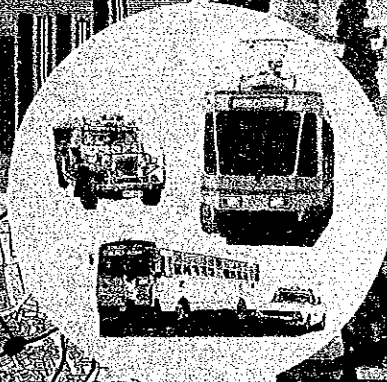
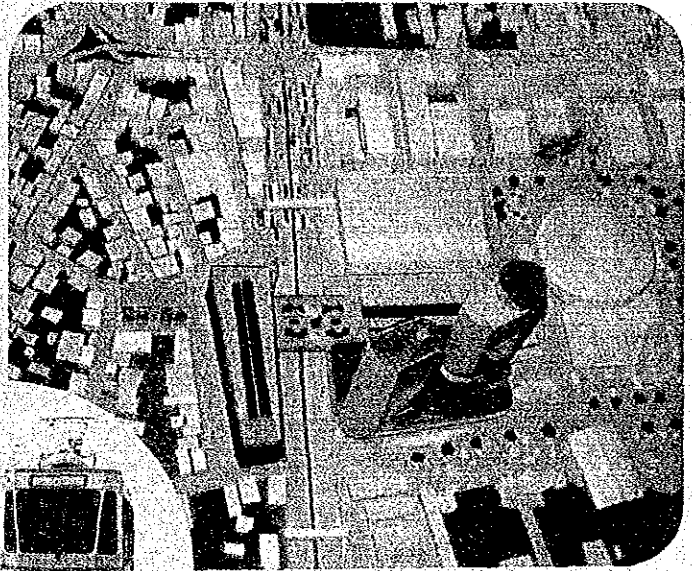
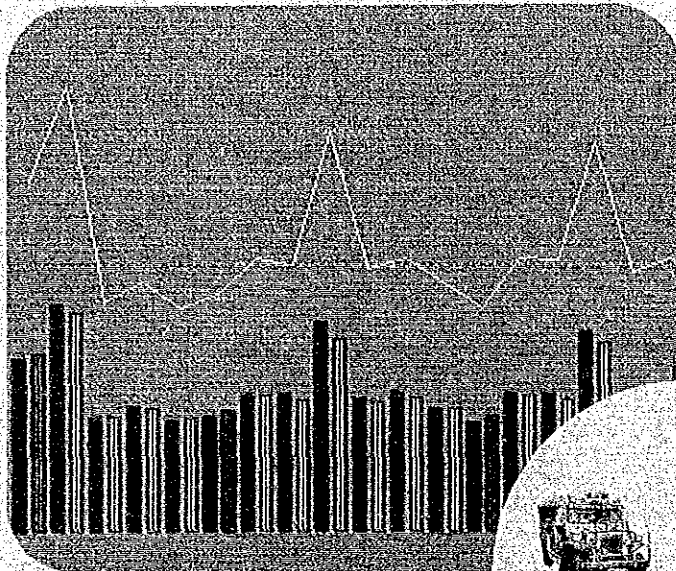


The Metro Manila Transportation Planning Study Phase II Final Report

TECHNICAL REPORT
Cubao Mode Interchange Area Study



SEPTEMBER 1985

JAPAN INTERNATIONAL COOPERATION AGENCY

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1.0 THE PROJECT SCOPE

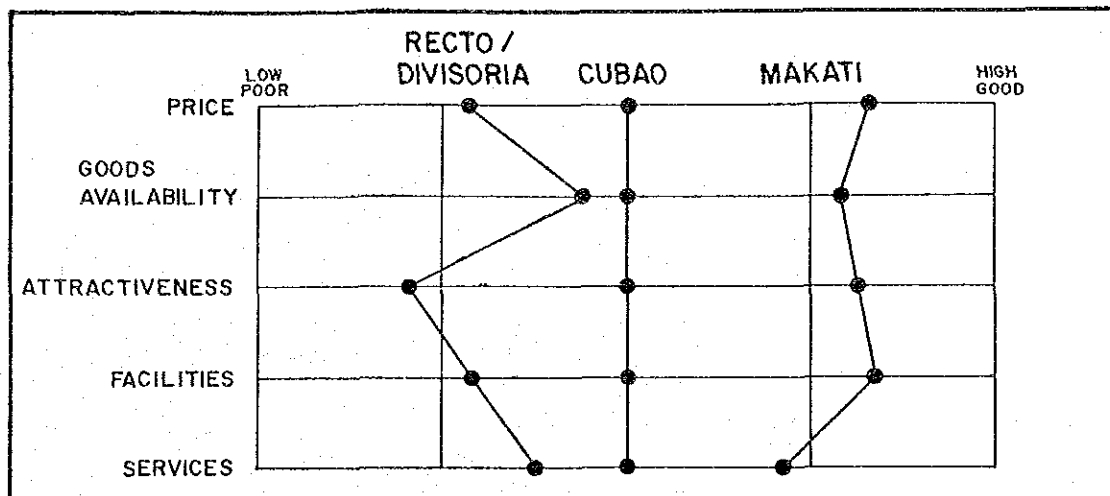
1.1 CUBAO IN METRO MANILA

Cubao is a district of Quezon City. But the name conjures a smaller area situated at the strategic node of EDSA and Aurora Boulevard and characterized by bustling commercial/business precincts developed by the private sector. Although the development spreads extensively along EDSA and Aurora Boulevard, its dominant point is Araneta Center - a 35 hectare complex with planned commercial/amusement/business establishments.

The origin of Araneta Center classifies it as non-traditional in the context of other metropolitan magnets. Its commercial activities were paced by the Araneta Coliseum which was built in the early 60's. In the subsequent years, urban development grew outwards of the old CBD and expanded towards Quezon City and Marikina Valley, with dramatic impact on the growth of the Araneta Center. Six years after the Coliseum was put up, the Nation and New Frontier Cinema were opened. In the early 70's, a number of establishments followed suit to include Farmers Plaza, Marikina Shoe Annex, Automatic Center, Fiesta Carnival, and Rustan. Farmers Garden set up shop in 1975 followed by the development of Ali Mall (Phases I and II) along P. Tuazon corner Gen. Romulo. During the early 80's, the commercial activities continued to flourish with the construction of Shoe Mart, UNIWIDE, National Book Store and Aurora Towers.

The emergence of Cubao can be related to the market niche it created and catered to. Its overall image attracted the large and growing middle-class who found the old CBD a little too congested and the Makati area a little too classy if not snobbish. This image is best illustrated by Figure 1.1.

Figure 1.1
Perceived Image of Cubao Commercial Complex



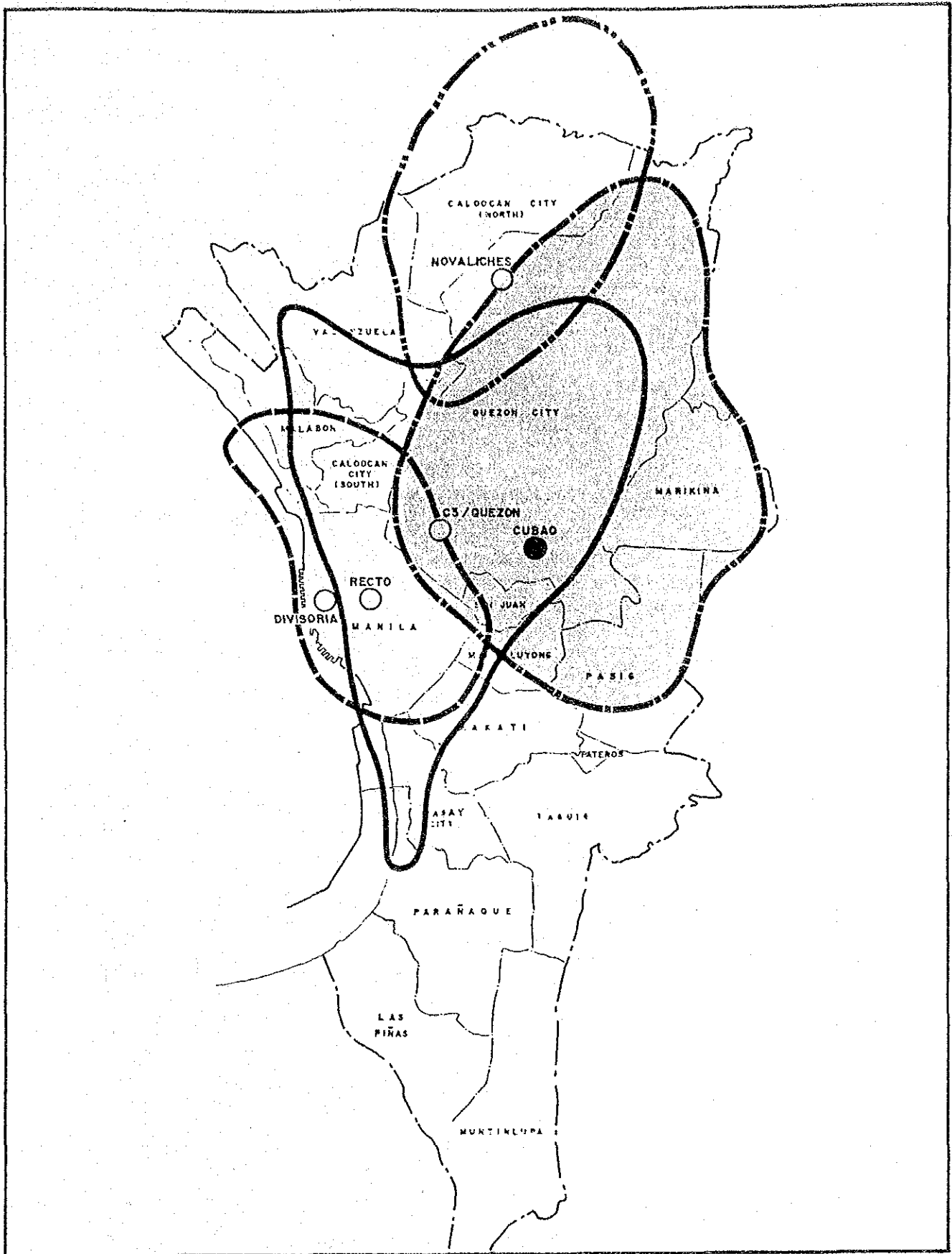
SOURCE : CONSUMER'S INTERVIEW SURVEY, JUMSUT II

The large catchment area or clientele of Cubao is shown in Figure 1.2. Such a population base provided a stable and continuing market which sustained Cubao's momentum. As a further differentiation, Table 1.1 provides a narrative description of Cubao vis-a-vis Monumento, Makati and other business centers.

Table 1.1
Comparison of Cubao with Other Commercial
Complex/Areas

Complex	Characteristics	Access Transportation Mode ^{1/}
Cubao	<ul style="list-style-type: none"> • non-traditional planned development with no associated planned residential zones • mainly commercial activities • further growth can be expected through denser development/redevelopment 	<p>public 72%</p> <p>private 28%</p>
Makati	<ul style="list-style-type: none"> • a modern Western-type planned development with corresponding planned residential neighborhoods • commercial and business activities • intensive development still in progress though at a decelerating pace 	<p>public 54%</p> <p>private 46%</p>
Monumento	<ul style="list-style-type: none"> • mainly traditional development similar in character to Cubao and Carriedo • mixture of commercial and business activities • not much room is available for future growth in the absence of a single large developer 	<p>public 83%</p> <p>private 17%</p>
Ermita South (including Harrison Plaza)	<ul style="list-style-type: none"> • mixture of non-traditional and traditional development • mixture of commercial and business activities • little room for new development 	<p>public 63%</p> <p>private 37%</p>
Recto	<ul style="list-style-type: none"> • traditional development that coasted along Quiapo's pace • mixture of commercial and business activities with no focus • a large block of land for development available but at tremendous constraints 	<p>public 86%</p> <p>private 14%</p>
Divisoria	<ul style="list-style-type: none"> • traditional development of the old Manila • mixture of commercial and business activities induced by the busy ports of entry • no room available for new development except redevelopment 	<p>public 78%</p> <p>private 22%</p>

Source: 1980 HIS results



LEGEND:





-  CUBAO ●
-  RECTO ○
-  DIVISORIA ○
-  NOVALICHES ○



Figure 1.2
 Catchment Area of Selected
 Major Commercial and
 Business Complex/Area

1.2 BOUNDARY OF STUDY AREA

For analytical or planning purposes, the study area was set approximately to the perimeter shown in Figure 1.3. This area extends approximately two kilometers from east to west between N. Domingo and 20th Avenue and approximately 2.5 kilometers from north to south between Kamias and Santolan Road. Requirements of traffic flow analysis expanded the area coverage; while planning of mode interchange facility was limited to a much narrower zone and specific locations.

1.3 JUMSUT II's BRIEF ON CUBAO

Why look at Cubao? From the point-of-view of traffic, it has been dealt with by TEAM, Police, Araneta Center, TOC, and other groups. The most recent study of MMUTSTRAP Part B1, summarized most of the activities and proposals. The traffic management proposals for Cubao were formulated to maximize the usage of the existing network, to upgrade access to the Araneta Center, and to improve the distribution of traffic within the commercial center.

But Cubao is too important as a development point in Metro Manila to be examined only as a traffic case. Its problems require a more comprehensive treatment, aside from the need to fill up planning gaps and reconcile conflicting ideas. JUMSUT II was therefore tasked with the study of:

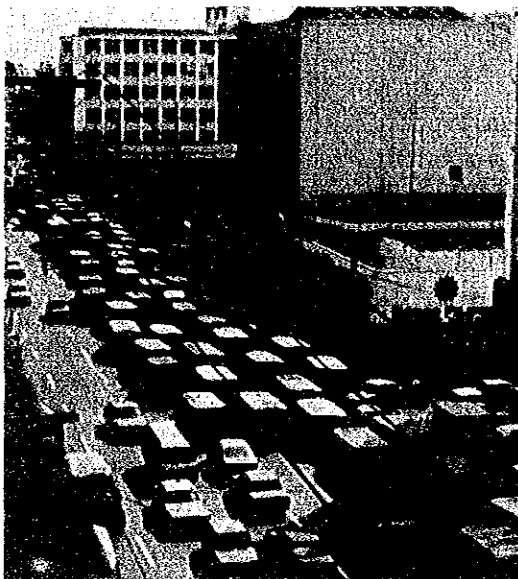
- a) The role and characteristics of public transportation in the Cubao area. Cubao, is more dependent on public transport modes for access, than comparable non-traditional commercial centers.
- b) The linkage of transportation with the future growth and continuing vitality of commercial/urban activities. Further growth of the area appears restricted because of access for public and private modes of transportation, rather than inadequacy of physical space for urban development. Balanced development between urban/commercial functions and transportation facilities is desirable.

