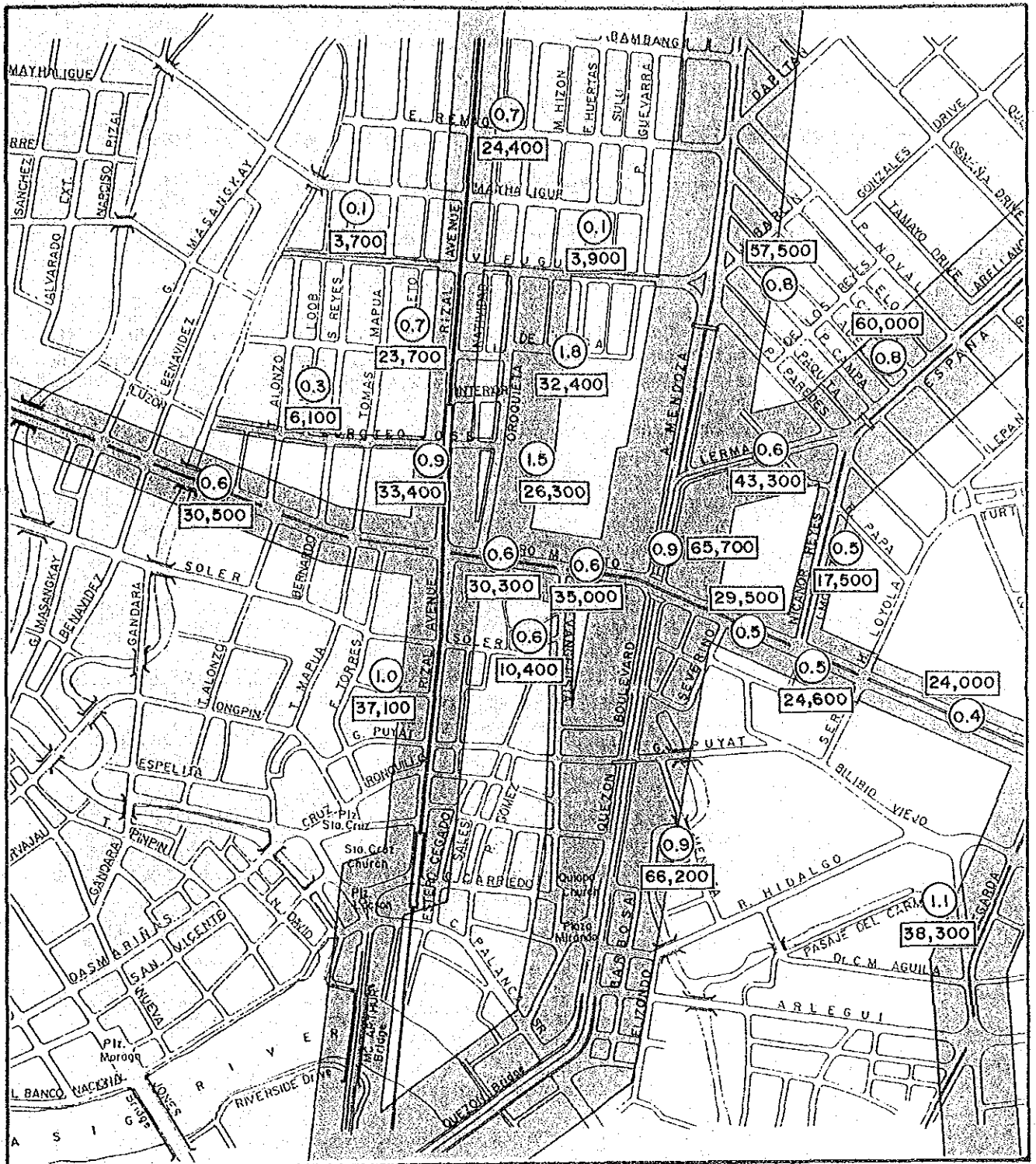
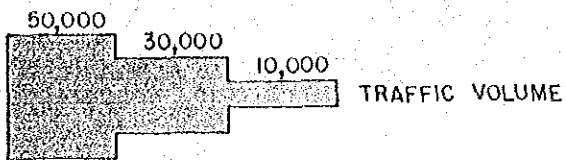


Figure 2.2
Existing Road Network



LEGEND:



○.6 VOLUME / CAPACITY RATIO



0 50 100 300 M

Figure 2.3
Road Traffic Flow

2.2.2 Traffic Congestion in the Area

Severe traffic congestions occur in the following locations:

- a) several intersections along C. M. Recto
- b) along A. Mendoza service road beside Central Market
- c) along Oroquieta

Traffic bottlenecks in the Recto area are most severe on the C. M. Recto section between Evangelista and Rizal Avenue. These are due to several factors (refer to Figure 2.4):

- a) Left turning jeepneys from Evangelista reach 700 vehicles/hour during the evening peak.
- b) Disruptive manual control of signals by traffic police at the intersections of C. M. Recto/Rizal Avenue and C. M. Recto/Evangelista (refer to Figure 2.5).
- c) Conflicts between the through traffic and the provincial buses turning at Oroquieta intersection.

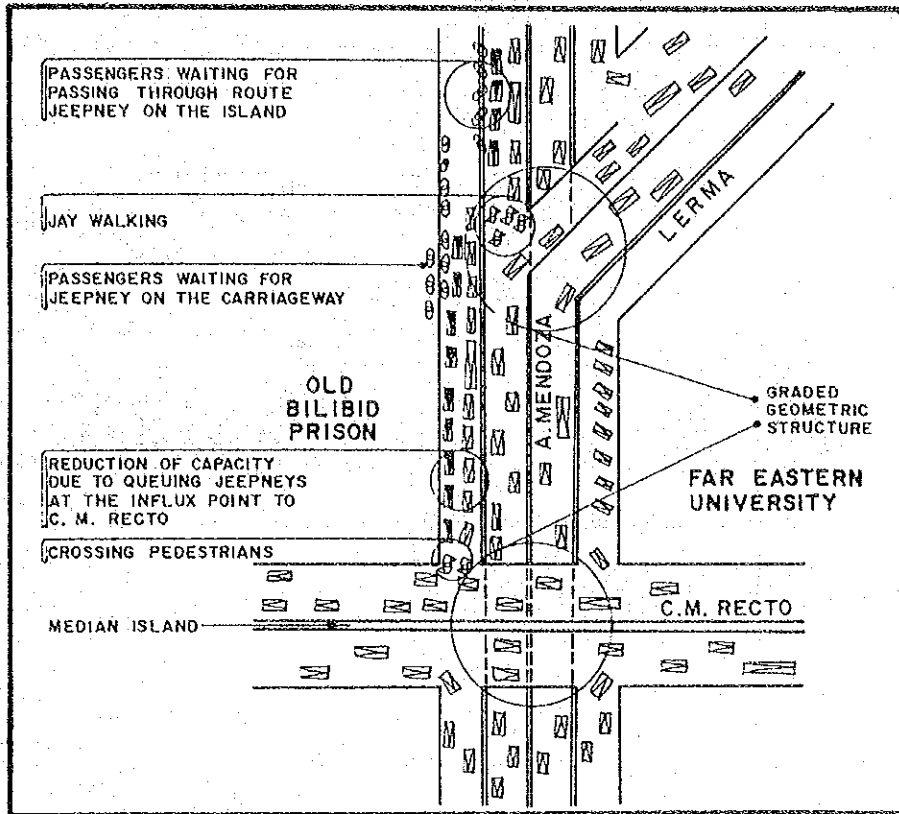
The volume/capacity ratio of the C. M. Recto - Rizal Avenue intersection is quite low at 0.68 due to the LRT construction along Rizal Avenue. Travel speed goes down to 6-7 Kph between T. Mapua and N. Reyes during peak hours.

The service road on A. Mendoza is also a congested section. The morning peak hourly vehicle traffic volume is only 700 but usually congestion occurs in the afternoon. This displaces the flow of passing through traffic on the A. Mendoza inner lanes. The latter is further aggravated by the following conditions:

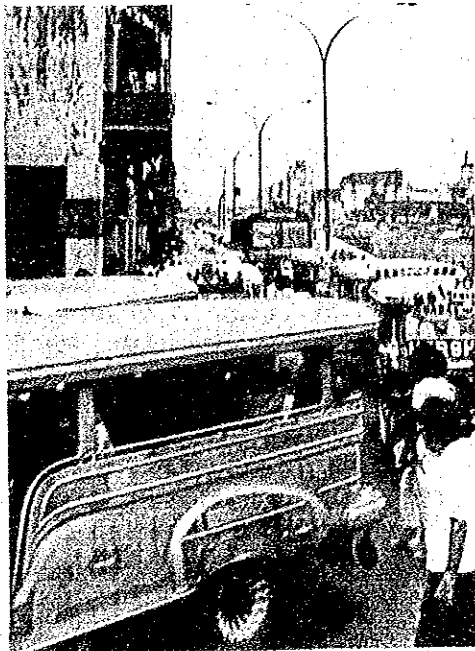
- a) Congestion at C. M. Recto forces the inflow of traffic from A. Mendoza service road to a standstill;
- b) Crossing pedestrians (5,000 persons at peak hour) spill over the inflow lane to C. M. Recto;
- c) Uncontrolled jeepney loading/unloading on the carriageway.

The congestion situation at A. Mendoza throughout the day can be described as follows:

- morning : congestion due to sheer volume of jeepneys and correspondingly, boarding and alighting passengers.
- daytime : congestion compounded by additional private car traffic mixing with buses and jeepneys on constricted through-traffic lanes.
- evening : vehicular traffic is not so much the culprit as the large pedestrian traffic volume (5,000/hour) on the carriageway of the service road.