Along with the preceding purposes, JUMSUT II will review the following areas in detail and propose a time-sequence package of implementation measures, viz.:

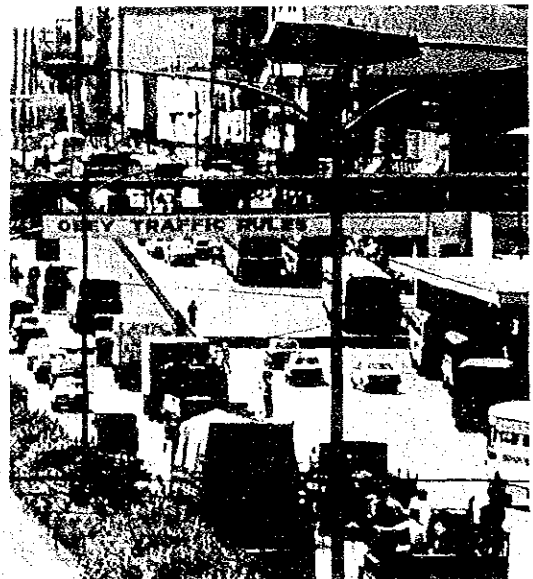
- a) Rerouting of public transportation in Cubao, including both intra- and inter-city jeepneys and buses. Proposals will be made to rationalize the public transportation routes and traffic flow in the area.
- b) Improvement of bus operation along EDSA service roads. Proposals made by MMUTSTRAP will be reviewed and expanded, where appropriate, to bring them to implementation stage.

- c) Strengthening of external access to the Araneta Center. There are existing proposals and recommendations. They will be analyzed in connection with other elements such as rerouting of public transportation and their impacts on traffic circulation in the area.
- d) Improvement of internal circulation of Araneta Center. Recommendations made by MMUTSTRAP will be reviewed in conjunction with the rerouting of public transportation and the position of the Center's management.
- e) Improvement of pedestrian movement. Proposals made in the past will be reviewed and assessed based on new data on public transportation passenger flow and rerouting schemes.
- f) Traffic management measures. Proposals for the improvement of intersections and road links as summarized in MMUTSTRAP Part B1 will be re-examined as to fit into a more general plan.
- g) Development of integrated mode interchange facilities. Possible evolution of a Cubao Mode Interchange Facility or terminals over the long-term will be outlined.

Congestion Along Aurora Blvd.



Congestion Along EDSA



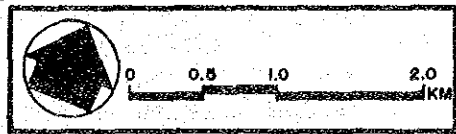
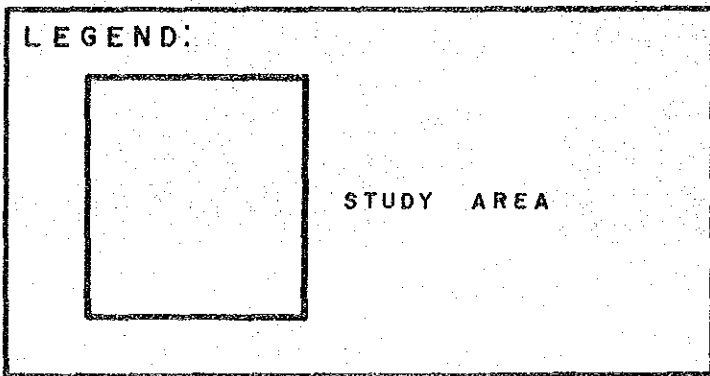
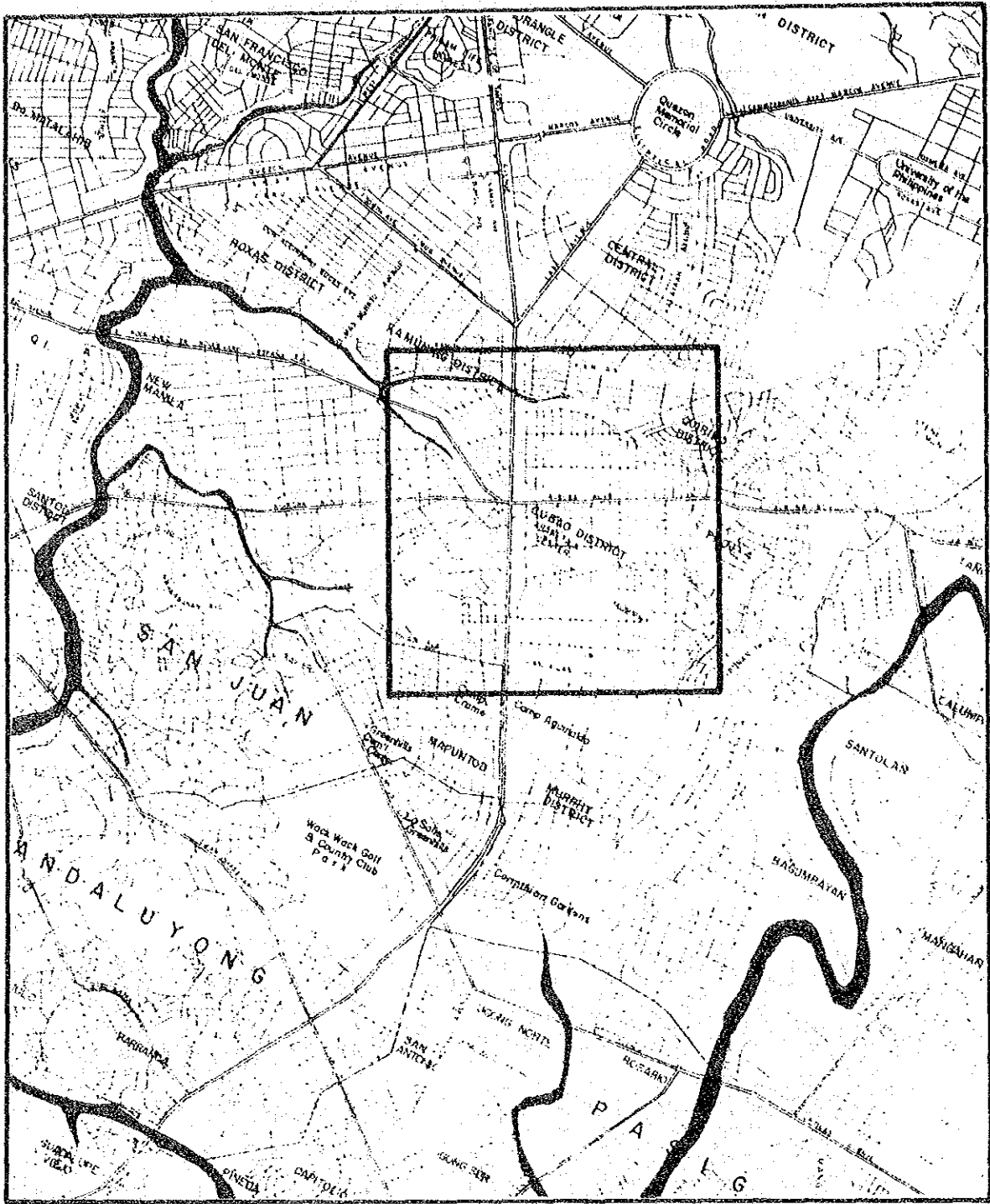


Figure 1.3
Study Area

2.0 THE PRESENT SITUATION

2.1 LAND USE AND SOCIO-ECONOMIC CHARACTERISTICS

2.1.1 Land Use

The Cubao study area is a mixture of different land uses. The Central portion is predominantly commercial with the Araneta Center Commercial Complex at the apex. The surrounding areas are considered residential with densities ranging from low (along P. Tuazon, N. Domingo, Arayat, E. Rodriguez) to high (area bounded by Benitez and Banahaw). The greater portion, however, is medium-density residential (see Figure 2.1).

Apart from the Complex itself, the area's land use pattern is characterized by commercial activities proliferating along side secondary roads (EDSA, Aurora Boulevard and 15th Avenue) and decline in intensity with distance from the said roads.

2.1.2 Socio-Economic Characteristics

In general, the area characterizes a low-intensity development with pockets of medium-scale densification as exemplified by the area bounded by P. Tuazon and Santolan Road where population density reaches 430 persons/hectare. Daytime and residential population differs markedly within and among sections of the area.

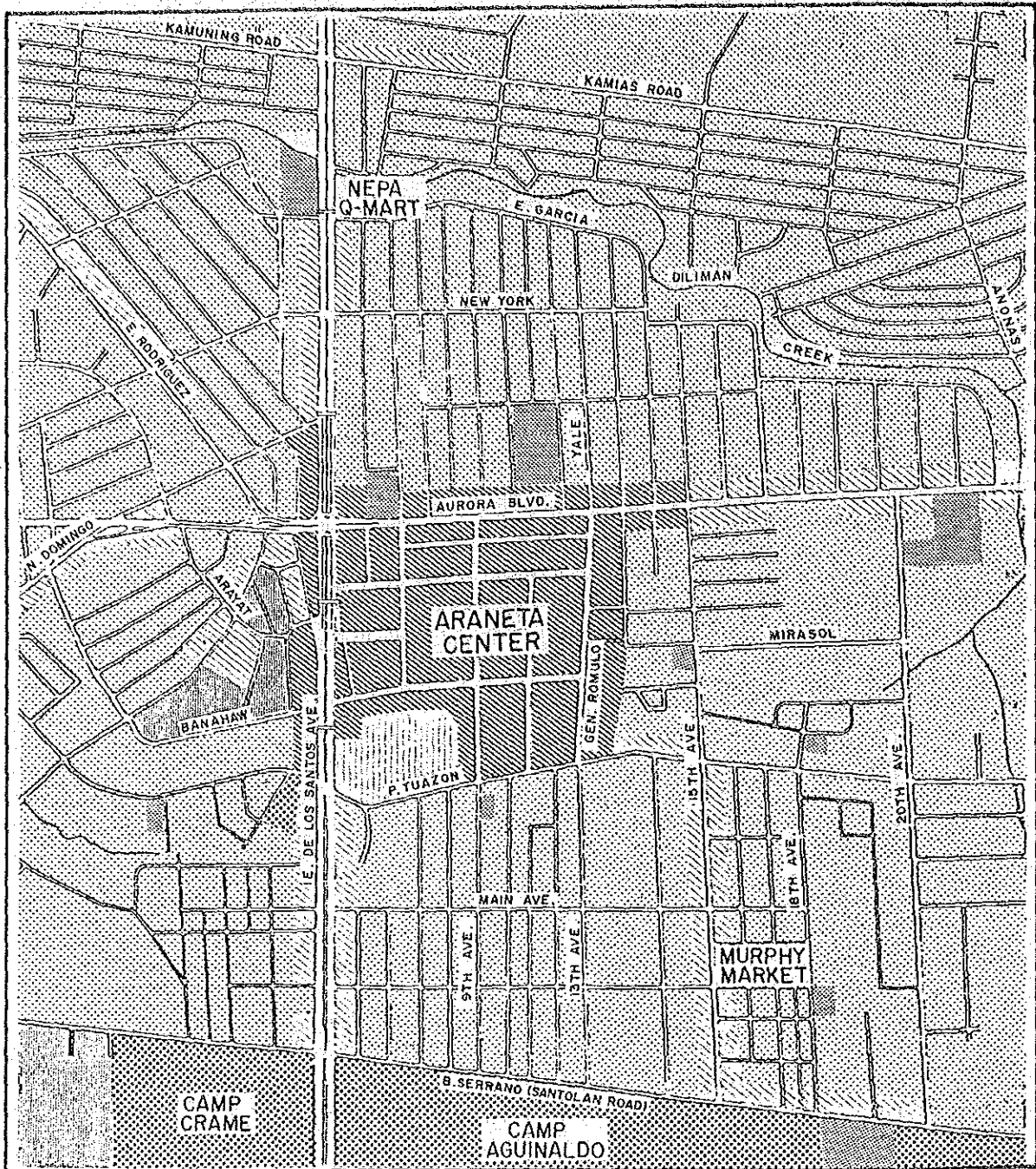
Residents of the study area may be classified as belonging to the lower-middle economic segment of the population since the average household income in the representative zones range only from ₱800 to ₱2,000 per month. Median income for the Metro Manila region is approximately ₱1,200 (at 1980 price).

Car ownership is generally low as can be expected from the population in this income class. Car-owning rates in the 5 zones of the study area are shown in Table 2.1. It can be inferred from the table that its residents form a captive market of the public transport system. This hypothesis is confirmed by an examination of the trip distribution profile which gives greater than 70% trip made via public modes.









2.2 ROAD SYSTEM AND TRAFFIC

2.2.1 Road Network

The road network is generally a gridiron pattern as shown in Figure 2.2. An indication of the intensity of road use in the network is depicted in Figure 2.3. The major roads in the study area are as follows:



LEGEND:

- | | | | |
|---|------------------------------|---|---------------------------|
|  | RESIDENTIAL (LOW DENSITY) |  | COMMERCIAL (HIGH DENSITY) |
|  | RESIDENTIAL (MEDIUM DENSITY) |  | INSTITUTIONAL (SCHOOL) |
|  | RESIDENTIAL (HIGH DENSITY) |  | INSTITUTIONAL (CAMP) |
|  | COMMERCIAL (MEDIUM DENSITY) |  | PARK & OPEN SPACES |

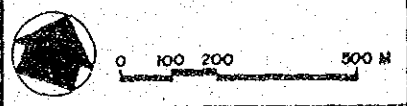


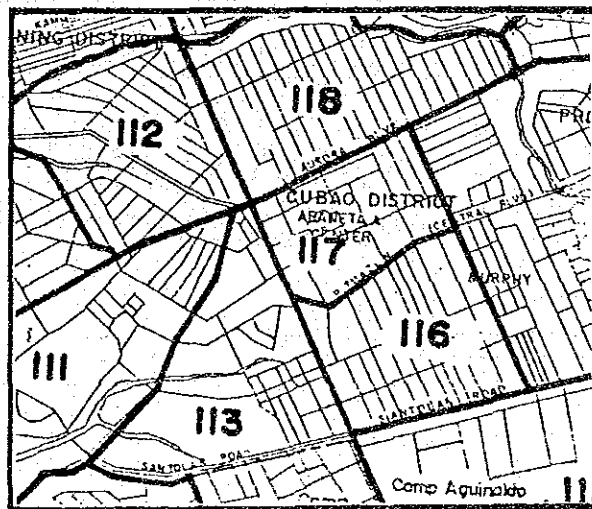
Figure 2.1
Existing Land Use

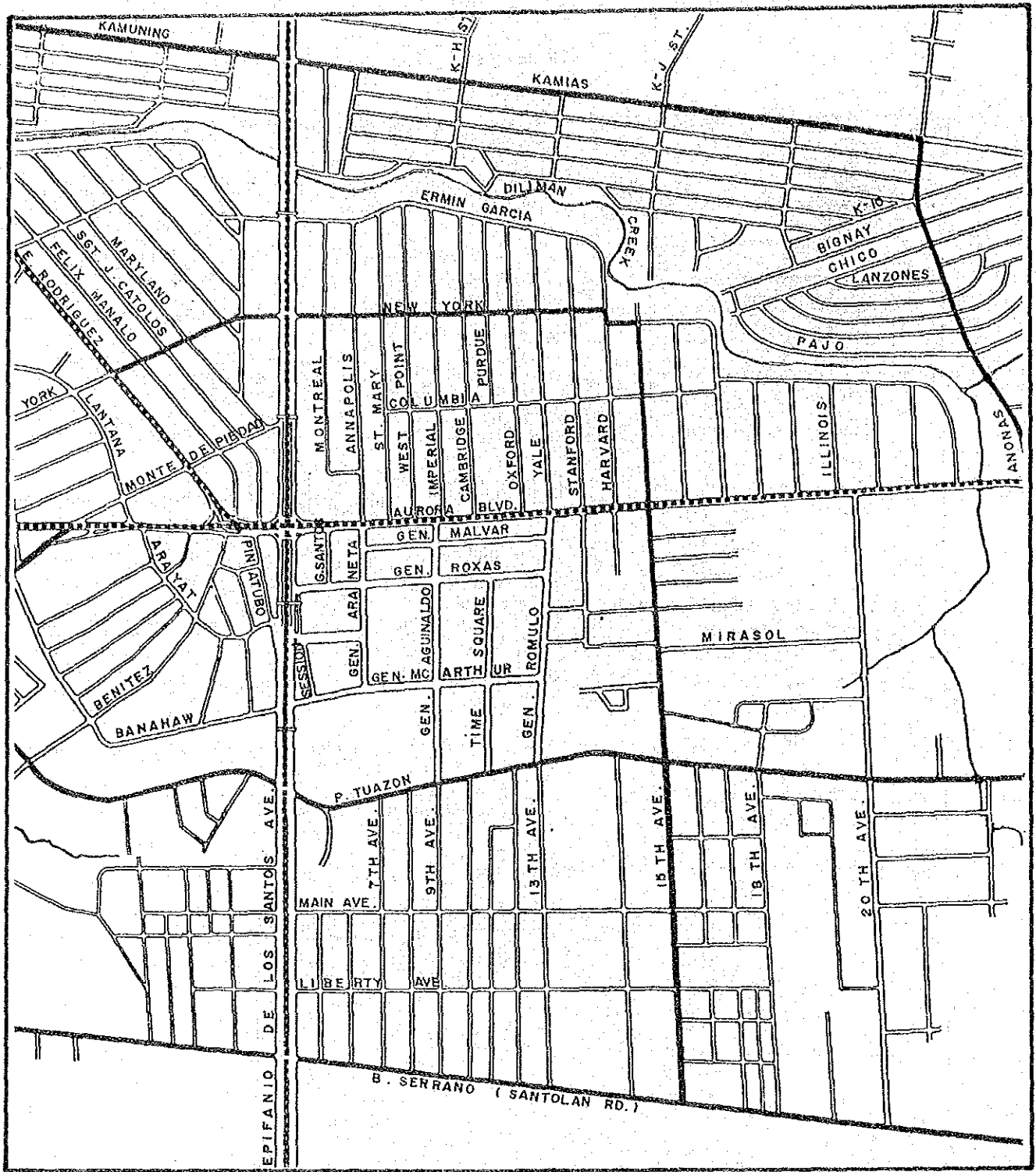
Table 2.1
 Characteristics of Cubao Mode Interchange Area

		HIS 202 zone ^{1/}					
		111	112	113	116	117	118
Socio-economic	Population	16,500	18,600	24,100	26,800	-	23,700
	Daytime Population	14,300	23,200	24,500	17,200	19,600	34,300
	No. of employment by workplace	6,200	5,900	9,300	5,100	17,800	15,400
	Population Density (person/ha.)	120	180	160	430	-	210
	Daytime Population Density (per/ha.)	110	230	160	280	470	310
	Average Household Income (P/mo.)	1,130	890	980	1,420	-	1,870
	Car Owning Rate (%)	9	8	8	9	-	34
Traffic	No. of Trips	61,701	69,945	82,074	84,630	274,818	199,710
	Public (%)	44,165 (71.6)	49,884 (71.3)	54,901 (66.9)	70,279 (83.0)	181,233 (65.9)	135,840 (68.0)
	Private (%)	17,536 (28.4)	20,061 (28.7)	27,173 (33.1)	14,351 (17.0)	93,585 (34.1)	63,870 (32.0)




Source: JUMSUT I

1/ location of zones are shown below





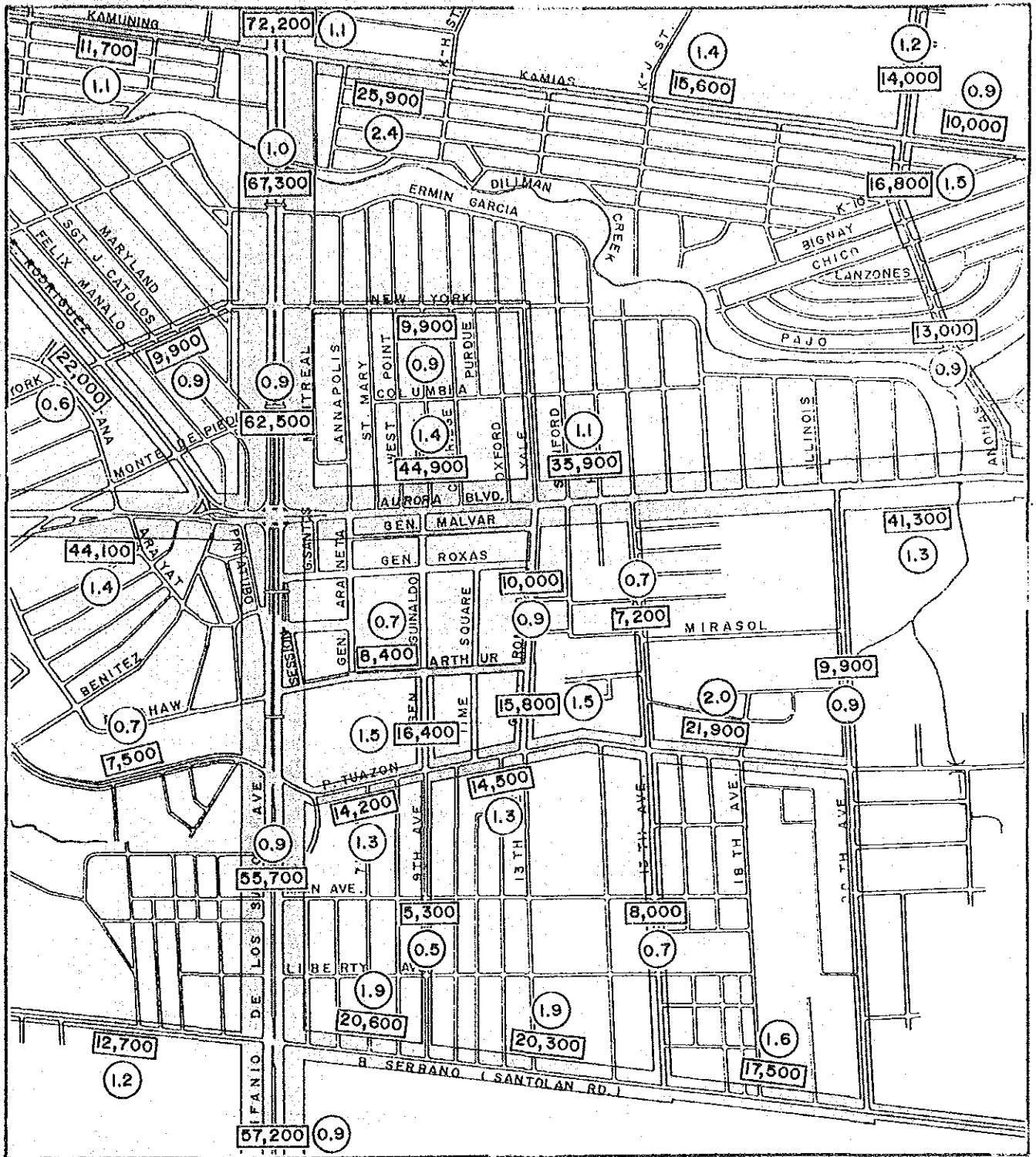
LEGEND:

- 
PRIMARY ROAD
- 
SECONDARY ROAD
- 
LOCAL ROAD



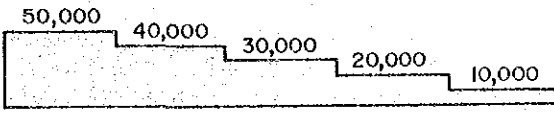
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Figure 2.2
Existing Road
Network



LEGEND:

TRAFFIC VOLUME



(1.4) VOLUME / CAPACITY RATIO

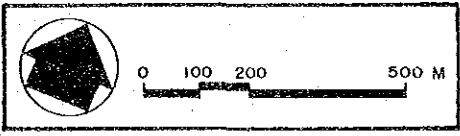


Figure 2.3
Road Traffic Flow

Primary Roads:

- a) EDSA (8 lanes divided with service roads). Current traffic volume ranges from 60 to 75 thousand per day. Except for some localized congestion at several intersections and service roads, it can still accommodate additional traffic volume.
- b) Aurora Boulevard (4 lanes undivided). This road serves the east-west crosstown movement and is heavily utilized by jeepneys. The daily traffic volume is 40 to 48 thousand with estimated volume capacity ratio ranging from 1.1 to 1.4. Heavily developed land uses along side the road, frequent jeepney stops for loading and unloading of passengers, restricted capacity at Aurora/EDSA intersection, and other factors contribute to the traffic congestion experienced through the day, particularly along the section fronting the Araneta Center.
- c) E. Rodriguez (4 lanes undivided). This road provides an alternative primary link between Cubao and the old CBD by connecting Aurora Boulevard with Quezon Avenue to the west. The daily traffic volume is approximately 22,000 with volume capacity ratio of 0.6.

Secondary Roads:

- a) P. Tuazon (2 lanes undivided). This link was originally built as a collector road but has gradually assumed the functions of a secondary road by virtue of its role as a link between Marikina to the East and the Southern parts of Metro Manila, and as access to Araneta Center. Current daily traffic volume is 14 to 22 thousand with volume capacity ratio ranging from 1.3 to 2.0.
- b) Santolan Road (2 lanes undivided). This road has similar functions as P. Tuazon. With the heavy traffic congestion along EDSA and Aurora Boulevard, Santolan has absorbed more and more vehicles. Current daily traffic volume is 18 to 21 thousand with volume capacity ratio ranging from 1.6 to 1.9.
- c) 15th Avenue (2 lanes undivided) and 20th Avenue (2 lanes undivided). These parallel roads on a north-south axis function as secondary roads together with P. Tuazon and Santolan Roads. Current daily traffic volume is 7 to 10 thousand with volume capacity ratio ranging from 0.7 to 0.9. Utilization is therefore below capacity.
- d) New York (2 lanes undivided). This road (also originally built as a collector) now acts as a secondary road providing an alternative link to the East and the North with increasing traffic congestion along Aurora Boulevard and the Aurora/EDSA intersection. Current daily traffic volume is 10 thousand with volume capacity ratio of 0.9.

Since this cuts across residential zones, traffic along New York Street is considered an environmental nuisance.

Other Collector Roads: The above network is further strengthened by the following collector roads:

- General Romulo, within the center and perpendicular to Aurora.
- General Aguinaldo, also within the center and parallel to General Romulo.
- General McArthur, within the center and parallel to P. Tuazon.
- Yale, on the northside of Aurora and connecting with General Romulo.
- Ermin Garcia, a serpentine road north of and almost parallel to New York street.

2.2.2 Traffic Congestion in the Area

Prevailing traffic bottlenecks in the Cubao Area are critical along Aurora Boulevard and EDSA. Serious congestion is noted at:

- a) EDSA and Aurora Boulevard intersection
- b) Section of Aurora Boulevard adjoining Araneta Center
- c) EDSA service roads

Less significant congestions are also observed in other locations at or near intersections. Table 2.2 summarizes the current situation of major congested roads.

With regard to the traffic congestion at the EDSA/Aurora intersection, several factors can be surmised, such as:

- a) Absolute lack of traffic capacity at the intersection.
- b) Uncontrolled loading and unloading practice of jeepneys along Aurora Boulevard.
- c) Heavy and disorderly pedestrian traffic crossing Aurora Boulevard.

In the Araneta Center, one-way street concept is advocated except for Gen. Aguinaldo, Central Avenue and P. Tuazon. Currently, six sets of traffic signals are operated automatically during off-peak

time and manually during peak time. A number of prohibitions were imposed on loading/unloading, turning and parking. In most cases, these regulations are not strictly adhered to by those concerned.

Approximately, 4,000 parking slots are available within the Araneta Center, 480 of which are integral part of shopping establishments. An estimated 1,500 are off-road pay-parks, while the remaining are for "free" - though not for long.

Table 2.2
Characteristics of Congested Road Sections

Location	Calculated V/C Ratio	Characteristics
1. EDSA/Aurora Intersection	1.16	- congestion appears in all directions - queue length along Aurora Blvd. towards Marikina is 500 to 600 meters throughout the day. - congestion along Aurora Blvd. towards Manila is similarly serious - congestion along EDSA service roads are limited during peak hrs.
2. EDSA/New York	0.84	- minor queue develops along New York during peak hours
3. EDSA/P. Tuazon	0.81	- minor queue develops along P. Tuazon
4. P. Tuazon/Gen. Aguinaldo-9th Avenue	0.82	- minor queue develops along three directions except 9th (one-way) Ave.
5. P. Tuazon/Gen. Romulo-13th Ave.	0.83	- minor queue develops along P. Tuazon during peak hours

Engineering analysis suggests that the current volume/capacity ratio of EDSA/Aurora intersection may be reduced from 1.16 to 0.84 (this level represents an approximate queueing length of 100 meters), if the intersection is ideally operated. This also assumes that no adverse practice of buses along EDSA service roads and jeepneys along Aurora Boulevard occur. Nevertheless, it can be concluded that current traffic volume has already reached the maximum road capacity. Minor relief from present congestion is possible if the prevailing behaviors of public transportation vehicles and passengers are curbed. No dramatic improvements however, can be expected.

There are three lanes along the EDSA service roads. Normally two lanes are preempted by buses, leaving one lane for private and other vehicles as shown in Table 2.3. Unlike that of Aurora Boulevard, the throughput of EDSA service roads is nowhere near capacity due to the negative impact of the buses.

Table 2.3
Estimated Volume/Capacity Ratio
of EDSA Service Roads

No. of Lanes Allocated for:	On Makati side		On Monumento side	
	Daily traf- fic volume	V/C Ratio ^{1/}	Daily traf- fic volume	V/C Ratio ^{1/}
Buses : 2	5,600	0.3	5,900	0.4
Other Vehicles : 1	9,500	1.1	6,900	0.8

Source: JUMSUT II estimate based on the existing data

^{1/} Calculated by assuming traffic capacity of 9,000/lane/day.

2.2.3 Traffic Flow Characteristics

More refined analyses were carried out on the current traffic flow characteristics. The impact of Araneta Center based traffic vis-a-vis the total traffic flow of the area was deemed very significant, as shown in Table 2.4, it appears that:

- a) 40% of the total traffic along EDSA north of Aurora, 20% of the EDSA volume south of Aurora, and an average of 55% of total traffic along Aurora Boulevard are destined for the Araneta Center. To the extent that the public transportation vehicles along EDSA use the service roads for boarding and alighting, they can also be classified under the mode interchange requirements.