Queueing Jeepneys and Crossing Pedestrians at the Influx Point of C. M. Recto

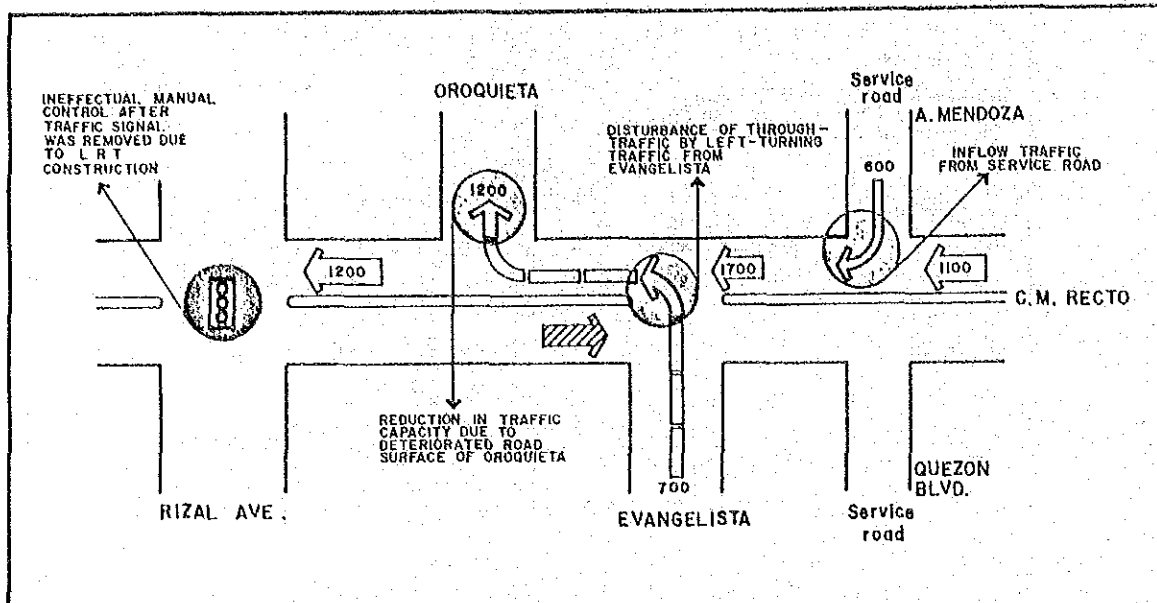


Passengers Waiting for Passing Through Route Jeepney on the Island



Figure 2.4
Causes of Congestion along
A. Mendoza Service Road

Figure 2.5
Traffic Congestion along C. M. Recto



The main problem of Oroquieta is the deterioration of the road pavement. With vehicles travelling at reduced speeds (5-10 km/hour), traffic queues stretch to C. M. Recto. With two lanes in one way direction plus a parking lane, the existing road capacity is actually adequate for the traffic volume of 1,200 vehicles/hour.

Other congested sections are as follows:

- a) along Rizal Avenue - - - caused by the on-going LRT construction
- b) V. Fuguso - - - vehicular flow disrupted by tricycles and on-street vending beside Central Market
- c) C. M. Recto/N. Reyes and C. M. Recto/Loyola Intersections - - - often clogged due to malfunctioning traffic signals and left-turn movements at C. M. Recto/N. Reyes intersection.

2.3 PUBLIC TRANSPORTATION ASPECTS

2.3.1 Routes

Existing public transportation routes related to Recto Mode Interchange Area are summarized in Table 2.2 and described as follows:

Jeepney:

There are 333 routes with 13,740 operating units. Of this total, 291 routes are passing through with 12,150 operating units; while only 42 are terminating with 1,590 operating units. Inter-city services are minimal.

Bus

Of the total 37 bus routes, 32 are passing through and only 5 terminating. Impact of provincial bus service, however, is considered significant in the study area.

Table 2.2
Existing Public Transportation Routes Related to Recto

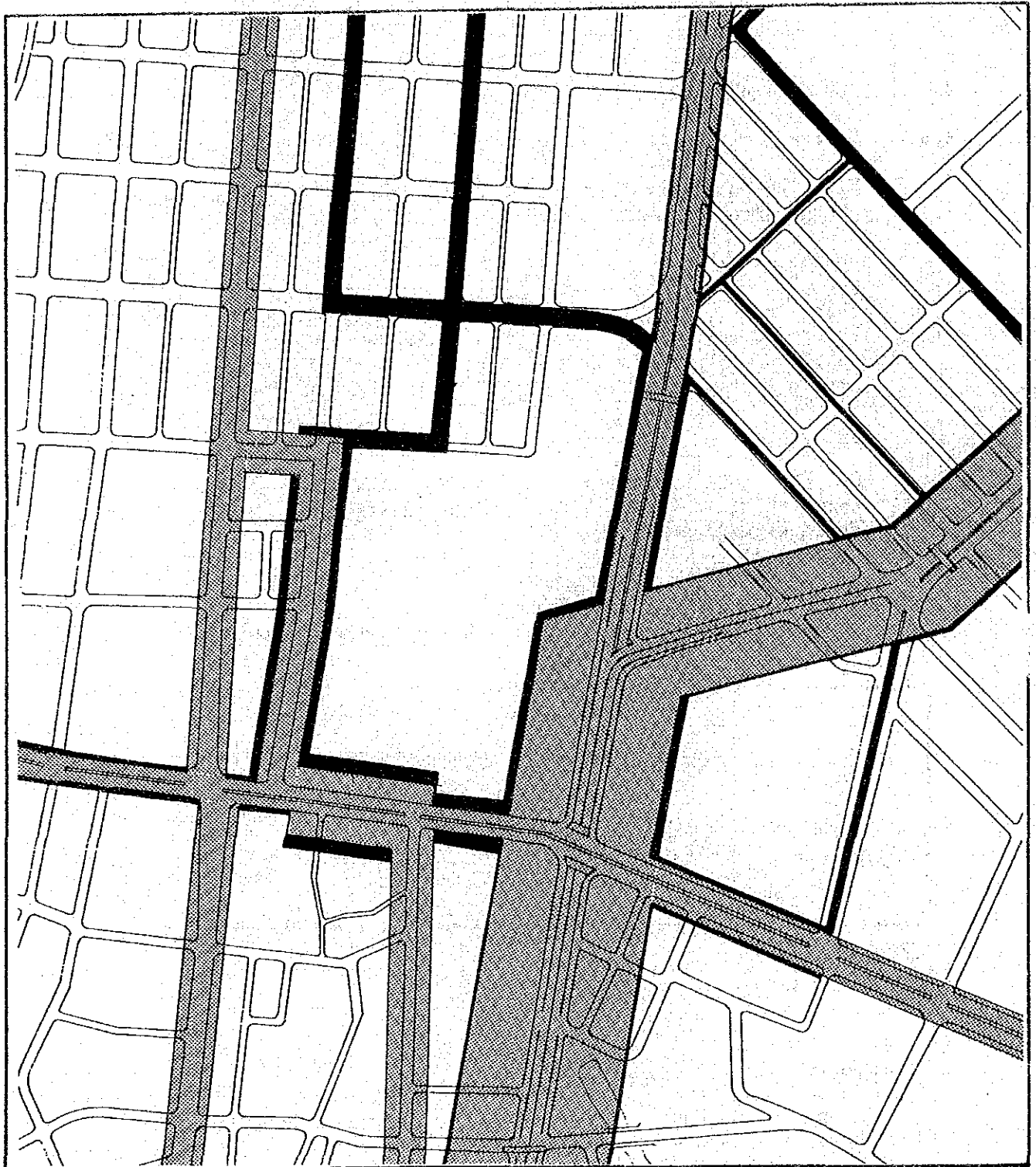
Mode	Terminate		Passing Through ^{1/}		Total	
	No. of Routes	No. of Units	No. of Routes	No. of Units	No. of Routes	No. of Units ^{1/}
Intra-City JPY	38	1,365	286	11,893	324	13,258
BUS	3	120	26	449	29	569
Provincial JPY	4	228	5	252	9	480
BUS	2	295	6	365	8	660

Source: JUMSUT I



^{1/} No. of units refer to daily operating units.

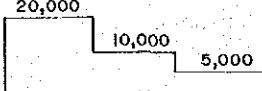
Route coverage and frequency are shown in Figures 2.6 and 2.7, for jeepney and bus, respectively. Heavy jeepney traffic converges along C. M. Recto between Evangelista and Oroquieta, and along Lerma and Quezon Avenue. It is noted that jeepney operation tends to be irregular due to the on-going LRT construction. Some routes identified previously in JUMSUT I have ceased to operate.

Route structure of jeepney and bus is schematically shown in Figure 2.8. C. M. Recto, España - Quezon Boulevard, A. Mendoza - Quezon Boulevard, Rizal Avenue are the trunk routes for passing through jeepneys. Terminating routes fall into two types - those which provide loop service in the north and those which terminate at P. Campa. Although many routes converge at the intersection of C. M. Recto and A. Mendoza, interline transfers occur further down near the Quiapo Church.



LEGEND:

 TERMINATING
 PASSING THROUGH


 20,000
 10,000
 5,000

FREQUENCY / 16 HRS

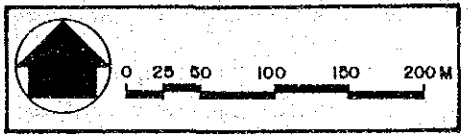



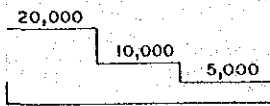
Figure 2.6
Jeepney Route Coverage
and Frequency



LEGEND:

 TERMINATING

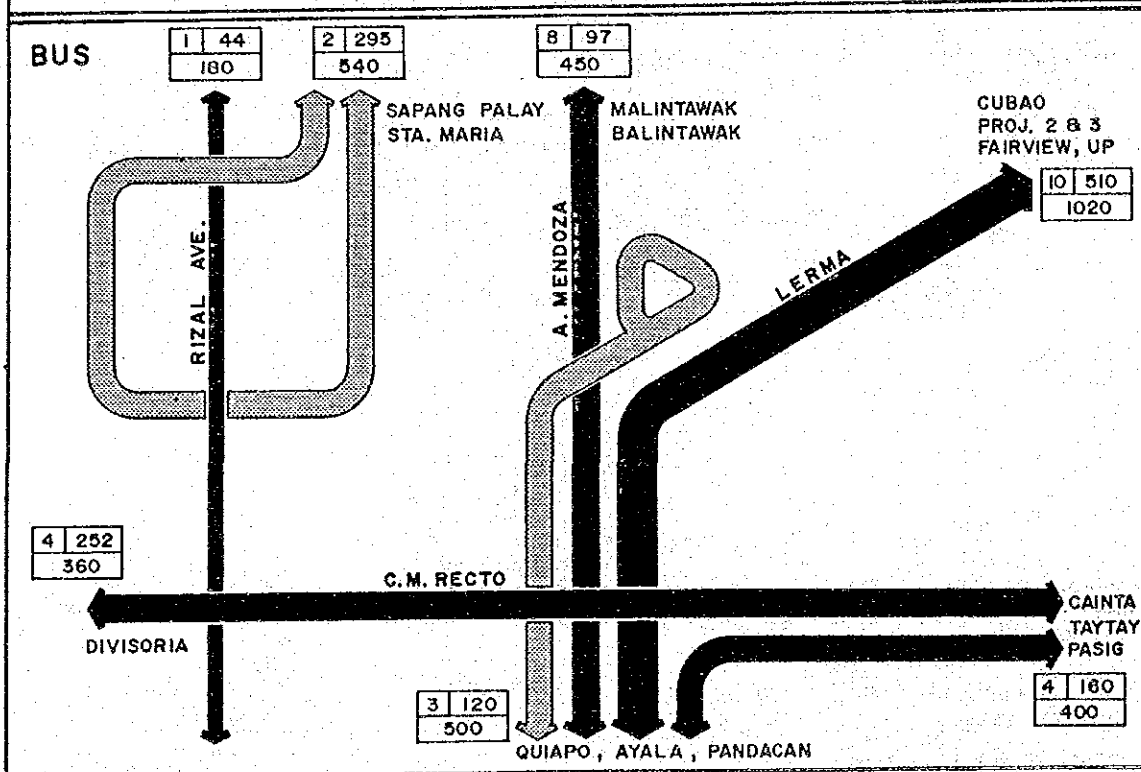
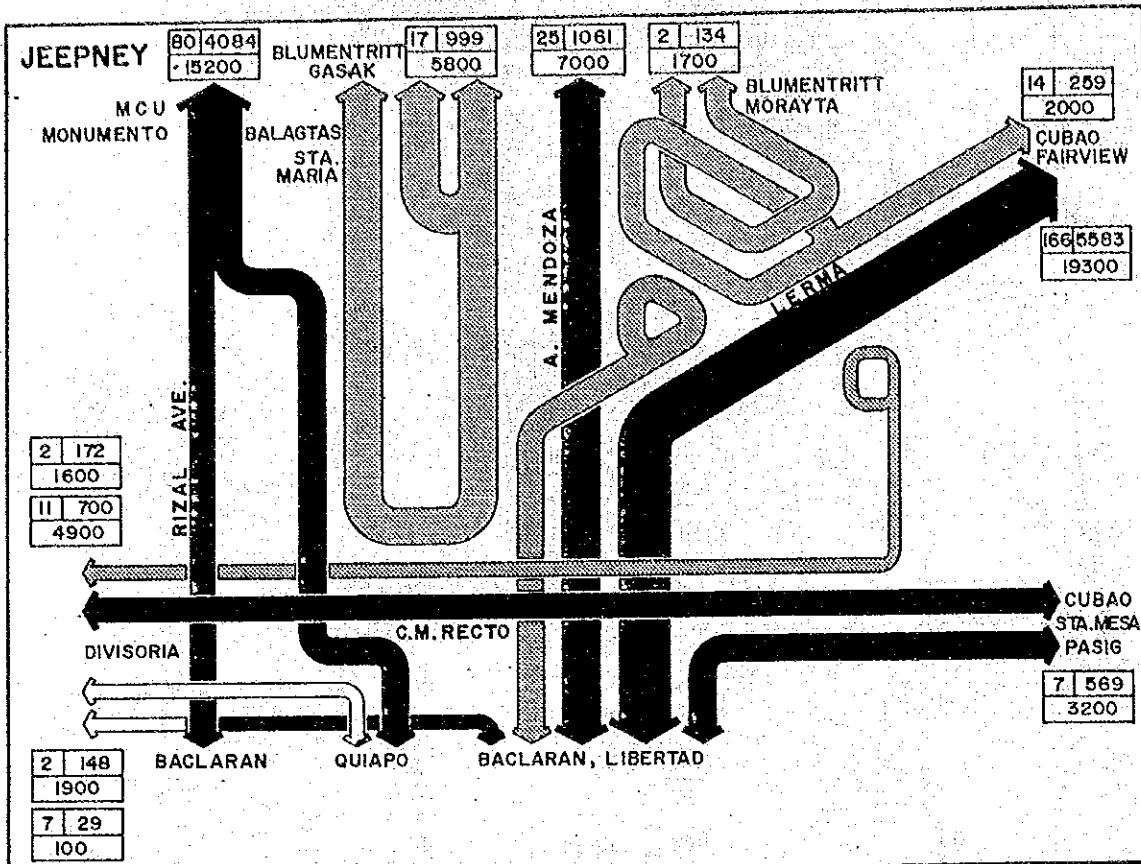
 PASSING THROUGH


 20,000
 10,000
 5,000
 FREQUENCY / 16 HRS



0 25 50 100 150 200M

Figure 2.7
Bus Route Coverage
and Frequency



LEGEND:

NO. OF ROUTES	NO. OF UNITS
FREQUENCY/16 HRS.	

TERMINATING ROUTE
 PASSING THROUGH ROUTE

Figure 2.8
Existing Public
Transportation Route
Structure

JUMSUT II

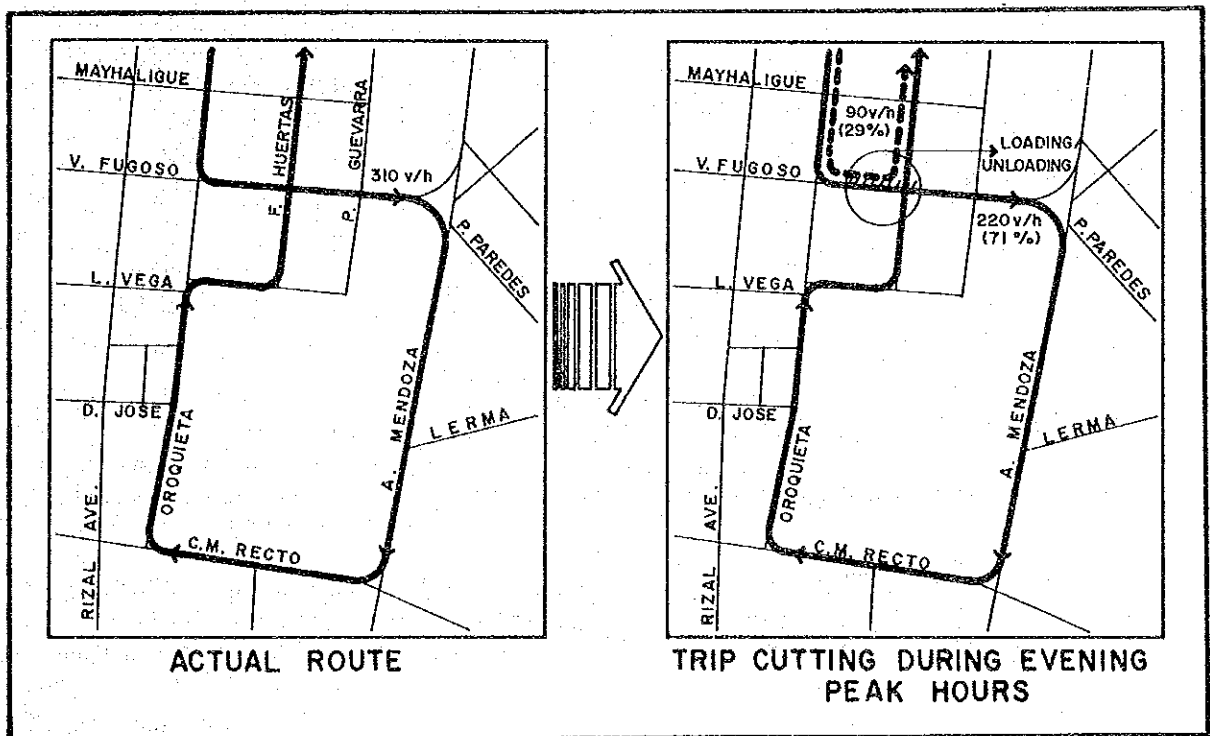
Passing-through bus routes use the same trunk roads as the jeepneys. Terminating routes consist of those which provide service in the north and those which serve the south.

The existing route structure in the Recto area suffers from the following problems:

- Trip cutting of northbound routes during evening peak hour.
- Transport service coverage is to avoid the congested turning loop confined due to the physical limitations of the grade separation from A. Mendoza to Quezon Avenue. This is discussed in more detail in Section 2.3.4 of this chapter.

Trip-cutting on the northbound routes forces unnecessary passenger transfers on and along A. Mendoza service road. Approximately 30% of the jeepneys cut their trips short of the full route as shown in Figure 2.9. A driver interview survey revealed the strong aversion against congestion along Central Market, the A. Mendoza service road, and Oroquieta. This in turn, induces passengers to walk in the evening to V. Fugoso to catch their rides, thus encouraging further the aberrant behavior.

Figure 2.9
Trip Cutting Practice of Northbound Loop Routes



2.3.2 Existing Terminals and Turning Points

There are four jeepney and two bus terminals/turning points in the Recto mode interchange area. These terminals are mapped on Figure 2.10 and described in Table 2.3. These are primarily managed by various drivers' associations employing their own dispatchers. All the jeepney and bus terminals use road space, thus obstructing vehicular and pedestrian flow.

The bus terminal on Dapitan Street is more of a turning point since queueing and boarding occurs at the A. Mendoza - V. Fuguso intersection.

The mini-bus terminal at D. Jose uses the road-space and parking space on the defunct Opera House. There are approximately 70 mini-buses waiting in this area during off-peak hours. This situation is expected to be temporary since a proposed private development on the Opera House site would preempt the available space.

The Philippine Rabbit provincial bus terminal operating along busy Rizal Avenue disturbs other traffic at its point of entry/exit. On-street parking and weaving actions on the Oroquieta side causes traffic to bottle and ripple to C. M. Recto.

The important loading/unloading areas are mostly on the primary roads - C. M. Recto, Lerma, España, A. Mendoza service road and Rizal Avenue.

The new LRT station at the intersection of Rizal Avenue and D. Jose Street is anticipated to generate as many as 112,000 passengers per day.

A tricycle terminal is located on V. Fuguso, where the queue often-times extend to the Central Market at P. Guevarra Street.

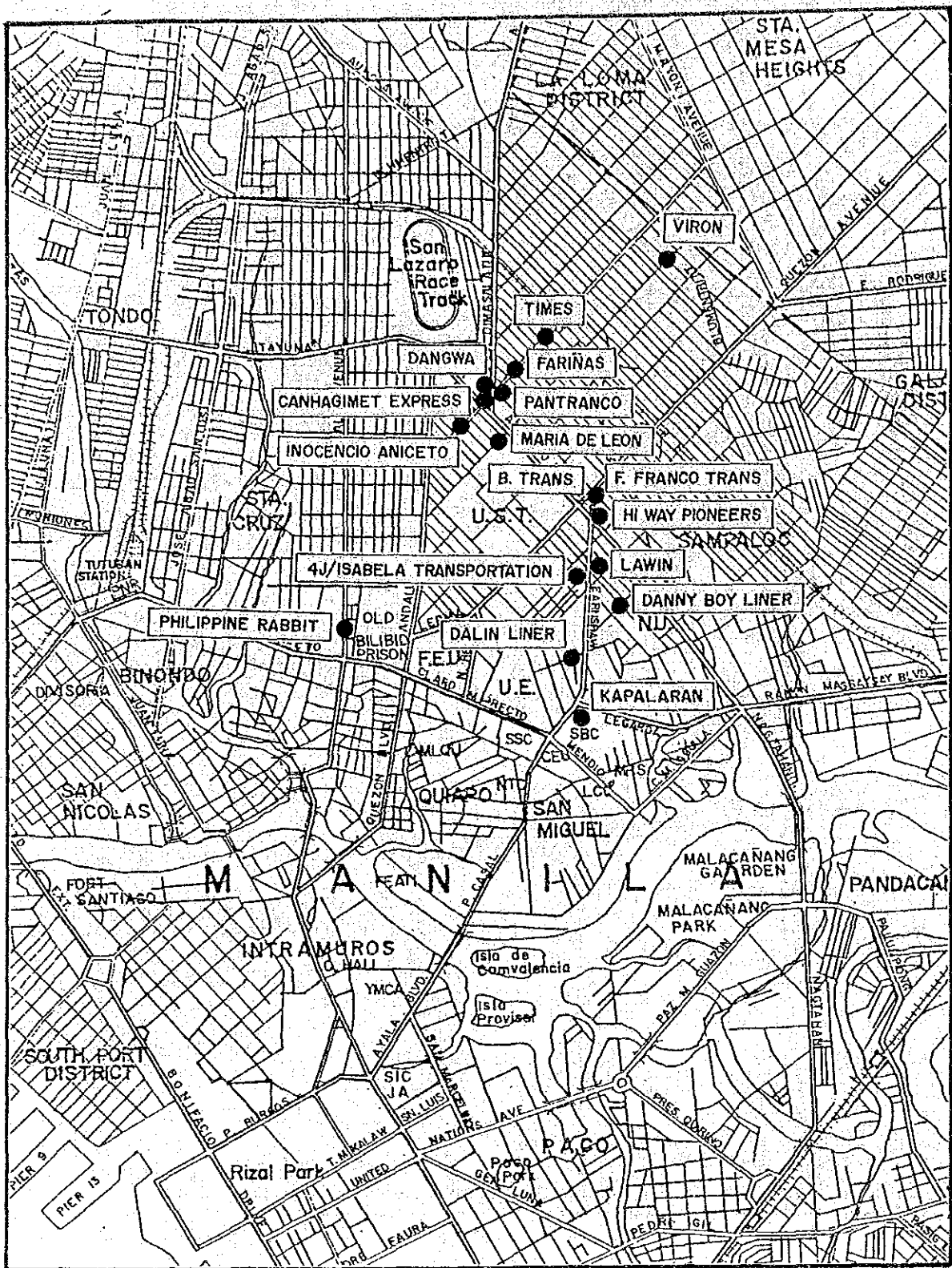
2.3.3 Provincial Bus Terminals

Distribution

In the study area, 16 provincial bus terminals can be found, (see Figure 2.11) of which 13 are off-road facilities.

Average lot size of the terminal is 1,000 square meters inclusive of office, passenger facilities, and (for 7 of them) maintenance facilities. Six of the terminals are on land owned by the respective bus companies, while the other 10 are on rented private land. (Refer to Appendix 2.1 for more detailed information).

Daily frequency is 290 outbound trips for Philippine Rabbit and less than 50 for the rest. Operating hours are from early morning extending to midnight. Eight companies operate air-conditioned units.



LEGEND :

● LOCATION OF PROVINCIAL (LONG DISTANCE) BUS TERMINALS

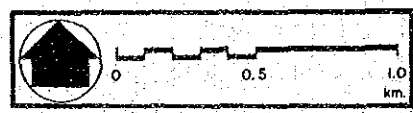


Figure 2.11
Location of Provincial
(Long Distance) Bus
Terminals

Table 2.3
Existing Public Transportation Terminals in Recto

Name/Location ^{1/}	Type	No. of Routes	No. of Units	Freq./16hrs.	Remarks
A. JEEPNEY					
1. A. Mendoza	Intra-City Inter-City On-Road	17	999	5,800	-
2. P. Paredes	Intra-City On-Road	21	288	2,100	1 Dispatcher
3. P. Campa	Intra-City On-Road	2	134	1,700	2 Association 4 Dispatcher
4. N. Reyes	Intra-City On-Road	2	172	1,600	1 Association 2 Dispatcher
B. BUS					
5. D. Jose	Inter-City On-Road Off-Road	2	295	540	4 Dispatcher
6. J. Barlin	Intra-City On-Road	3	120	500	-
7. Phil. Rabbit	Inter-City Off-Road	8	167	500	Private Company
C. TRICYCLE					
8. P. Guevarra	On-Road	-	26	-	-

Source: JUMSUT II

^{1/} Numbers correspond to those of Figure 2.10.

Passenger Characteristics

As shown in Table 2.4, 41% of the provincial-bound passengers use jeepneys as their access mode. Taxi is also used considerably (19.7%).

A broad brush interview of bus company management revealed an average occupancy of 50% to 70% during weekdays and 70% to 100% during weekends. Of the 18 bus companies, 7 acknowledged a growth in the number of passengers from previous years, 3 at static level, and 8, a decline.

Table 2.4
Access Modes to Provincial Bus Terminal

Mode	Percentage
Jeepney	41.0
Bus	9.8
Taxi	19.7
Walking	16.4
Others	13.1
Total	100.00

Source: JUMSUT II

Passenger OD Within Metro Manila

The catchment zone for the provincial bus terminals is confined generally to C-3. Origin or destination points of the passengers in Metro Manila gravitate around the CBD north of Pasig River and nearby areas. A few indicated Taft Avenue, Aurora Boulevard and Pasig also.

Prevailing Problems

The provincial bus terminals in the Recto Study area are not without problems, especially from the societal viewpoint.

a) Terminal/Environmental Problems

- Small terminals are scattered in residential area where noise becomes unbearable in the night time and early morning.
- Poorly designed entrance/exit create localized traffic obstructions.
- Insufficient parking bays within the terminal leads to the use of nearby streets.

b) Operational Problems

- Inefficient utilization of capacity as a consequence of disjoint ownership.
- Complete facilities, such as refueling and maintenance bays cannot be afforded by many companies.
- Competitive pressures over a volatile market lead to non-optimal scheduling.

c) Passenger Convenience

- Passenger choice is circumscribed by the scattered locations of terminals with no clear division of destinations.
- Difficulty of getting on the next best schedule, at the cost of moving from one terminal to another or long wait if the first chance was missed.
- Access to the terminals via public transportation is not always direct nor convenient
- Buses and terminal facilities are more often than not dirty.
- Bus frequency within a given route and terminal is lower than what the system as a whole provides.
- Luggage security is non-existent.

2.3.4 Recto as a Passenger Transfer Point

Approximately 490,000 passengers were counted over 16 hours in the Recto study area. Of this number, jeepneys carried 7x more than buses. School related trips were naturally above average because of the large educational institutions in the area.

Table 2.5
Public Transportation Passenger Traffic

Mode	Number of boarding/alighting/16 hrs.					
	Intra-City		Inter-City		Total	
	000	(%)	000	(%)	000	(%)
Jeepney	408	(82.9)	23	(4.7)	431	(87.6)
Bus	21	(4.3)	40	(8.1)	61	(12.4)
Total	429	(87.2)	63	(12.8)	492	(100.0)

Source: JUMSUT I

A mini-interview survey of public transport passengers showed that 2/3 of total passengers terminate their trips in the study area and the remaining 1/3 take another ride. This percentage distribution is reflected in Table 2.6 below.

Table 2.6
Percentage of Transfer and Terminating Public Transportation Passengers by Mode

Mode	Transfer	Terminating	Total
Jeepney	33.4%	66.6%	100.0%
Bus	60.0	40.0	100.0
Total	37.8	62.2	100.0

Source: JUMSUT II

Of those passengers who transfer (~ 185 thousand), about 70% are jeepney to jeepney, while 24% shift from jeepney to bus. Bus passengers are not as loyal since only 2% transfer without changing mode.

Table 2.7
Modal Transfer of Public Transport
Passenger

From \ To	Jeepney	Bus	Others
Jeepney	68.8%	23.8%	1.5%
Bus		2.2%	3.7%
		Others	-

The demand for jeepneys being high, further analysis was made in relation to route structure (refer to Figure 2.12). The following observations apply:

- a) Of the total boarding and alighting jeepney passengers at the Recto MIA (310,000/day), 30.5% and 20.1% are northbound and southbound, respectively. The restricted nature of the roads and the existing routes to the north-east vis-a-vis the Recto MIA is reflected in the relatively small demand of 13.4% recorded for this direction. (see A of Figure 2.12)
- b) Transfer passenger volume is approximately 180,000/day. The northbound movements attract or induce majority of these transfers (see B of Figure 2.12). Popular transfer modes are jeepney-jeepney and jeepney-bus.
- c) Figure 2.12-C locates the two centers of gravity for terminating jeepneys and transfer passengers. Two distinct terminals are suggested by existing conditions; these are physically separated by A. Mendoza-Quezon Avenue. The absence of a pedestrian line naturally impairs the passenger interchanges that logically arise between the two terminal sites. The P. Campa terminal area caters to the routes with low frequency but wide coverage; the Recto terminal site serves those with high frequency but of limited coverage to the north.
- d) Micro analysis of passenger movements in the Recto area leads to Figure 2.12-D. Transfers are oriented to the north, as mentioned earlier. Transfer between northbound routes and the Espana-bound routes is low, perhaps due to the barriers posed by the grade separated intersection of A. Mendoza.