Table 2.4
Percentage of Araneta Center Base Traffic
to Total Traffic Flow

Roads/Location	Araneta Center-based Traffic Volume/Day			
	Private ^{1/}		Public ^{1/}	
	Vehicles	% to Total	Vehicles	% to Total
EDSA : north of Aurora	14,500	30.2	400	3.1
EDSA : south of Aurora	13,900	29.3	200	1.6
Aurora Blvd.: east of EDSA	12,600	71.6	10,600	44.2
Aurora Blvd.: west of EDSA	22,100	81.5	12,300	47.9

Source: JUMSUT II estimate based on the existing data

^{1/} private vehicles only, with the % reflecting the ratio for the Araneta Center traffic.

^{2/} public vehicles whose routes terminate at Cubao.

- b) Out of the total private vehicles using EDSA and Aurora Boulevard, those going to/from Araneta Center reach as high as 81% (or 52% of all modes) and as low as 29%. The impact of private vehicles coming from or destined to the Araneta Center could even be 90% of private traffic at the EDSA/Aurora intersection.

Because of the less efficient road space utilization implied by the private cars, their impacts deserve closer scrutiny. Several observations were synthesized from the existing traffic data of TEAM, information from the Araneta Center management, and supplemented by limited traffic counts conducted by JUMSUT II, viz:

- a) The overall traffic volume to/from Araneta Center in directional terms, is shown in Figure 2.4. Out of the total traffic inflow and outflow of 87,000 vehicles, 73% or 63,100 vehicles are private cars. Their access to Araneta Center are P. Tuazon (51.5%), Aurora Boulevard (28.5%), and EDSA (20.0%).
- b) P. Tuazon provides a more significant role as an access road to Araneta Center, while Santolan caters more to the through traffic towards Marikina.
- c) 15th Avenue functions as an access both to Araneta Center and other adjoining areas, while 20th Avenue caters mainly to the through traffic towards EDSA.

2.3 PUBLIC TRANSPORTATION ASPECTS

2.3.1 Routes

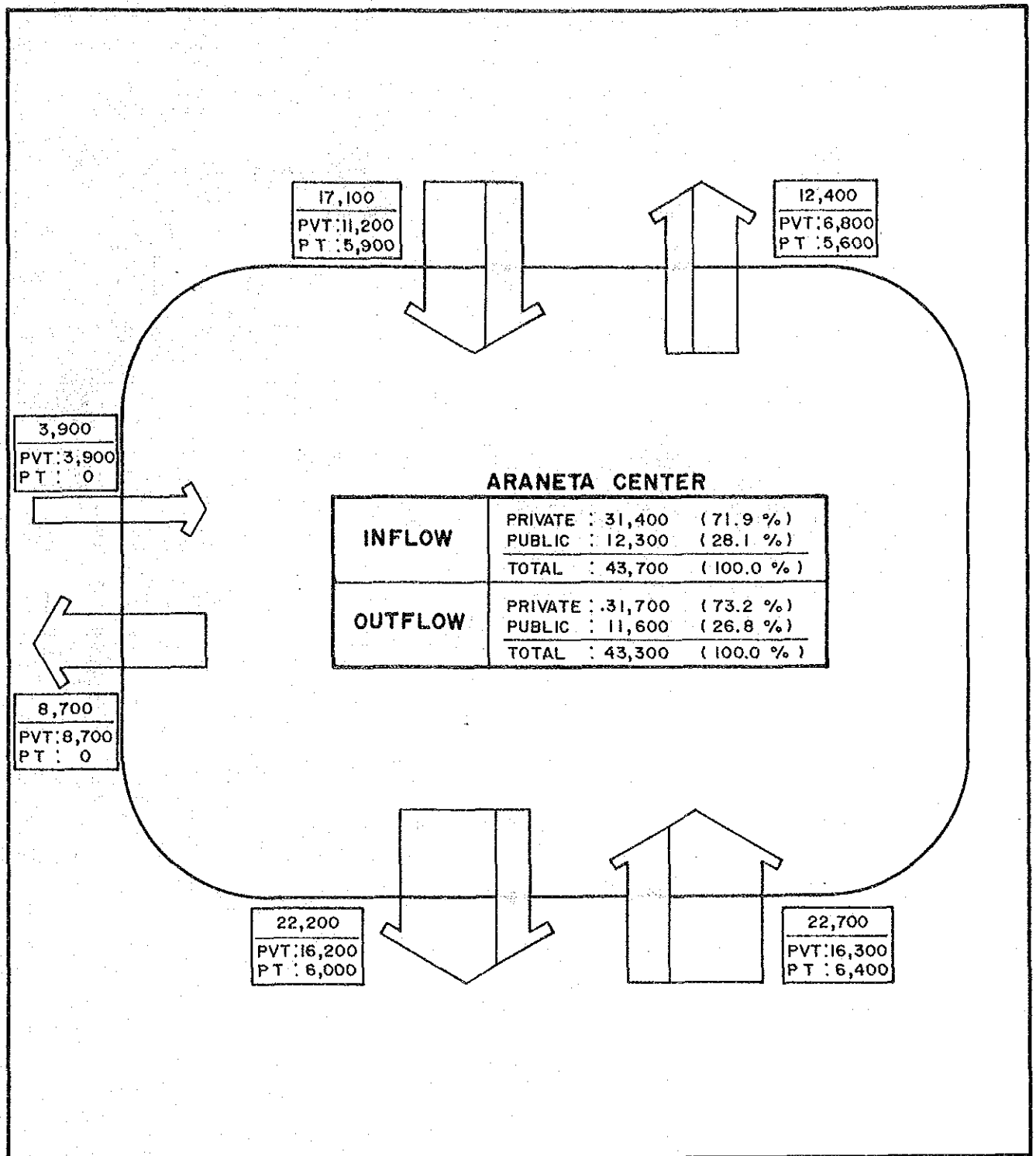
Cubao area is served by 102 jeepney routes, 53 of which terminate while 49 pass through Cubao. There are 82 bus routes serving Cubao, 7 of which terminate and 75 pass through. Approximately, 4,080 jeepneys and 3,000 buses pass Cubao. About 2,700 jeepneys and 130 buses have Cubao as their terminal points.

Table 2.5
Existing Public Transportation Routes
Related to Cubao


Mode	Terminate		Passing Through		Total	
	No. of Routes	(No. of Units) ^{1/}	No. of Routes	(No. of Units)	No. of Routes	(No. of Units)
Intra-city Jeepney	46	(2200)	48	(1402)	94	(3602)
Bus	5	(84)	69	(2794)	74	(2878)
Provincial Jeepney	7	(467)	1	(14)	8	(481)
Bus	2	(49)	6	(82)	8	(131)

Source: JUMSUT I

^{1/} number of units refer to daily operating units



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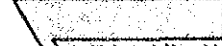


PVT: Private Vehicles

No. of vehicles / 16 hour

PVT: Private Vehicles

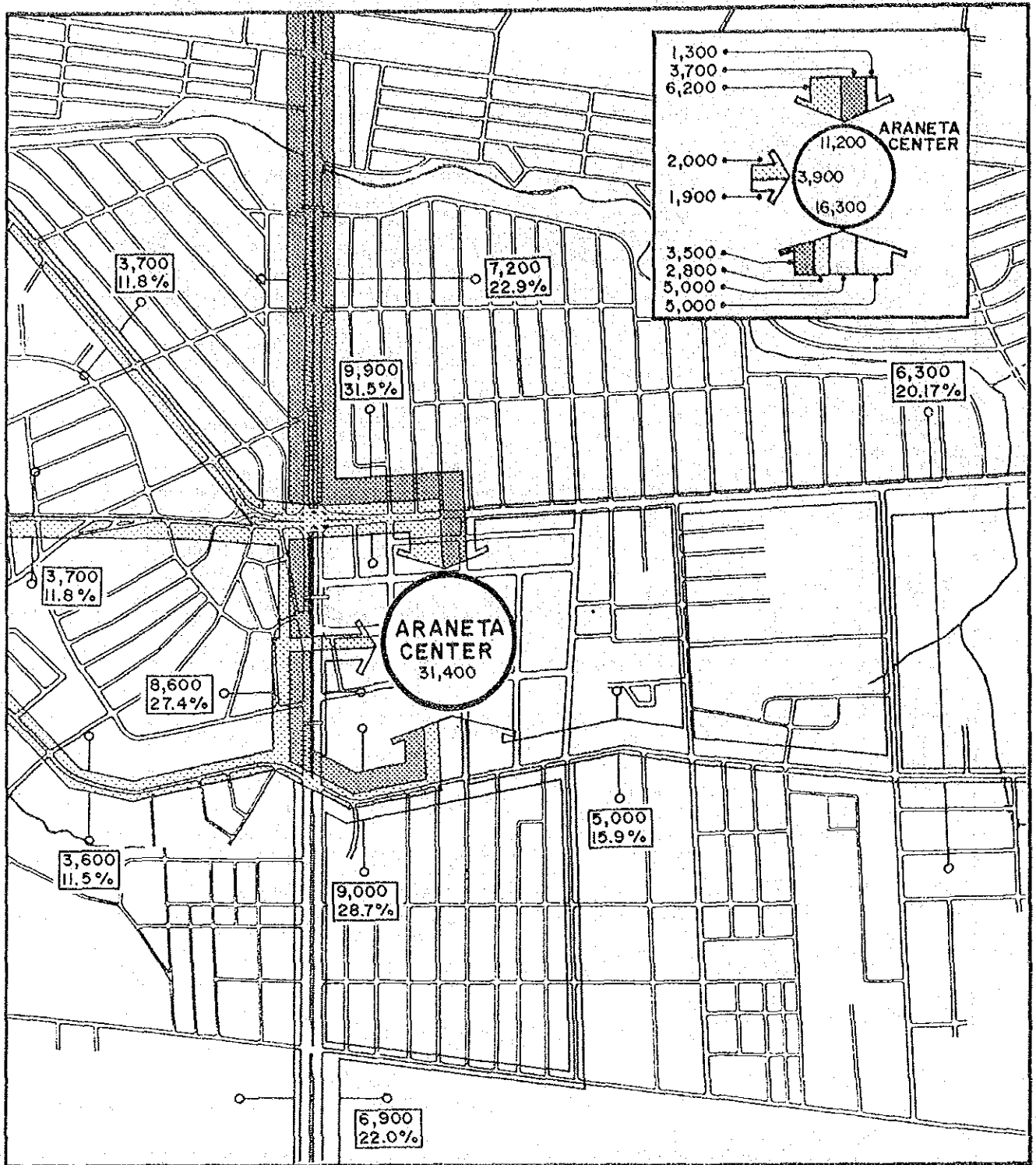
PT: Public Vehicles



PT: Public Vehicles

SOURCE : JUMSUT II SURVEY

Figure 2.4
Overall Traffic
Volume to/from Araneta
Center by Direction



LEGEND:

TRAFFIC DIRECTION TO ARANETA CENTER:

	from EAST
	from WEST
	from SOUTH
	from NORTH

UNIT : VEH. / DAY

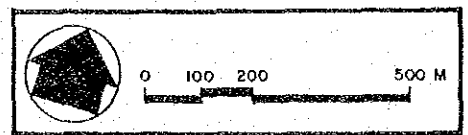


Figure 2.5
Private Traffic Flow to Araneta Center

The combined frequencies and route tentacles over the study area of the buses and jeepneys are shown in Figures 2.6 and 2.7, respectively. Major jeepney routes use Aurora Boulevard and E. Rodriguez, while buses are mainly on EDSA. Other secondary roads served by public transportation are P. Tuazon, Santolan, Gen. Malvar, Gen. Roxas, Gen. McArthur, 15th Avenue, 13th Avenue, Arayat, Yale, Felix Manalo, Sgt. Catolos, Maryland, and a sprinkling of other collector roads.

Jeepney route structure is further amplified in Figure 2.8 and Appendix 2.1. One of the significant factors which contribute to the severe congestion along Aurora Boulevard is the overlapping of major jeepney routes terminating at Cubao. These routes are bound for Marikina via Aurora Boulevard, towards Quiapo via E. Rodriguez, and towards Divisoria via Aurora Boulevard.

On the other hand, the bus route configuration is quite simple when compared to that of jeepneys. Most of the traffic is concentrated along EDSA where buses are the primary source of congestion along the service roads. Figure 2.9 illustrates how the buses operate in EDSA. Of the total daily bus traffic of 12,800/day, almost 90% stop at Cubao using the service roads in the process.

2.3.2 Existing Terminals and Turning Points

The Cubao study area is the setting for major public transport passenger interchanges, encompassing such activities as:

- boarding and alighting (of loading and unloading) of passengers
- turning of vehicles
- waiting and parking



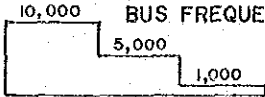
It is generally observed in Metro Manila particularly with regard to the jeepney operations, that vehicles stop anywhere. Thus, locations of passenger loading and unloading points/areas are not fixed. Cubao is no different as shown in Figure 2.10. Major loading and unloading areas are mostly on major roads and do not correspond to the locations of the designated terminal areas. Existing terminals function mostly as turning points and lay-over areas, as described in Table 2.6. This table also includes data about provincial bus terminals sited in the Study Area.

Other and more specific observations about public transport facilities are the following:

- a) There are 14 jeepney terminals and 14 bus terminals, including bus stops. These are widely dispersed in the Cubao study area.