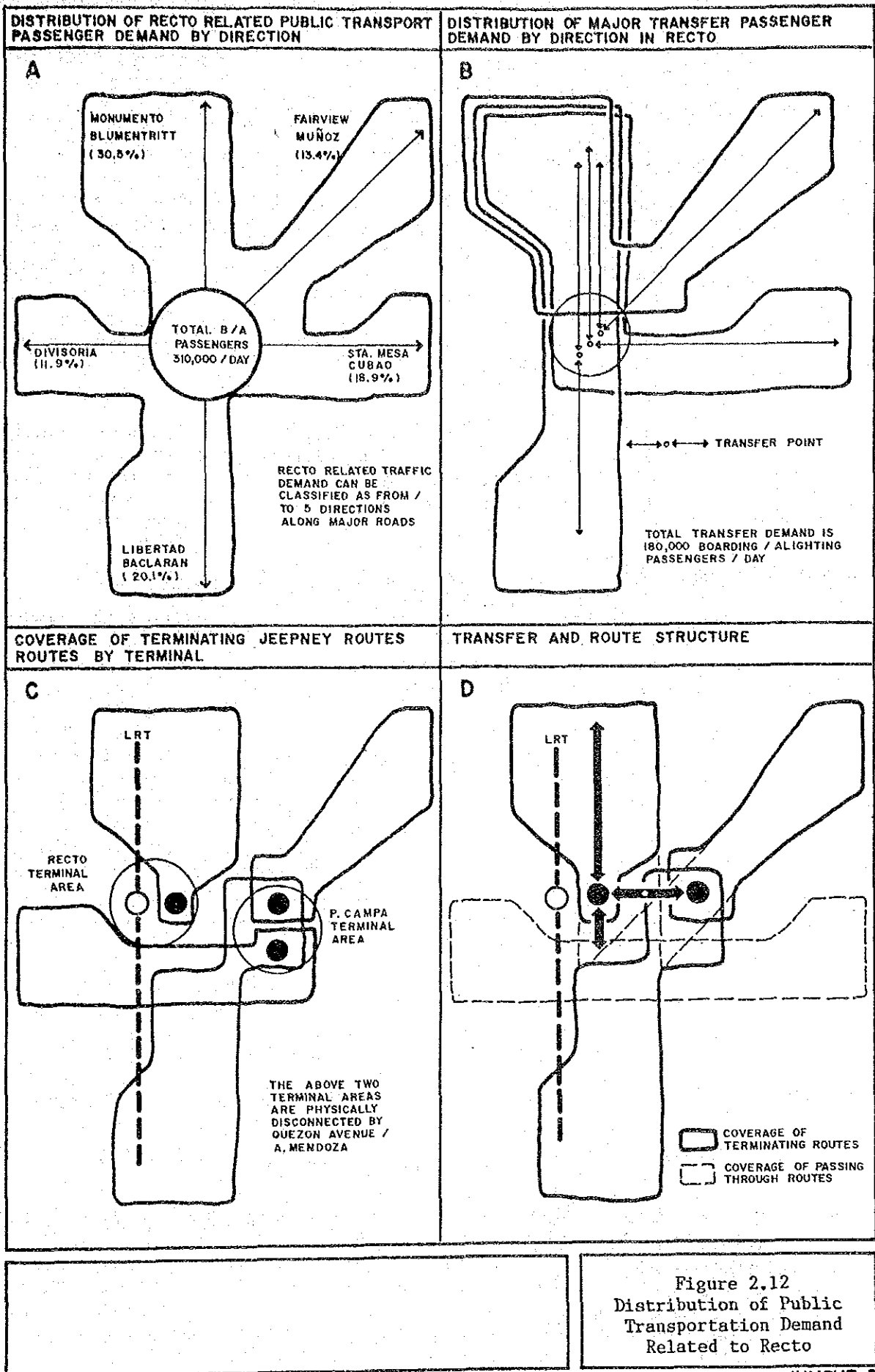


Figure 2.12
Distribution of Public
Transportation Demand
Related to Recto

Additional characteristics of jeepney operations in major routes radiating from Recto MIA were established from on-board survey. These are depicted in Figure 2.13 and described below:

- Average load factor is high but no more than 80%.
- Loading of passengers on the northbound loop routes accounts for the congestion on A. Mendoza service road. Boarding/alighting activities decrease as vehicles reach Oroquieta. Marked difference in occupancy is also evident between peak and off-peak hours.
- West-bound routes have boarding/alighting points extensively distributed along C. M. Recto. Occupancy is different by direction.
- Jeepneys passing through A. Mendoza exhibit little hourly fluctuation. Major boarding/alighting points occur on the short section between the entrance to the service road and the Lerma intersection - where passengers wait using medians.

2.3.5 Passenger Behavior on A. Mendoza Service Road

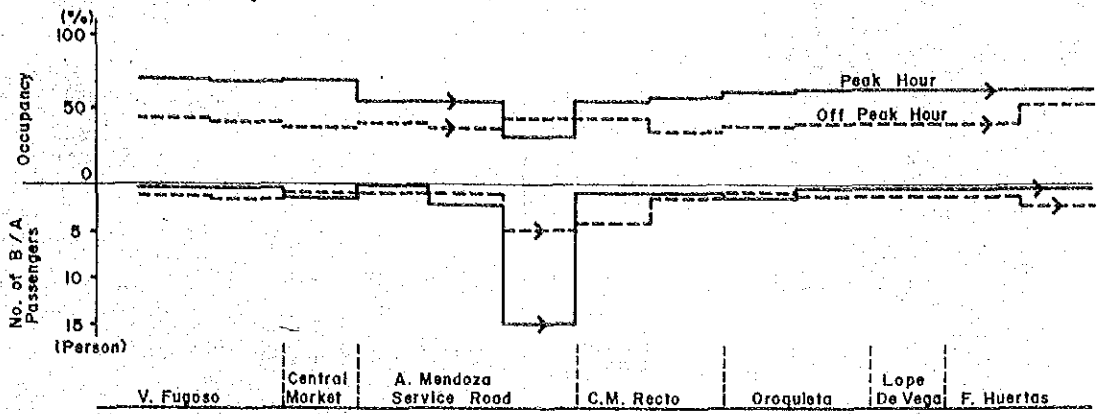
Passenger behavior on A. Mendoza service road deserves a closer examination for two reasons - its by product of severe traffic congestion and the possibility of suppressed transfers attendant to the merging of two trunk routes.

Figure 2.14 shows the schematic distribution of passenger demand related to A. Mendoza service road. These were obtained from the 1984 OD tables (refer to A of Figure 2.14) and passenger interview survey conducted on-site. (refer to B, C and D of Figure 2.14)

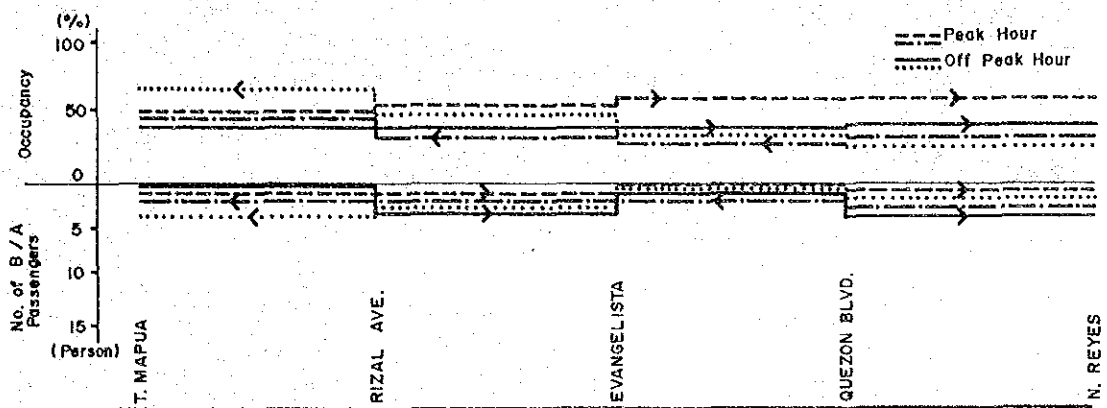
- The results of the free demand traffic assignment (Figure 2.14-A) reiterate the previous findings that passenger demand has two distinct modalities - north-east corridor and south corridor as one, and along A. Mendoza service road for the north corridor, as the other.
- However, results on passenger and pedestrian interview on the A. Mendoza service road revealed a wider distribution of passenger demand towards various direction-implying an important terminal function. (see B and D of Figure 2.12).
- Transfer activity is also considerable along A. Mendoza service road as shown in C of Figure 2.12. This suggests the need for interchange - to include the north-bound loop routes and Quezon Avenue bound routes.

It is obvious that the A. Mendoza and its service road is used extensively by commuters. Due to the geometric design of the C. M. Recto/A. Mendoza intersection, interchange functions among different routes are impaired despite their convergence. It can, therefore, be concluded that the service level and conveniences to the public would be improved considerably if the appropriate passenger-vehicle interface facility is built or provided.

A. North Bound Loop Route



B. C. M. Recto Based Routes



C. A. Mendoza Passing Through Routes

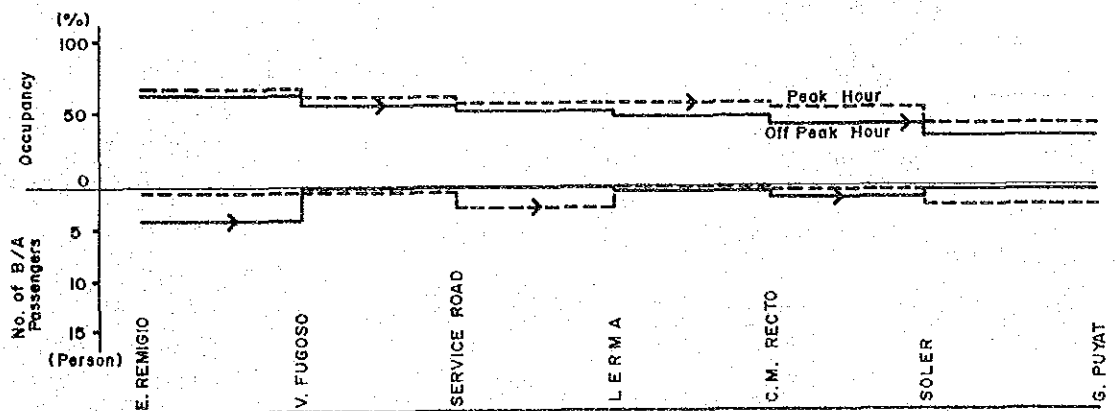
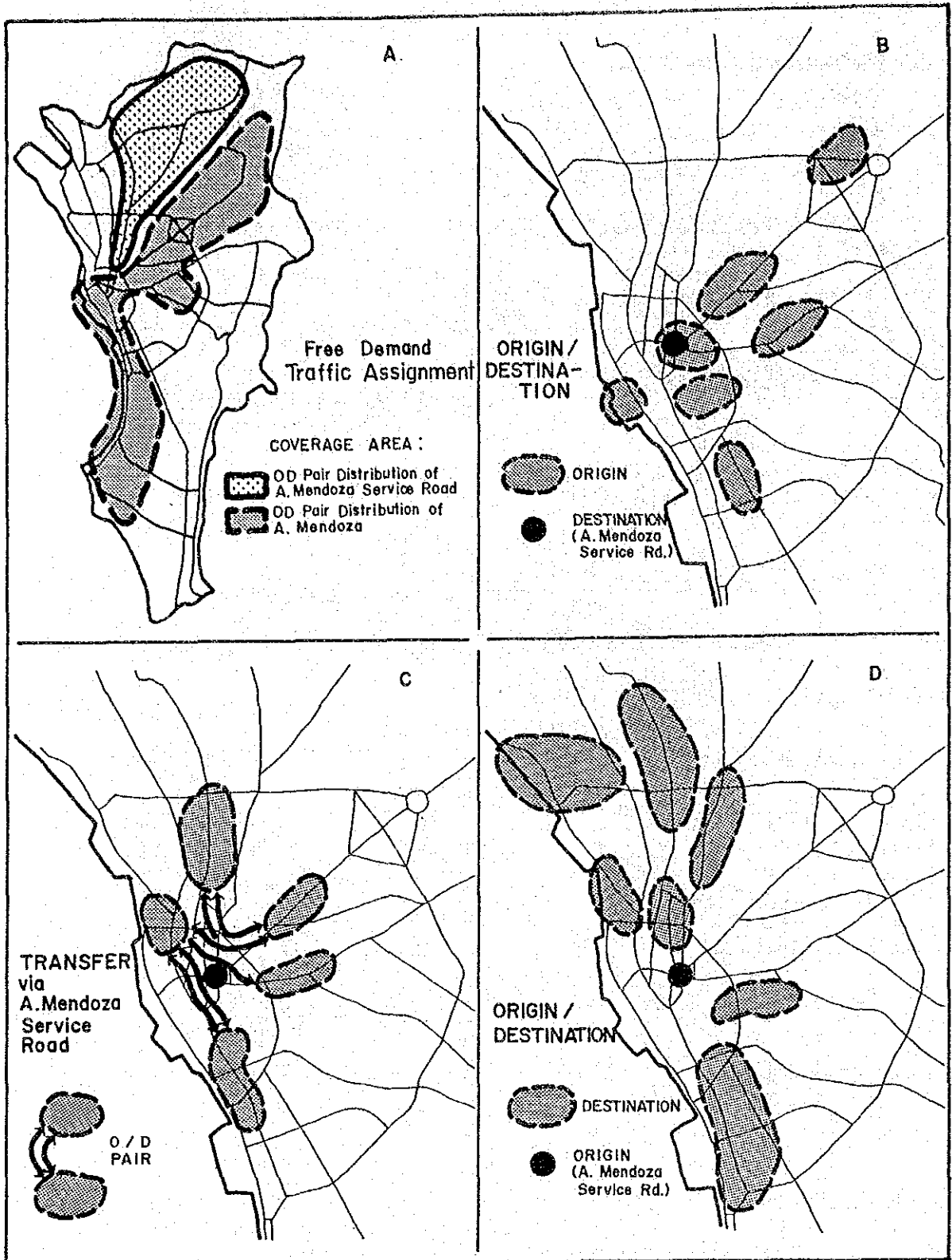


Figure 2.13
Boarding/Alighting
of Passengers and
Occupancy of Major
Jeepney Routes



LEGEND :

- A : RESULT OF FREE DEMAND TRAFFIC ASSIGNMENT
- B : RESULT OF PEDESTRIAN INTERVIEW SURVEY ALONG A. MENDOZA SERVICE ROAD DURING EVENING PEAK

Figure 2.14
 Passenger Demand
 Distribution Related to
 A. Mendoza Service Road

2.4 PEDESTRIAN TRAFFIC AND FACILITIES

An inventory of existing pedestrian facilities, aside from sidewalks, reported 3 underpasses, and at-grade pedestrian crossing. These facilities serve crossing pedestrians whose evening peak hourly volume is shown in Figure 2.15 and discussed below:

- a) Passengers cross the C. M. Recto - Quezon Boulevard intersection at the rate of 11,000/hour. On the other hand, pedestrians at the northern section cross at the rate of 5,000/hour with adverse effect on traffic from the A. Mendoza service road.
- b) Commuters cross the C. M. Recto - Rizal Avenue intersection at the rate of 13,000/hour, mainly across C. M. Recto.
- c) While pedestrian crossing is restricted at the A. Mendoza-Lerma intersection, 1,000 still take the risk every hour. These are mostly transfer passengers from jeepneys and persons taking a short-cut to UST.

As there are various commercial, amusement, and educational establishments concentrated in the area, pedestrian traffic volume is significantly large as to be problematic. For example,

- a) Danger to pedestrians crossing at intersections without (or non-functioning) traffic signals.
- b) Jay-walking at A. Mendoza/Lerma, Lerma/Morayta, C. M. Recto/Severino and C. M. Recto/Evangelista intersections.
- c) Competition between street vendors and pedestrians for space at C. M. Recto, V. Fuguso and A. Mendoza.

Pedestrian Traffic at C.M. Recto/N. Reyes Intersection



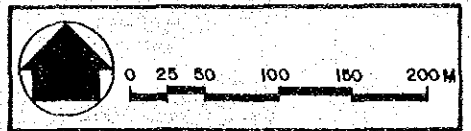
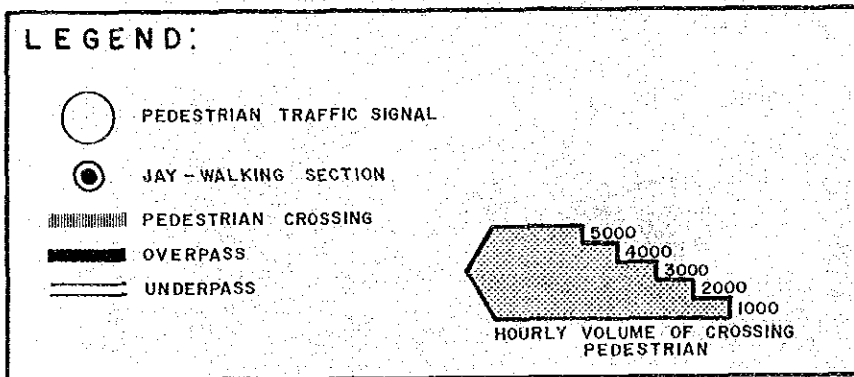
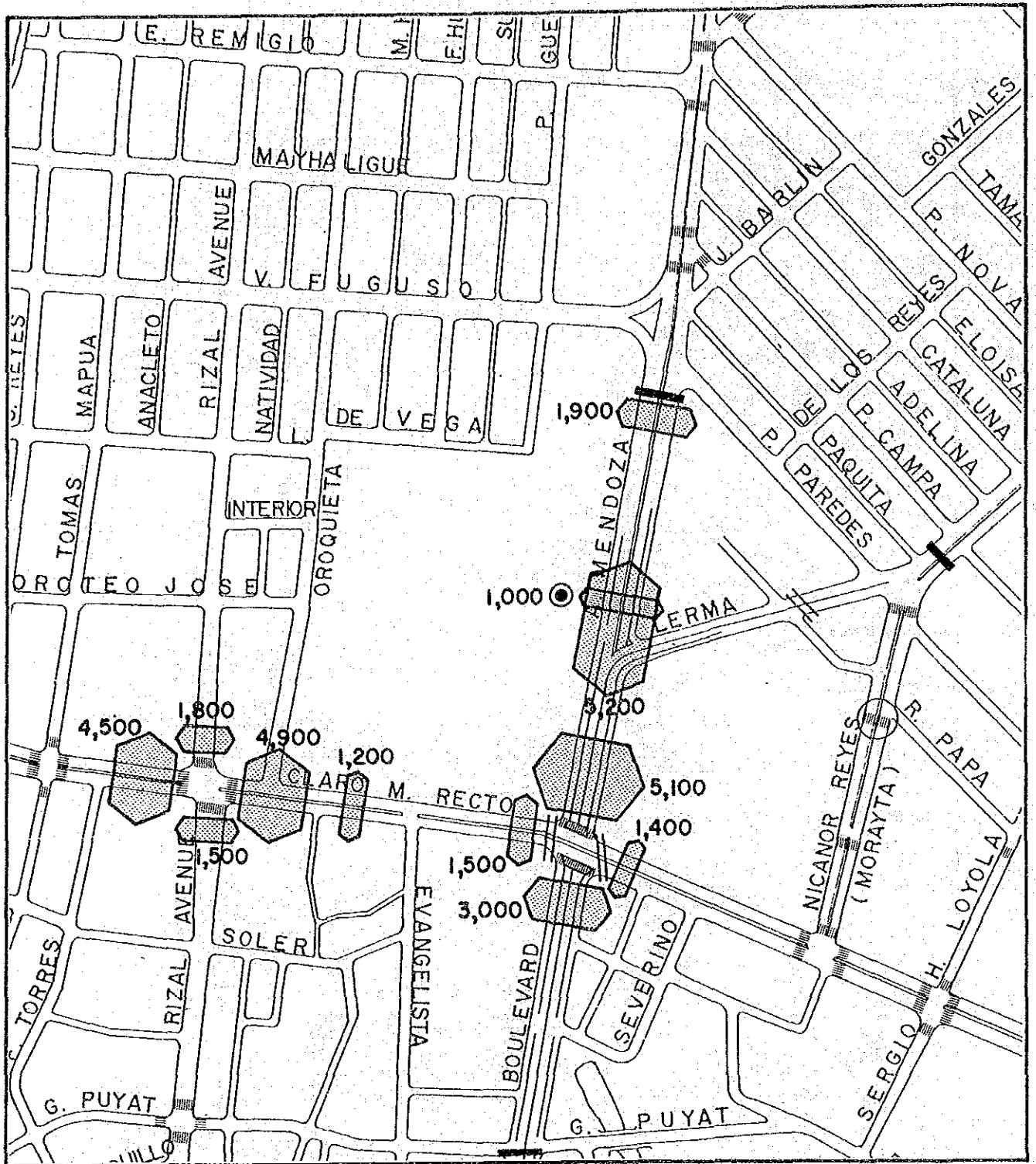


Figure 2.15
Pedestrian Facilities
and Crossing Pedestrian
Volume

2.5 TRAFFIC MANAGEMENT ASPECTS

2.5.1 Traffic Management

Several traffic management treatments have been implemented in the Recto area: the extent ones are shown in Figure 2.16 and described as follows:

a) One-way streets

Direction	Road Section
South → North	Oroquieta (C. M. Recto - De Vega) F. Huertas Evangelista, P. Campa, R. Papa, E. Torres, S. Reyes
North → South	Oroquieta (from North - V. Fuguso)* T. Mapua, P. Noval
East → West	Soler
West → East	De Vega, G. Puyat (T. Mapua - Evangelista) D. Jose (from West - Oroquieta)

* A section of Oroquieta between V. Fuguso and De Vega Street is closed, despite the completion of road construction activities.

b) Traffic Signals

There are 8 traffic signals installed with 5 operational. The two at C. M. Recto/N. Reyes and C. M. Recto/Loyola intersections are not functioning; thus, manual control by traffic aides and policemen is the norm. The same situation occurs at the intersection of C. M. Recto - Evangelista.