LEGEND:

-  BUS ROUTE (TERMINATING)
-  BUS ROUTE (PASSING THROUGH)
-  BUS FREQUENCY (16 HRS. / BOTH DIRECTIONS)

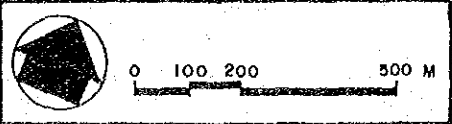
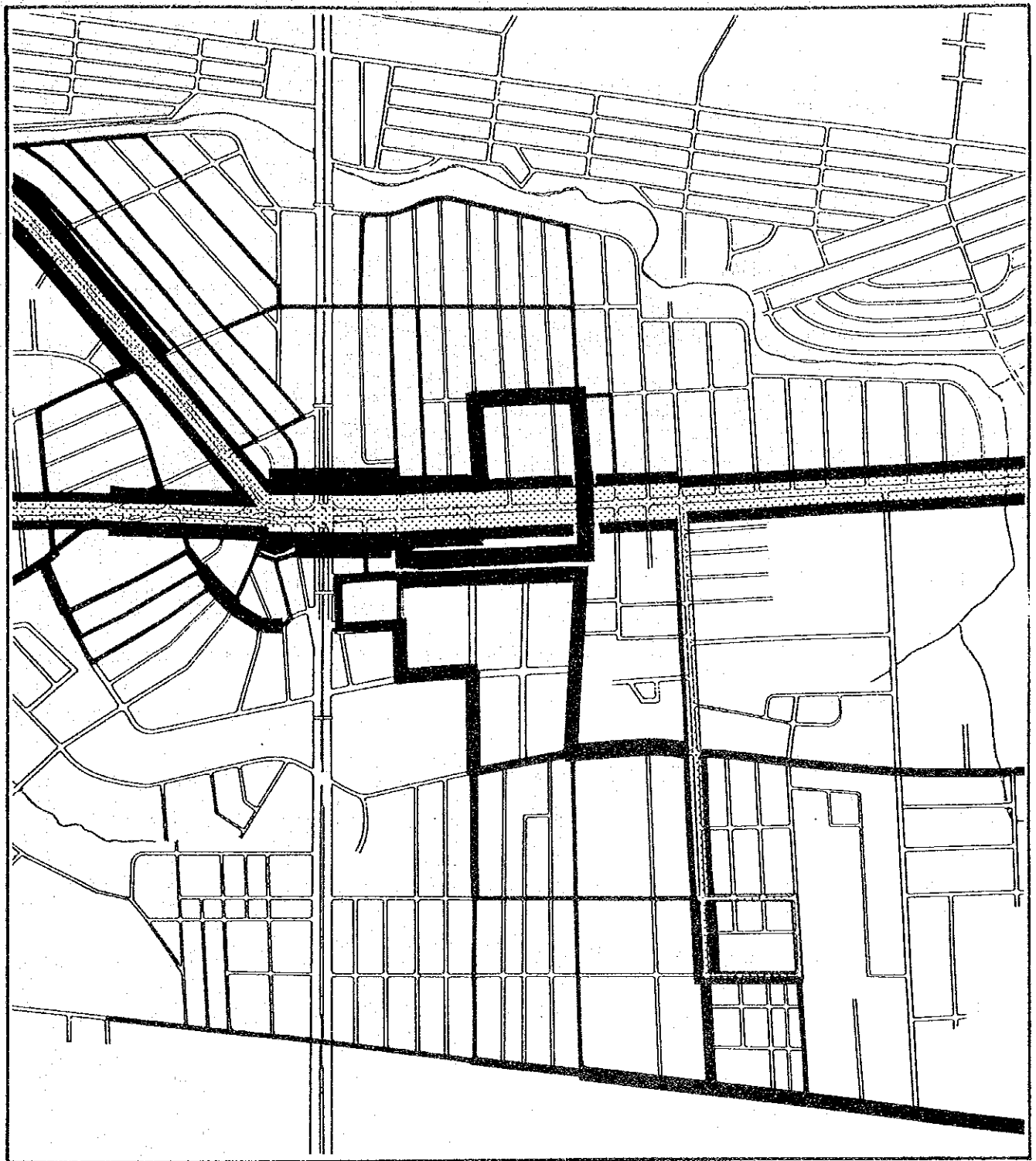


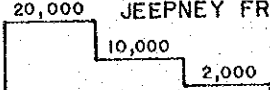


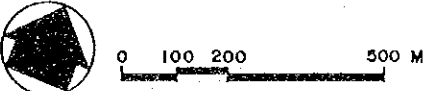
Figure 2.6
Bus Route Coverage
and Frequency



LEGEND:

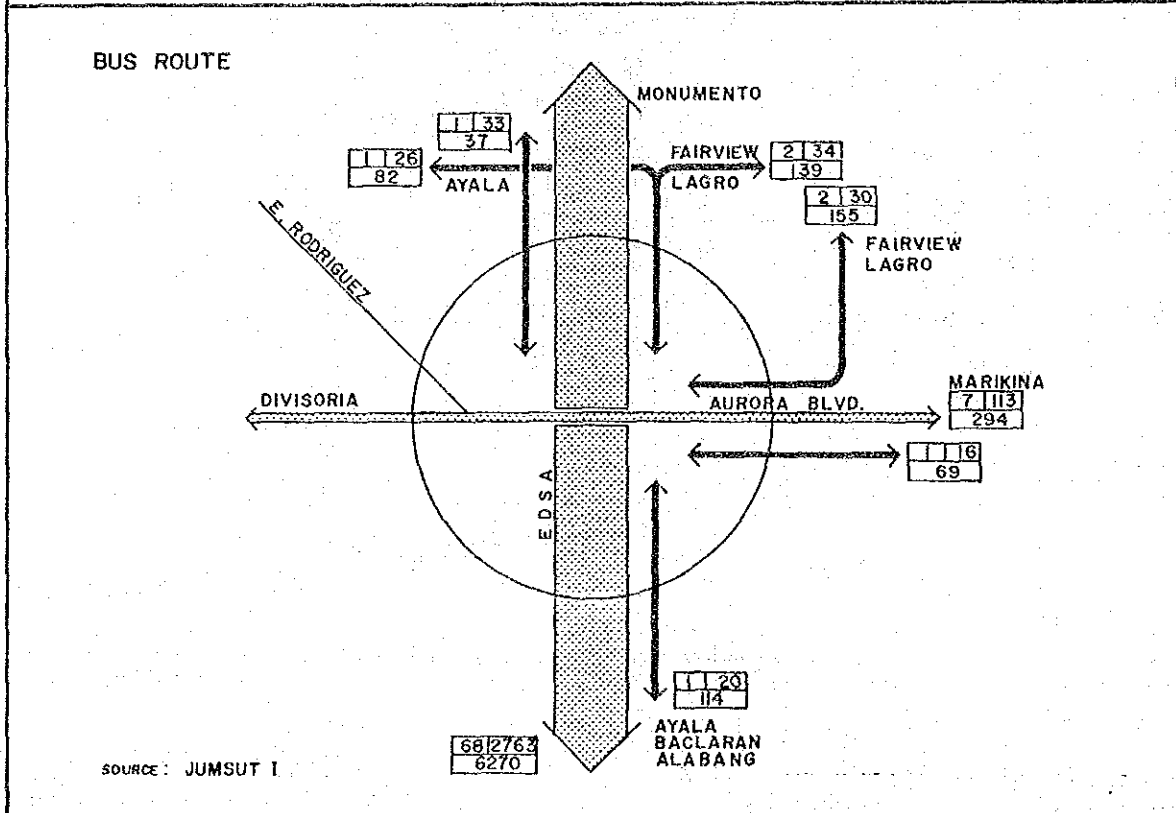
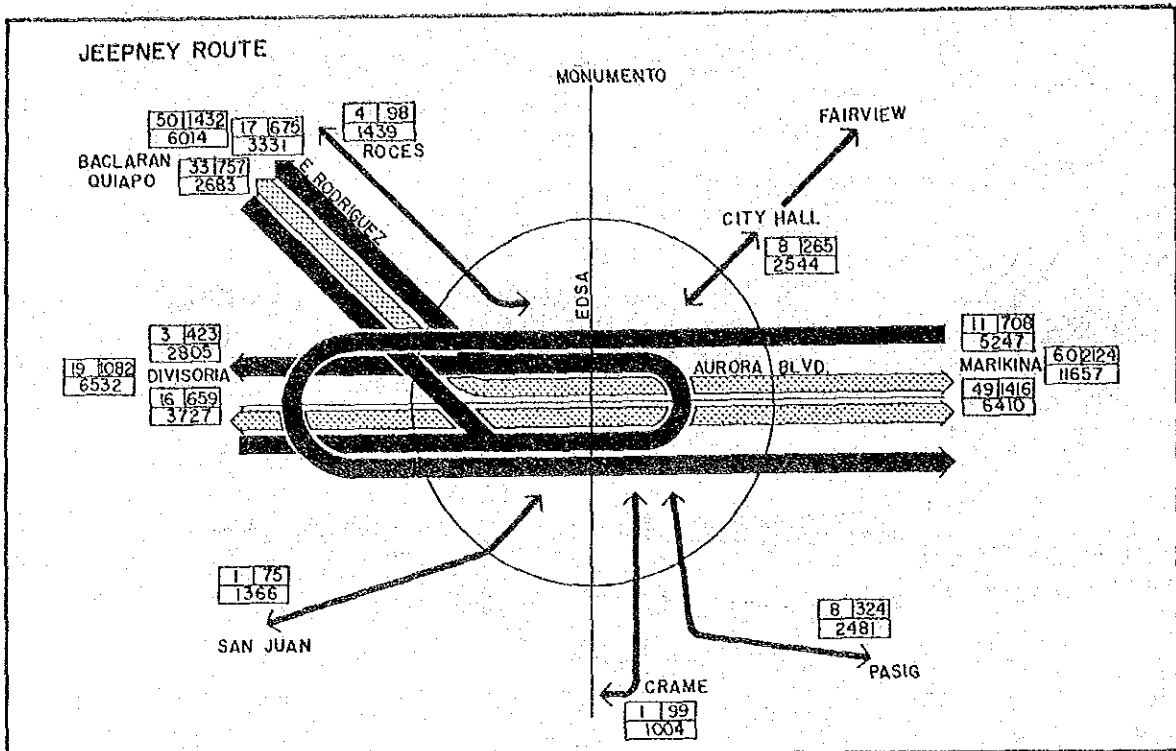
-  JEEPNEY ROUTE (TERMINATING)
-  JEEPNEY ROUTE (PASSING THROUGH)
-  JEEPNEY FREQUENCY (16 HRS. / BOTH DIRECTION)

20,000
10,000
2,000



0 100 200 500 M

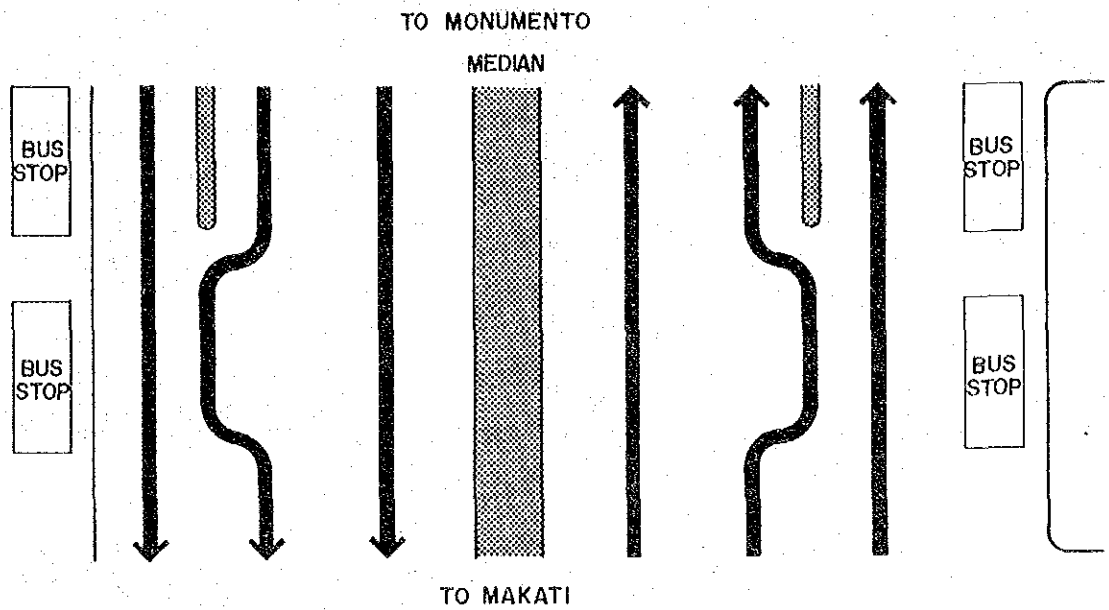
Figure 2.7
Jeepney Route
Coverage and
Frequency



LEGEND:

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

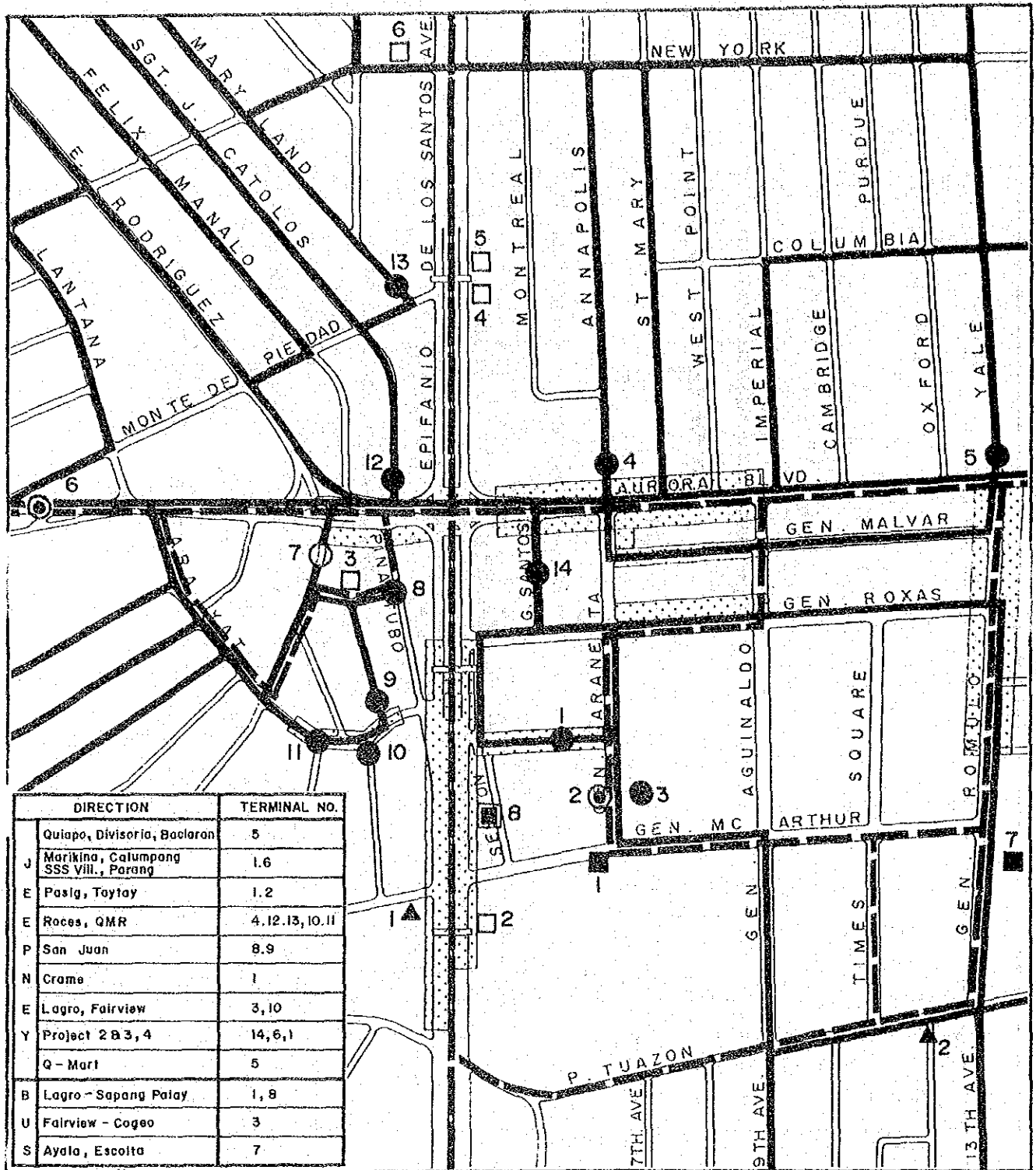
Figure 2.8
Existing Public
Transportation
Route Structure



	SOUTH BOUND TRAFFIC (16 HRS.)				NORTH BOUND TRAFFIC (16 HRS.)			
	STOP AT CUBAO		THROUGH TRAFFIC	TOTAL	THROUGH TRAFFIC	STOP AT CUBAO		TOTAL
	TYPE I	TYPE II				TYPE I	TYPE II	
NO. OF BUSES/DAY	3,800	2,100	500	6,400	800	2,500	3,100	6,400
% TO TOTAL	59.4	32.8	7.8	100.0	12.5	39.1	48.4	100.0