c) Loading/Unloading Regulations

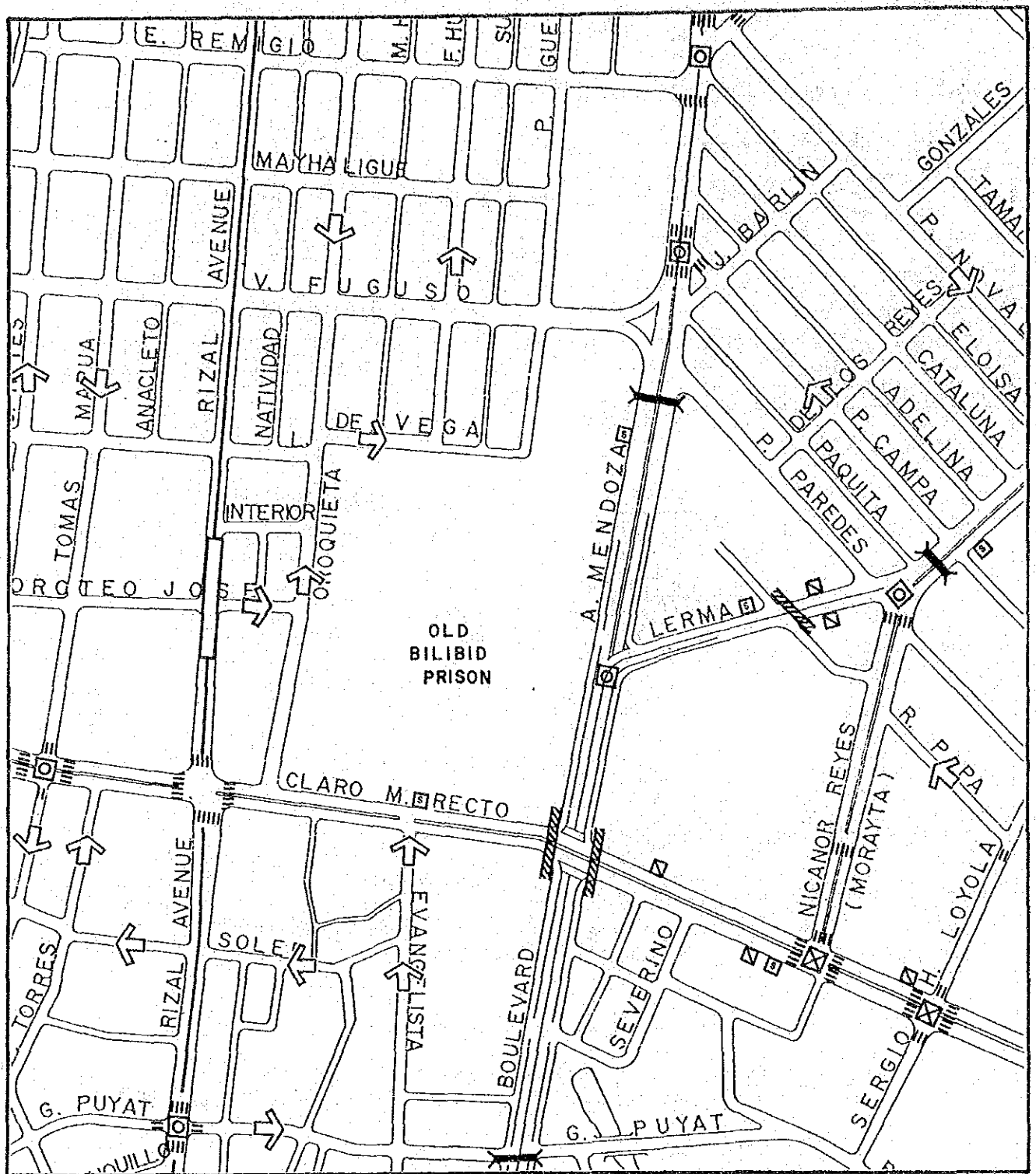
Prohibition signs have been set up against loading/unloading, but jeepneys and buses constantly disregard them.

d) Other Prohibitions

There are a number of intersections with signs prohibiting turning. Left-turning is also prohibited at the C. M. Recto/Rizal Avenue intersection in both directions.

2.5.2 Car Parking

Off-street parking facilities are virtually non-existent in this area. Consequently, extensive on-road parking is being practised to the detriment of smooth vehicle and pedestrian traffic.



LEGEND:

	PEDESTRIAN CROSSING	→	ONE WAY
////	PEDESTRIAN UNDERPASS		
—/—	PEDESTRIAN OVERPASS		
⊙	TRAFFIC SIGNAL (functioning)		
⊗	TRAFFIC SIGNAL (not functioning)		
⊠	NO LOADING / UNLOADING		
⊞	BUS / JEEPNEY STOP		

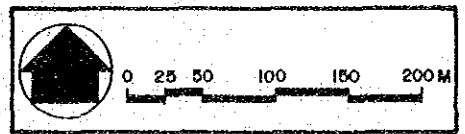
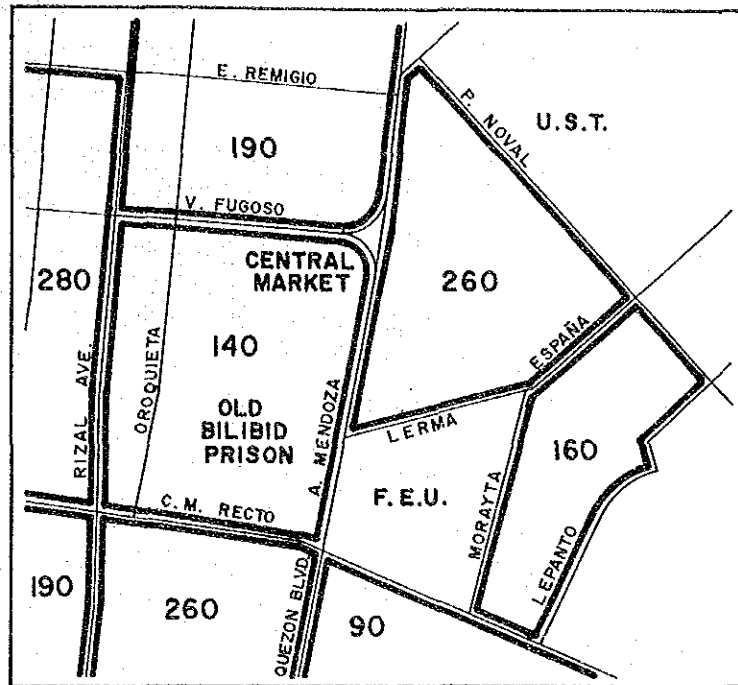


Figure 2.16
Existing Traffic Management

Locations of widespread parking of cars are shown in Figure 2.17. Approximately 1,600 vehicles park on-road. Approximately 80 standing vehicles are observed along C. M. Recto between A. Mendoza and Rizal Avenue. The density of parking observed (13 vehicles/100 meters) indicates that one whole lane on each side of the road is withdrawn from use of moving traffic.

Figure 2.17
Existing Conditions of Car Parking



Source: JUMSUT II

140 NUMBER OF CARS PARKED IN THE ENCLOSED AREA

3.0 PREVIOUS STUDIES AND PROPOSALS

3.1 PRECEDENTS

MM Team II and MMUTSTRAP have undertaken studies with particular relevance to the Recto MIA, especially along C. M. Recto on the matter of traffic management. A more important report in the planning of a mode interchange facility is the "Recto Old Bilibid Area Study" prepared by MMC in mid-84. To some extent, JUMSUT I is also relevant with its rerouting plans in conjunction with the LRT operation - wherein Recto is one of the affected zones.

3.2 MMTEAM II

MMTEAM has been studying and planning the installation of traffic signals. TEAM Phase I focused on areas inside C-2, while C-2 and C-4 was the territorial coverage of TEAM Phase II. For C. M. Recto, traffic signals were proposed for 12 intersections, of which 7 have been installed by TEAM Phase I. The other 5 proposed signals are still awaiting implementation.

3.3 MMUTSTRAP B1

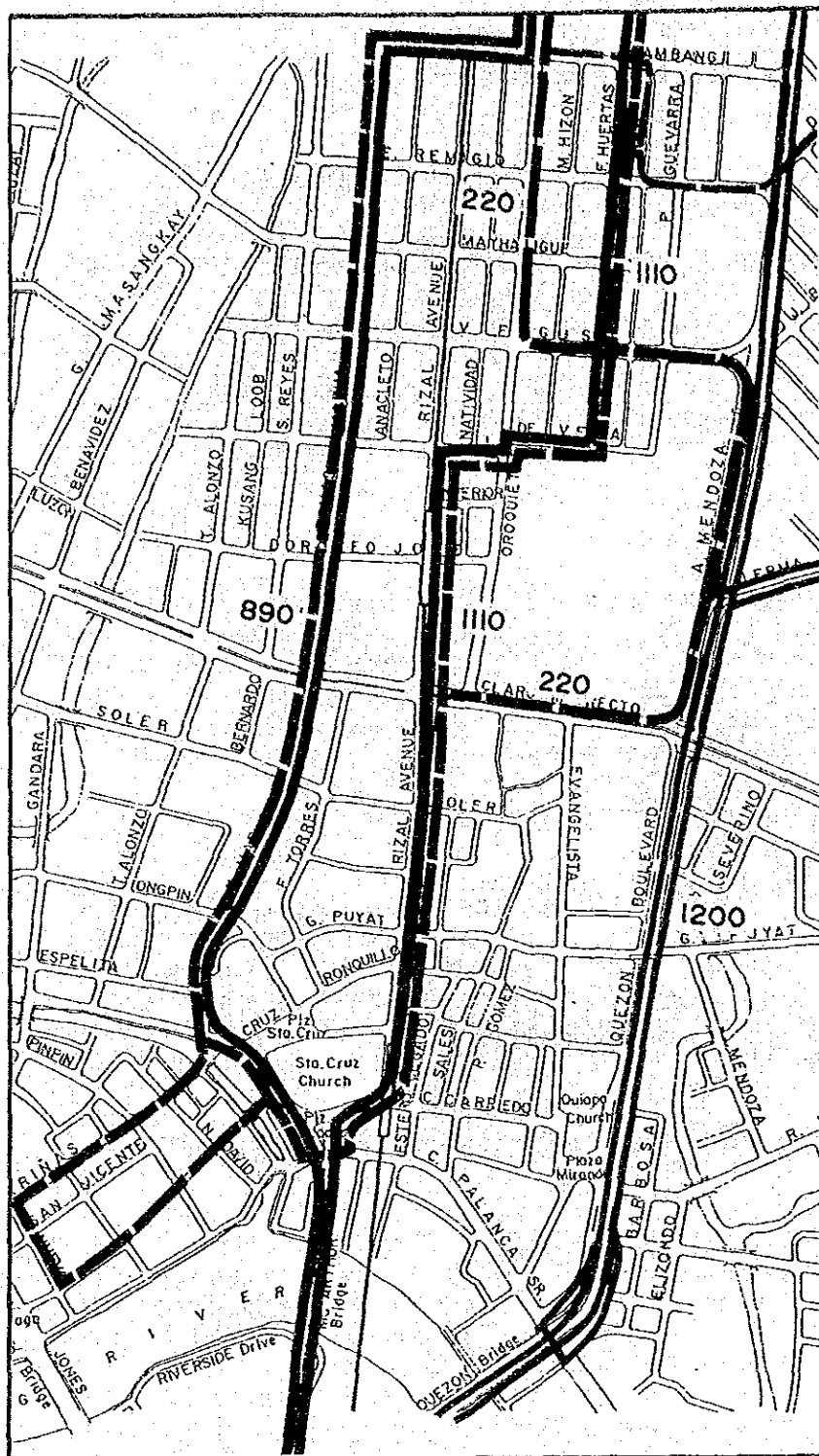
MMUTSTRAP Part B1 took another look at the Manila CBD mainly from a traffic engineering standpoint. The boundaries of this study overlapped with the northeastern part of the MMUTSTRAP's "Manila Sub-area Traffic Management Study". As part of its analysis, it reviewed the effectivity of traffic signals installed and/or proposed in TEAM Phases I and II.

3.4 MMC URBAN LAND MANAGEMENT STUDY: REDEVELOPMENT CONNECTED TO METRORAIL

The project is basically the redevelopment of the Old Bilibid Area Compound and the corollary acquisition of access to and from the development site. A major feature of the plan is the construction of a pedestrian skyway connecting Doroteo Jose to FEU and Lerma across A. Mendoza. A transport terminal integrated into commercial blocks is also envisaged to obviate traffic jams attendant to on-street loading and unloading activities. Appendix 3.1 capsulized the plans on the OBA.

3.5 JUMSUT I REROUTING PLAN

Initial rerouting plans for jeepneys were developed in JUMSUT I to synchronize with the scheduled opening of the LRT. A summary of the existing routes and corresponding rerouting proposals are depicted and summarized in Figure 3.1.



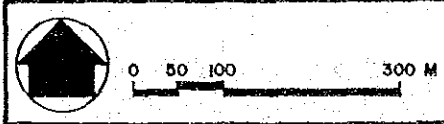
SUMMARY OF JUMSUT I REROUTING PLAN

A. NORTH LOOP ROUTES	
EXISTING: A. MENDOZA - C. M. RECTO - OROQUIETA - DE VEGA	PLAN: A. MENDOZA - C. M. RECTO - RIZAL AVENUE - DE VEGA
B. PASSING THROUGH ROUTES ALONG RIZAL AVENUE	
EXISTING:	PLAN: RIZAL AVENUE - BAMBANG
- PASSING THROUGH ROUTES ALONG SOUTH BOUND	
EXISTING: RIZAL AVENUE	PLAN: T. MAPUA
- PASSING THROUGH ROUTES ALONG NORTH BOUND	
EXISTING: EVANGELISTA - C. M. RECTO - OROQUIETA - DE VEGA - RIZAL AVENUE	PLAN: RIZAL AVENUE - DE VEGA - F. HUERTAS

LEGEND:

- PROPOSED REROUTING ON EXISTING PANELS (REROUTING FROM RIZAL AVE. TO TAFT AVE.)
- PROPOSED REROUTING ON EXISTING PANELS (REROUTING FROM QUIAPO UNDERPASS TO LRT CENTRAL STATION)
- PROPOSED ADDITIONAL ROUTE (FEEDER TO LRT)
- PROPOSED ADDITIONAL ROUTE (FEEDER TO LRT)

1110 JEEPNEY FREQUENCY/PEAK HOUR



**Figure 3.1
Jeepney Rerouting
Plan in LRT Corridor
(JUMSUT I)**

4.0 TRANSPORT SYSTEM ANALYSIS

4.1 TRANSPORTATION PROBLEMS

4.1.1 General Diagnosis

Broadly speaking, the transport problems in the Recto MIA can be summed up under three categories:

- a) those that currently prevail given the present regime;
- b) those brought about by construction and commencement of the LRT operation; and
- c) those that will ensue from the implementation of the OBA urban redevelopment.

Although some of the existing problems would be resolved by the occurrence of the latter two events, they also create their own new problems. These are discussed below and illustrated in Figure 4.1.

4.1.2 Impact of the LRT Operation

The estimated number of daily boarding and alighting passengers at the D. Jose LRT station is 110 thousand.

The total volume of passengers that will board/alight on other modes will be a function of the daily volume of LRT passengers along C. M. Recto between Quezon Avenue and Rizal Avenue.

The anticipated flow of passengers from the LRT station is shown in Figure 4.1. Thus,

- Passengers will converge at Rizal Avenue and C. M. Recto; consequently, it is necessary to improve sidewalks along Rizal Avenue from D. Jose to C. M. Recto.
- Transfers between the LRT and other public transport modes will be at the intersection of Rizal Avenue and C. M. Recto, simply because bus and jeepney run on the latter road. As a result, serious bottleneck would occur unless remedied beforehand.
- Connection between LRT and A. Mendoza necessitates the construction/installation of extensive pedestrian facilities, especially in connection with the redevelopment of Old Bilibid Prison.

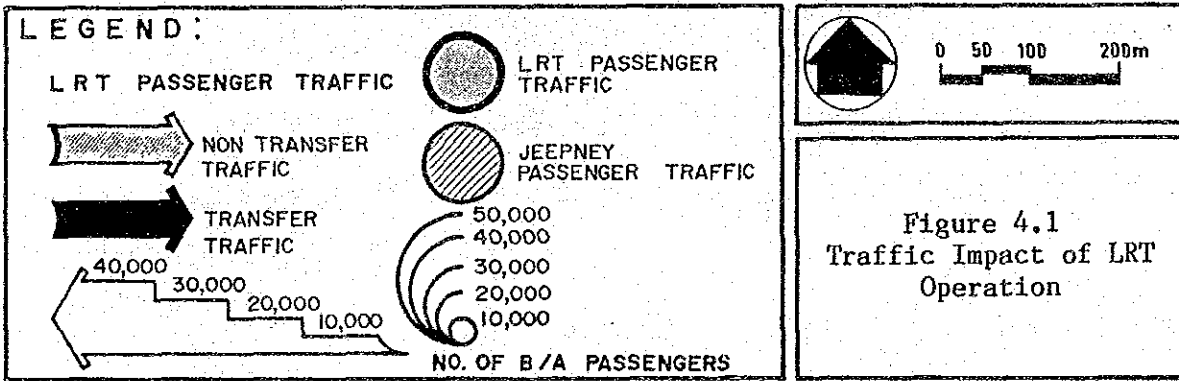
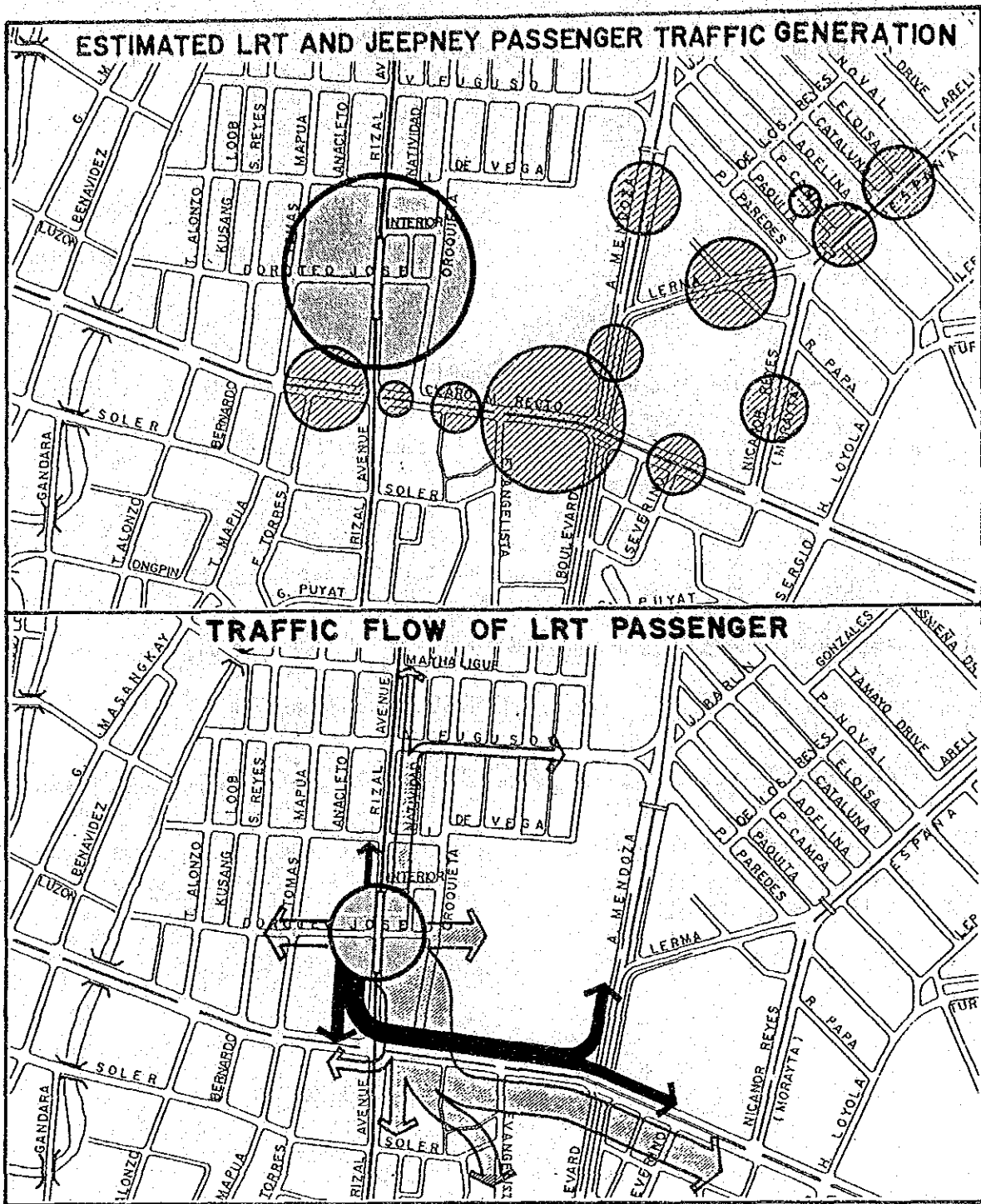


Figure 4.1
Traffic Impact of LRT
Operation