SOURCE : JUMSUT II OCULAR SURVEY

Figure 2.9
Frequency of EDSA
Bus by Type



DIRECTION	TERMINAL NO.
Quiapo, Divisoria, Baclaran	5
J Marikina, Calumpang SSS Vill., Parang	1,6
E Pasig, Taytay	1,2
E Reces, QMR	4, 12, 13, 10, 11
P San Juan	8,9
N Crome	1
E Lagro, Fairview	3, 10
Y Project 2 & 3, 4	14, 6, 1
Q-Mart	5
B Lagro-Sapang Paalay	1, 8
U Fairview - Cogeo	3
S Ayala, Escolta	7

LEGEND:

- Jeepney Route
- Bus Route
- Jeepney Terminal (Intra)
- Jeepney Terminal (Inter)
- Bus Terminal (Intra)
- Bus Terminal (Inter)
- Tricycle Terminal
- Major Boarding/Alighting Section

NOTE: NUMBERS CORRESPONDS TO TABLE 2.6

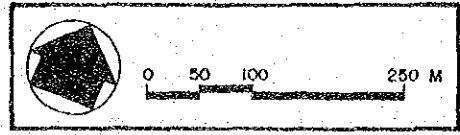


Figure 2.10
Location of Existing
Terminals/Turning Points

Table 2.6
Existing Public Transportation Terminals in Cubao

Mode	Name/Location	Type	No. of Routes	No. of Units	Freq./hr.	Remarks
JEEPNEY	1. Central Avenue	intra-city on-road	5	298	3,363	3 associations 7 dispatchers term. fee ₱65-70/mo.
	2. General Araneta	intra-city	4	222	402	3 associations 5 dispatchers term. fee ₱4/park
		inter-city on-road	2	42	1,139	
	3. Araneta Coliseum	intra-city	2			1 association 3 dispatchers term. fee ₱4/park
		off-road				
	4. Annapolis	intra-city	1	32	421	1 association 3 dispatchers term. fee ₱4,000/mo.
		off-road				
	5. Shoe World Bldg.	intra-city	20	1,102	6,249	
		off-road				
	6. Aurora Blvd.	intra-city	5	304	2,497	
		inter-city	2	218	1,065	
	7. Benitez	inter-city	1	27	183	1 association 1 dispatcher
		on-road				
	8. Pinatubo/Matulio	intra-city	1	75	1,366	1 association 4 dispatchers
on-road						
9. Malabito	intra-city	1			1 association 1 dispatcher	
	on-road					
10. Irid/Arayat	intra-city	5	188	1,596	1 association 1 dispatcher	
	on-road					
11. Arayat/Zambales	intra-city	1	46	391	1 association 1 dispatcher	
	on-road					
12. Sgt. Catolos	intra-city	2	52	827	1 association 4 dispatchers	
	on-road					
13. Maryland	intra-city	2	19	233	1 dispatcher	
	on-road					
14. Gen. Santos	intra-city	1	22	402		
	on-road					
BUS	1. Gen. McArthur	intra-city on-road	3	30	155	1 association dispatcher term. fee ₱1,500/mo.
	2. Pantranco (EDSA)	inter-city	3	70	56	Pantranco bus co. 5 dispatchers parking fee ₱7,000/mo.
	3. Matulio	inter-city	1	16	69	1 association caller terminal fee ₱5,000/mo.
		off-road (partly on road)				
	4. Super Lines (EDSA)	inter-city	3	20	11	Super Lines Bus Co. dispatchers, conductors, guards
		off-road				
	5. Baliwag Transit (EDSA)	inter-city	7		66	Baliwag Transit Co. 3 dispatchers conductors, guards
off-road						
6. Dagupan Transit	inter-city	5	50	118	Dagupan Transit Co. dispatchers, conductors, guards	
	off-road					
7. Metro Manila Transit (Gen. Romulo)	intra-city	2	46	196	Metro Manila Transit Co.	
	off-road					
8. EDSA (infront of Farmers Market)	intra-city	45	2,717	6,217		
	inter-city on-road	5	87	147		

Table 2.6 cont'd

Mode	Name/Location	Type	No. of Routes	No. of Units	Freq/hr.	Remarks
TRI-CYCLE	1. Banahaw	around Cubao on-road		40		1 association
	2. 13th Avenue	around Cubao on-road		300		1 association

- b) Most of the jeepney terminals are at grade on existing streets; only two small off-road ones can be found along Aurora Boulevard. These terminals, however, are mostly managed by different drivers associations and dispatchers who control the departure of vehicles.
- c) Bus stops along EDSA are provided mainly with signboards, except the ones in front of the Farmers Market which has waiting sheds for passengers. None has other passenger amenities nor route information.
- d) Provincial bus terminals are usually equipped with such facilities as bus berths, parking areas, waiting sheds, offices and ticketing counters, shops, toilets, etc.

2.3.3 Cubao as a Passenger Interchange

Table 2.7 gives some order of magnitudes about the passenger traffic volume handled by the public transport system in Cubao. In particular,

- a) The total number of boarding and alighting passengers is approximately 690 thousand per day (16 hours). It can likewise be stated that 335 thousand persons go through Cubao daily via bus/jeepney - either as their destination or transfer point.
- b) The inter-city or provincial transport is not significantly felt in Cubao. It only accounts for 7.5% (or 52 thousand) of the total daily number of boarding and alighting passengers.

Table 2.7
Public Transportation Passenger Traffic

Mode	Number of boarding/alighting/16 hrs.					
	Intra-city		Inter-city		Total	
	000	(%)	000	(%)	000	(%)
Jeepney	418	(60.7)	44	(6.4)	462	(67.1)
Bus	219	(31.8)	8	(1.1)	227	(32.9)
Total	637	(92.5)	52	(7.5)	689	(100.0)

Source: JUMSUT I

- c) Of the balance of 637 thousand boarding and alighting passengers which are due to intra-city public transport, 418 thousand or 61% are serviced by jeepneys and 219 thousand or 32% by buses. It is estimated that 57% (or 261 thousand) of the jeepney passenger loads occur along Aurora Boulevard, while the remaining 43% are loaded/unloaded in other secondary roads and off-street terminals. On the other hand, almost 90% or 204 thousand of boarding and alighting passengers on buses are along EDSA.

Ocular and passenger interview surveys (2,154 samples) were conducted further to put down the passenger and transfer handling requirements of Cubao. The surveys were conducted on a weekday and a Sunday with the following results:

- a) Of the total public transport passengers approximately 28% and 40% are transferees during weekends and weekdays, respectively. This difference arises from the fact that Cubao functions more as a commercial and recreational attraction (which is strong on weekends) than an employment generator. Table 2.8 breaks this down further by public transport modes.

Table 2.8
Percentage of Transfer and Terminating Public Transportation Passengers by Mode

	Mode	Transfer	Terminating	Total
Weekday	Jeepney	38.7%	61.3%	100.0%
	Ordinary bus	46.2	53.8	100.0
	Love Bus	23.1	76.9	100.0
	Prov'l. bus	76.5	23.5	100.0
	Total	40.5	59.5	100.0
Sunday	Jeepney	27.2	72.8	100.0
	Ordinary bus	27.7	72.8	100.0
	Love Bus	30.0	70.0	100.0
	Prov'l. bus	80.0	20.0	100.0
	Total	27.7	72.3	100.0

- b) Regardless of the day in the week, almost all of the provincial passengers use Cubao merely as a transfer point while most (70% or more) of Love Bus passengers terminate at Cubao. Jeepneys and regular buses generate heavier transferees during weekdays than weekends. (see Table 2.9)

Table 2.9
Access Mode to Cubao of Public
Transport Users

Mode	Transfer Pass.		Terminating Pass.	
	Weekday	Sunday	Weekday	Sunday
Jeepney	63.8%	66.9%	69.0	68.8%
Ordinary bus	29.9	26.3	25.0	27.3
Love bus	2.3	4.1	5.2	3.6
Provincial bus	4.0	2.7	0.8	0.3
Total	100.0	100.0	100.0	100.0

- c) Of the Cubao bound passengers, 65% to 70% are relying on jeepneys, while 25% to 30% are on buses. Love Bus and provincial bus generate 6-7% only (see Table 2.10).

Table 2.10
Modal Transfer of Public Transport Passengers

To Cubao by:	From Cubao by:							
	Jeepnev		Ordinary bus		Others		Total	
	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday
Jeepney	47.0%	44.6%	15.2%	16.2%	3.3%	3.3%	65.5%	63.8%
Ordinary bus	18.6	15.3	0.7	1.4	7.3	2.3	26.6	29.0
Others	3.3	4.1	1.3	2.3	3.3	0.8	7.9	7.2
Total	68.9	74.0	17.2	19.9	13.9	6.1	100.0%	100.0%

- d) Inter-modal transfers are significant among and between:
- Jeepneys and Jeepneys : 45% to 47% of total transfers
 - Jeepneys and Buses : 15% to 25%

Table 2.11 shows the spatial distribution on locations of major boarding and alighting points of bus and jeepney passengers in the Cubao area. These are as follows:

- a) Eastern section of Aurora Boulevard where approximately 30% of total boarding and alighting passenger occur, whether bound to Cubao or elsewhere.

- b) EDSA accounts for roughly another 30% of the total
- c) General Malvar handles significant amount of alighting passengers (18% of alighting passengers, with Cubao as final destination).
- d) On the other hand, Center Avenue captures 16% of total boarding passengers who are also transferees from other modes.
- e) Other major boarding and alighting areas are Gen. Roxas, Gen. Romulo and Arayat/Pinatubo.

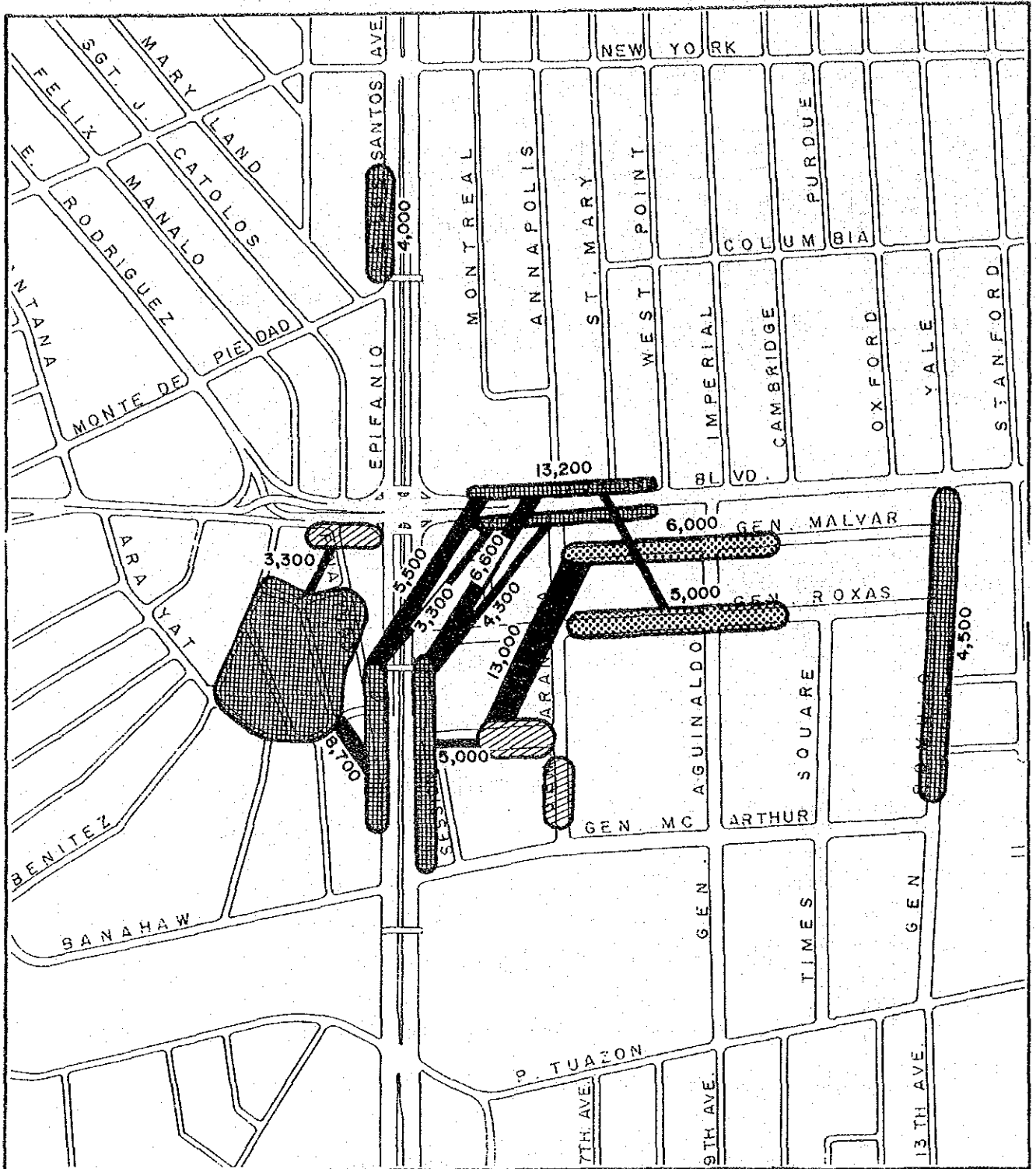
Table 2.11
Major Boarding and Alighting Points in Cubao

No. ^{1/}	Area	Non-Transfer		Transfer				Total Alighting
		Alighting		Alighting		Boarding		
		Number	%	Number	%	Number	%	
1.	EDSA (North-East)	-	-	-	-	2,300	1.8	-
2.	EDSA (North-West)	16,800	8.5	12,200	9.2	8,300	6.4	29,000
3.	EDSA (South-East)	17,000	8.6	15,100	11.4	8,500	6.5	32,100
4.	EDSA (South-West)	15,100	7.6	18,000	13.6	9,900	7.6	33,100
5.	Aurora (North-East)	42,000	21.3	23,000	17.4	27,300	21.0	65,200
6.	Aurora (South-East)	17,600	8.9	11,000	8.3	18,400	14.1	28,600
7.	Aurora (South-West)	-	-	-	-	9,700	7.4	-
8.	Aurora (North-West)	3,300	1.7	3,700	2.8	1,000	0.8	7,000
9.	Gen. Malvar	35,400	17.9	17,600	13.3	800	0.6	53,000
10.	Gen. Roxas	13,900	7.0	10,300	7.8	3,500	2.7	24,200
11.	Gen. Araneta	800	0.4	400	0.3	4,800	3.7	1,200
12.	Center Avenue	1,500	0.7	200	0.2	20,900	16.0	1,700
13.	Gen. Aguinaldo, Gen. McArthur, Times Square	-	-	-	-	800	0.6	-
14.	Gen. Romulo	14,900	7.5	6,000	4.5	5,000	3.8	20,900
15.	Arayat, Pinatubo	16,300	8.2	11,400	8.6	6,800	5.2	27,700
16.	Sgt. Catolos, Maryland, Monte de Piedad	3,300	1.7	3,300	2.5	2,300	1.8	6,600
Total		198,100	100.0	132,200	100.0	130,300	100.0	330,300





^{1/} Number for area corresponds to those shown in Figure 2.12.

Figure 2.11 illustrates these major flows of transfer passengers. The following patterns are discernible:

- a) Between the eastern segments of Aurora Boulevard and southern leg of EDSA (15% of total transfer passengers)
- b) Within the eastern section of Aurora Boulevard (15% of the total)



LEGEND:

-  MAJOR ALIGHTING POINT / AREA
-  MAJOR BOARDING POINT / AREA
-  MAJOR BOARDING / ALIGHTING POINT
-  MAJOR TRANSFER PASSENGER FLOW

SOURCE: PASSENGER INTERVIEW SURVEY, JUMSUT II

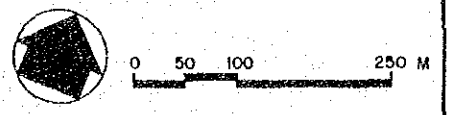
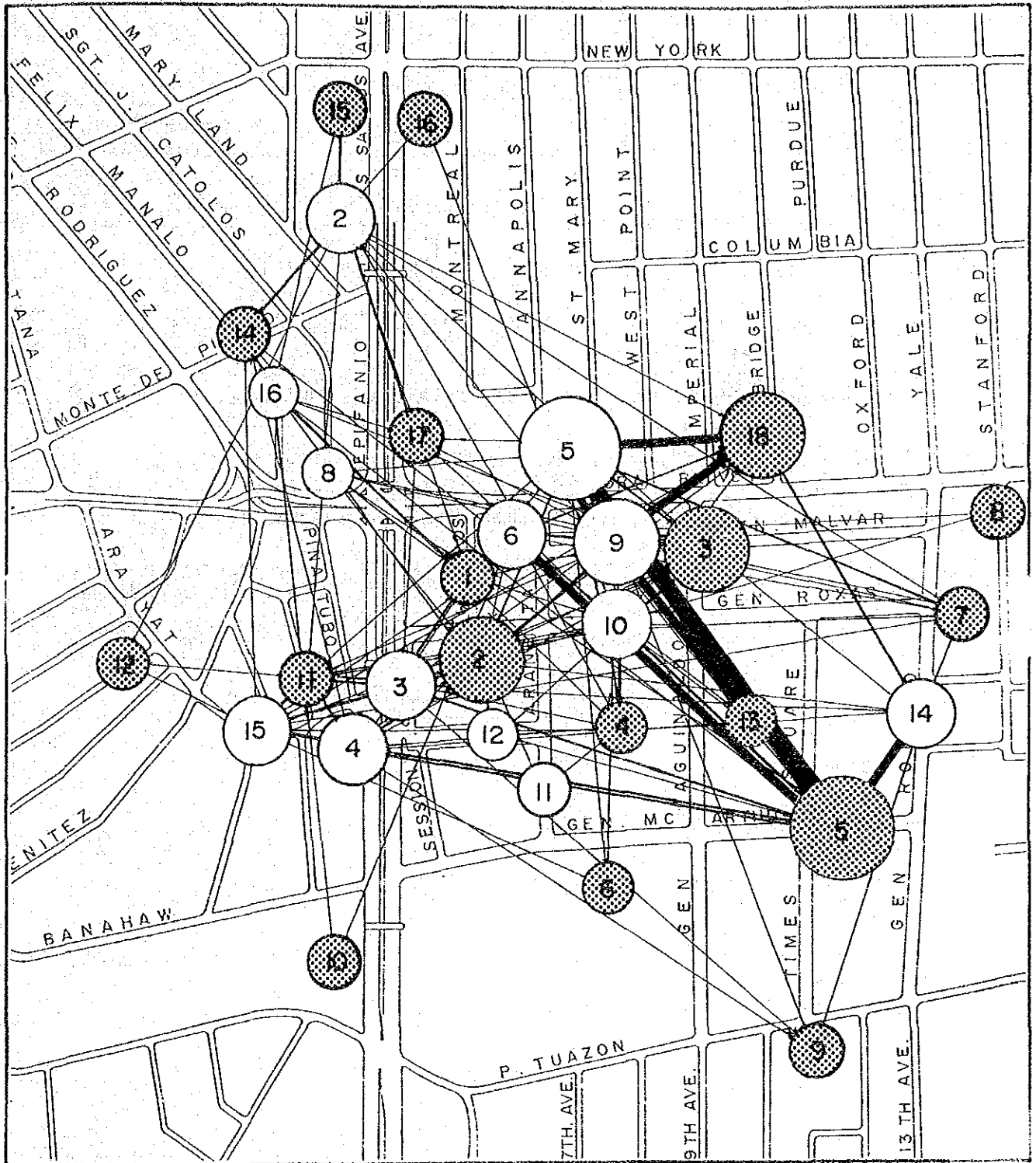


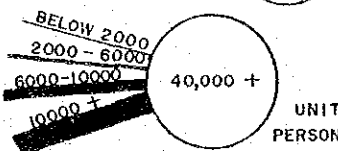
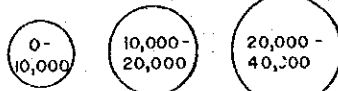
Figure 2.11
Transfer Passenger
Traffic Volume and Flow



LEGEND:

○ Alighting Point /Area

● Visiting Point /Area (Destination)



UNIT: PERSON/DAY

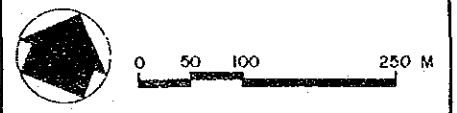


Figure 2.12
Non-Transfer Passenger

1/ NO. CORRESPONDS TO THAT SHOWN IN TABLE 2.11 FOR ALIGHTING AREA AND TABLE 2.12 FOR DESTINATION IN CUBAO.

2.4 PEDESTRIAN TRAFFIC AND FACILITIES

Because of the substantial volume of transfers, pedestrian traffic is naturally high. Existing facilities in the area consist of sidewalk, pedestrian overpass, at-grade pedestrian crossing, median/barrier as shown in Figure 2.13. Characteristics of pedestrian movements can be described on an area-by-area or block basis.

2.4.1 Along EDSA

The total number of pedestrians crossing EDSA is estimated to be 120 thousand, 96 thousand or 80% of whom use the pedestrian deck in front of Farmers Plaza, while 18 thousand or 15% use the one in front of Pantranco. It was estimated that approximately 5% or 6 thousand still cross the EDSA at-grade, probably because of:

- Inconvenient location of overpasses
- Danger in using the overpass in the evening
- Longer time spent in descending and ascending the stairs

Several locations were identified where sidewalk widths are insufficient (less than 1.0 meter) for the corresponding pedestrian volume, viz.:

- Infront of Ocean theatre
- Near the pedestrian overpass opposite Farmers Plaza
- Near the pedestrian overpass opposite Pantranco Bus Terminal
- Near Kowloon restaurant

2.4.2 Along Aurora Boulevard

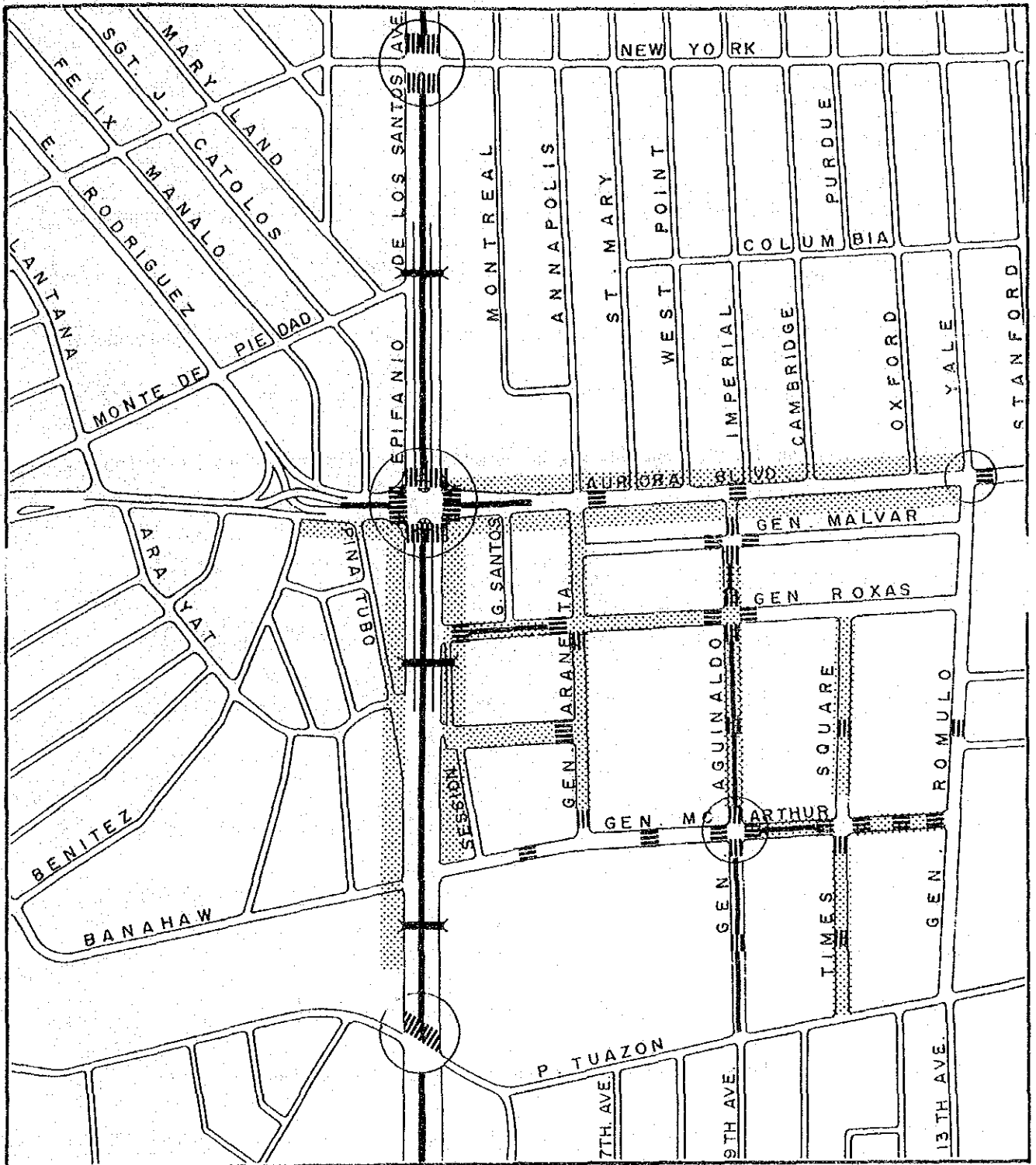
The number of pedestrians who cross Aurora Boulevard is estimated to be as many as 100 thousand a day. Although there are three pedestrian crossing at-grade between Gen. Santos and Yale (approximately 650-meter distance), only 45% of the pedestrians use the designated crossings. This aggravates the traffic congestion along Aurora Boulevard since majority of the pedestrians simply cross outside the designated lanes.

In particular, the lack of pedestrian discipline to the tune of 35,000 pedestrians crossing Aurora Boulevard (near the intersection of Aurora/Gen. Araneta) is one of the principal causes of traffic congestion.

2.4.3 Within Araneta Center

The total number of pedestrian traffic within the Araneta Center is estimated by the Center Management to be in the neighborhood of 750,000 a day.

This figure appears to be on the high side. Nevertheless, heavy traffic flow is seen in the areas near the Farmers Plaza, Gen. Aquinaldo, Rustan, Shoemart, and Ali Mall. Most of the roads are provided with sidewalks with sufficient width of more than 3.0 meters.



LEGEND:



PEDESTRIAN CROSSING



PEDESTRIAN OVERPASS



TRAFFIC SIGNAL



MEDIAN / BARRIER



CONGESTED SECTION OF PEDESTRIAN FACILITIES



0 50 100 250 M

Figure 2.13
Existing Pedestrian
Facilities

2.5 TRAFFIC MANAGEMENT ASPECTS

2.5.1 Existing Traffic Control

Figure 2.14 portrays the current traffic circulation in the Cubao area, including those of Araneta Center. These are described below.

a) One-way Streets

A number of streets are designated as one-way streets. Particularly within Araneta Center, all streets except Gen. Aguinaldo, Central Avenue and P. Tuazon are designated as one-way streets.

The access roads to Araneta Center are one-way couples as follows:

From south : 13th Avenue (bound for north)
9th Avenue (bound for south)

From west (EDSA) : Gen. McArthur (bound for east)
Gen. Roxas (bound for west)

From north (Aurora Boulevard) : Gen. Araneta (bound for south)
Gen. Romulo (bound for north)

Yale (bound for north) which connects with Gen. Romulo is a one-way street. On the other hand, Cambridge, Imperial, and Westpoint are also one-way streets bound for the south.

b) Traffic Signals

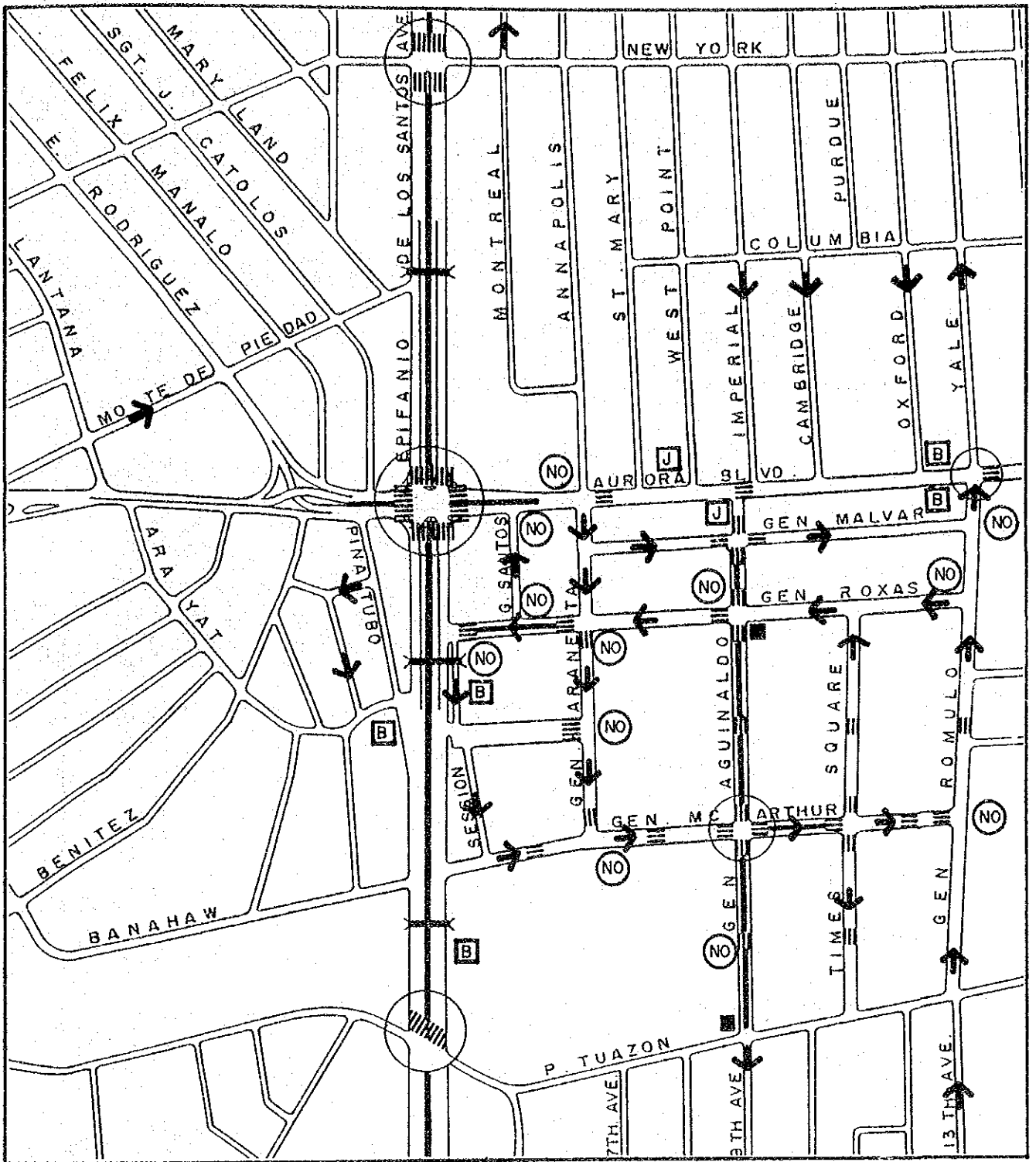
There are currently six sets of traffic signals within the study area, including four sets within Araneta Center. These are operated automatically during off-peak time, but operated by traffic aides manually during peak time.

Within Araneta Center, two intersections (i.e., Gen. Aguinaldo/Gen. Roxas and Gen. Aguinaldo/P. Tuazon) are controlled by traffic aides only during peak time.

c) Loading/Unloading Prohibitions

Except for some isolated spots in the Araneta Center, there are plenty of signs prohibiting loading/unloading. Permissible zones, however, are not too clear cut.

Despite the presence of signs, however, loading and unloading of PU vehicles occurs everywhere.



LEGEND:

- | | | | |
|---|---------------------|----|-----------------------|
| | PEDESTRIAN CROSSING | J | JEEPNEY STOP SIGN |
| ○ | TRAFFIC SIGNAL | NO | NO LOADING, UNLOADING |
| ■ | POLICE OUTPOST | → | ONE - WAY |
| B | BUS STOP SIGN | ⌢ | PEDESTRIAN OVERPASS |
| | | — | MEDIAN / BARRIER |

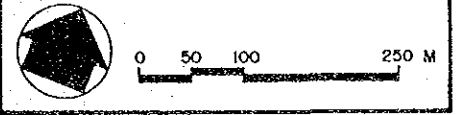


Figure 2.14
Existing Traffic Management

- c) From Gen. Malvar to Center Avenue (10% of the total)
- d) Between EDSA and the Arayat block (7% of the total)
- e) From EDSA to Center Avenue and from Gen. Roxas to Aurora Boulevard (4%, respectively)

Table 2.12 shows the distribution of destinations in Cubao area. Major destinations are Rustan, Shoemarts, Ali Mall (including Fiesta Carnival) which account for 31% to 77% of the total number of visitors to Cubao, followed by the commercial areas along the eastern section of Aurora Boulevard which account for 20% to 17%. Farmers Plaza/Market account for 9 to 11%. Figure 2.12 shows the flow of the visitors between their alighting locations and destinations.

Table 2.12
Distribution of Destinations in Cubao
Mode Interchange Area (%)

No. ^{1/}	Area	Sunday	Weekday
1.	ACT/UNIWIDE	5.0	6.5
2.	Farmers Plaza/Market	11.0	9.3
3.	Quezon Arcade/Aurora Tower	12.3	11.1
4.	Araneta Coliseum	-	-
5.	Rustans, Shoemart, Ali Mall, Carnival	31.2	37.0
6.	Automatic Center/Around White House	0.4	1.3
7.	Along Gen. Romulo (East)	9.2	11.9
8.	Corona Bazaar/Hots	0.1	-
9.	Along P. Tuazon (South)	0.7	1.0
10.	Along EDSA (West)/near Samson Tech.	0.2	-
11.	Alibangbang/near Arayat	5.0	3.4
12.	Aurora (South)	0.4	0.3
13.	EDSA/Aurora/Arizona	3.0	1.3
14.	Aurora/Arizona/North/Maryland	-	1.3
15.	Bughaw/Along EDSA (West) and New York	1.5	4.7
16.	Along EDSA (East) near New York	0.4	1.0
17.	Cubao Elementary School/along EDSA (EDSA)	2.6	0.3
18.	EDSA (East)/Aurora (North)	15.1	8.5
19.	Others	1.0	1.1
Total		100.0 %	100.0 %

Source: Consumers' Interview Survey, JUMSUT II

^{1/} Numbers correspond to those shown in Figure 2.12.

d) Turning Prohibition

At a number of intersections, turning prohibitions exists to reduce conflict movement.

e) Parking Prohibition

Within Araneta Center, parking is prohibited along the roads which have narrow shoulders or around the intersections where there are great pedestrian activities. These parking prohibitions are generally adhered to owing to the Center's adequate parking areas (which can hold a total of 4,000 vehicles) and its own traffic aides.

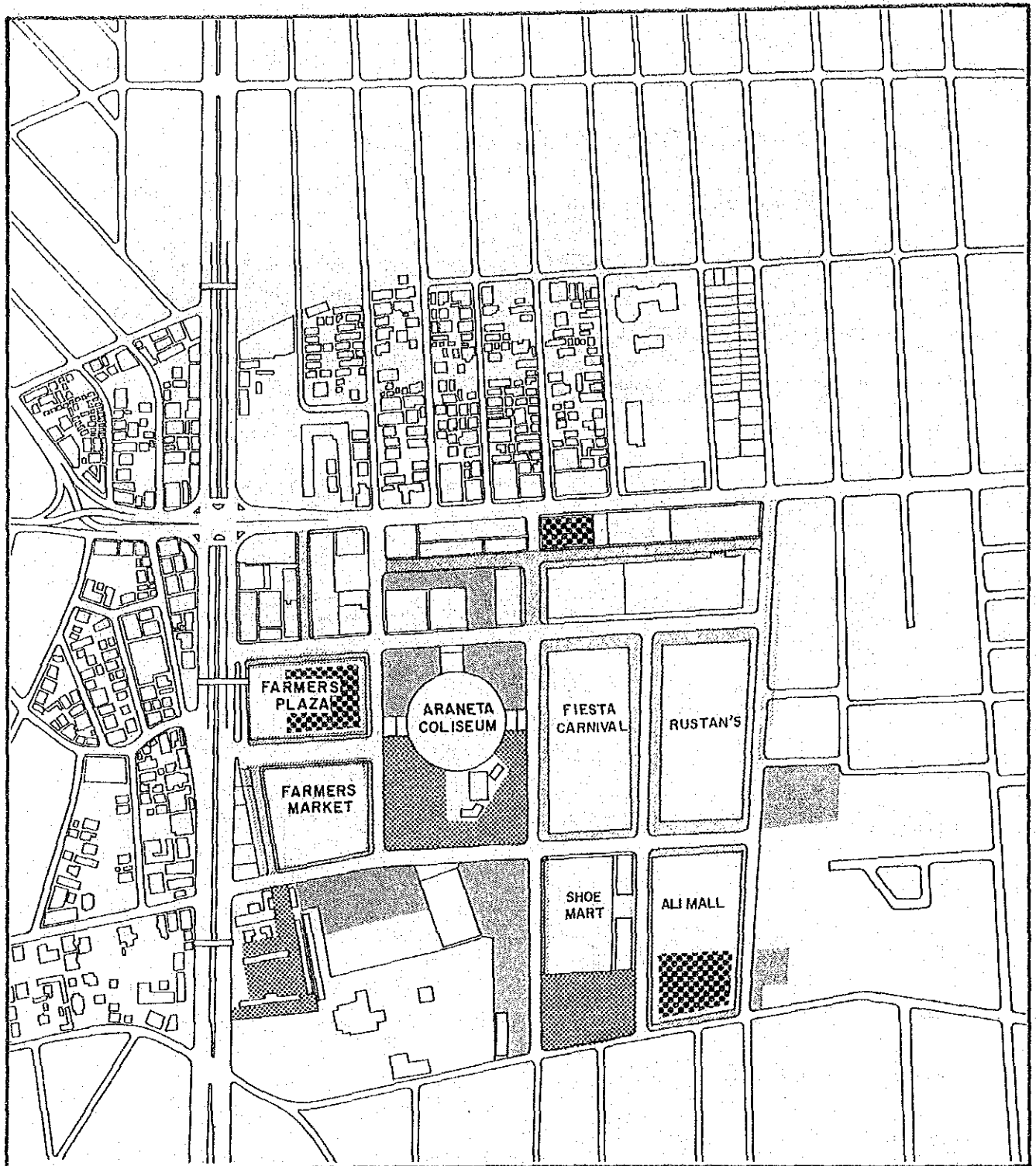
2.5.2 Car Parking

Approximately 4,000 parking slots available within the Araneta Center, 480 of which are integral pay-parking as part of shopping establishments. Approximately 1,500 are off-road pay-parks, while remaining are for free (see Figure 2.15).





Results of a sample survey of the representative parking spaces are shown in Table 2.13. The general conclusion is one of high availability.

Table 2.13
Utilization of Parking Area

Location	Type	Vehicle spaces (No. of lots)	Observed No. of Vehicles during 2-4 pm	Turn-over during 2-4 pm	Ave. Parking Time (min)	Maximum Occupancy (%)
1) Back of Coliseum (near Post Office) Araneta/McArthur	off-road free	117	435	3.7	52	80.2
2) Back of Coliseum (infront Carnival) Aguinaldo/McArthur	off-road free	87	117	1.3	67	37.5
3) Back of Coliseum (combined)	off-road free	204	552	2.7	55	62.0
4) Times Square (Rustan's)	off-road free	72	237	3.3	56	76.3
5) Gen. Malvar (bet. Gen. Aguinaldo and Gen. Romulo)	off-road	37	146	4.0	40	66.1



LEGEND:

-  FREE PARKING (ON ROAD)
-  FREE PARKING (OFF ROAD)
-  PAID PARKING (OFF ROAD)
-  PAID PARKING (IN HOUSE)

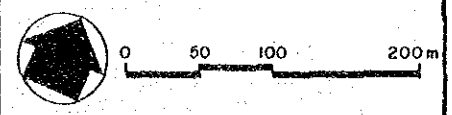


Figure 2.15
Existing Car
Parking Area

3.0 PREVIOUS STUDIES AND PROPOSALS

3.1 PRECEDENTS

A number of studies were already undertaken for Cubao. But most of these plans focus on the traffic management of the area. Except for the decentralized bus stop along EDSA, none appears to have been implemented as yet. Among the more notable reports are:

- MMUTSTRAP B1
- TEAM II
- Araneta Center

Since MMUTSTRAP Part B1 examined Cubao as a sub-area most recently, it integrated most of the proposals and plans made under TEAM II, but has not taken into account the Center Management's views.

3.2 MMTEAM II

MMTEAM II has been studying and planning the installation of traffic signals at about 170 locations mainly at the area between C-2 and C-4. Cubao is included. Implementation has been delayed and it may take 2 to 3 years more before new signals appear in the vicinity.

3.3 MMUTSTRAP B1

MMUTSTRAP Part B1 went further and investigated the problems of the area, again mainly from the traffic engineering standpoint. It covered the area bounded by EDSA, 20th Avenue, P. Tuazon, and Diliman River. Its recommendations are summarized in Table 3.1.

3.4 ARANETA CENTER

With regard to the private sector's thrust for Araneta Center, the best that could be gathered or discerned about its plans are as follows:

- a) The long-term plan is towards multiple usage and vertical developments. The target floor to land area ratio is 6:1.
- b) Accordingly, the following scenarios are foreseen:
 - The establishment along Aurora Boulevard will be redeveloped and improved to include a hotel in addition to commercial stalls. This will increase a total floor area by approximately 60,000 sq.m.

Table 3.1
Summary of Proposals and Recommendations
made under MMUTSTRAP B1

Area	Proposals Made
1. Traffic Signals	1) Proposals were made under TEAM II program and endorsed by MMUTSTRAP: (See Appendix 3.1)
2. Public Transport	1) Two alternative plans for jeepney routes were formulated by MOTC after discussions with Araneta Center. (See Appendix 3.2) 2) Strict enforcement to restrict buses standing in front of Farmers Plaza.
3. Aurora Blvd. Traffic and Access Management	1) Construction of new bridge over Diliman Creek. (See Appendix 3.5) 2) A series of one-way pairs should be implemented as soon as possible: a) 15th Avenue (north) with Harvard (south) b) Yale (north) with Oxford (south) c) Imperial (south) with Cambridge (north) (See Appendix 3.5) 3) Minor widening of 15th Avenue between Aurora Blvd. and New York. 4) Direct access to Araneta Center from Aurora Blvd. need to be restricted to simplify signal phasing arrangement and to reduce conflict of private vehicles with jeepneys. 5) The general TEAM (1982) recommendations for traffic signal control and coordination together with median installations on Aurora Blvd. between Anonas and EDSA are supported. (See Appendix 3.3)
4. EDSA Traffic and Access Management	1) Modern traffic signals proposed under TEAM II for EDSA are endorsed. 2) Signalization of Gen. McArthur/EDSA and EDSA/P. Tuazon to support the proposed one-way pair of McArthur (west) and P. Tuazon (east) favoured by TEAM should be implemented as soon as possible.
5. Traffic Management on P. Tuazon and Southern Access Routes	1) Appropriate regulatory signs should be installed on side streets to reduce the potential for accidents along 9th and 13th Avenue.

Table 3.1 cont'd

Area	Proposals Made
	<p>2) As a further measure for improving access from subdivisions east of Araneta Center, use of traffic aides to control the intersections of 20th/P. Tuazon and 20th/Santolan Road during peak periods should be considered.</p>
<p>6. Commercial Center Traffic and Pedestrian Circulation</p>	<p>1) An internal link proposed by TEAM (1982), as a longer term measure, between Gen. Araneta and P. Tuazon and the extension of Mirasol to Gen. Romulo/Gen. McArthur are considered desirable in principle. Further investigation is suggested</p> <p>2) Given the wide streets within the Araneta Center and to permit maximum flexibility in internal traffic movement, most of the internal roads should permit two-way movement except those already nominated for one-way operation. (See Appendix 3.4).</p> <p>3) Where there is two-way movement medians should be placed and pedestrian barriers installed. (See Appendix 3.4).</p> <p>4) Appropriate facilities for pedestrian crossings should be provided including pedestrian overhead bridges contemplated by the Araneta Center. (See Appendix 3.4).</p>
<p>7. Others</p>	<p>1) Prohibition of peak period parking on all secondary and improvement collector roads. Special measures should be taken to control parking on:</p> <ul style="list-style-type: none"> a) P. Tuazon b) Santolan Road c) E. Rodriguez d) 20th Avenue e) 9th Avenue, and f) 13th Avenue <p>2) The problem of angle parking in front of commercial premises on Aurora Blvd. and EDSA should be dealt with on a case to case basis.</p> <p>3) All primary and secondary roads should have lane markings and signs to the standards set out in the Philippine Pavement Making Manual and Philippine Road Signs Manual.</p>

- The Omega Complex is planned to be built at the corner of EDSA and P. Tuazon. It will exemplify the concept of a community within a community. It will have a total floor area of approximately 500,000 sq. m. on a multiple usage.
 - Farmers Plaza will have additional two floors with a total area of approximately 22,000 sq. m.
- c) Of particular importance to the transportation aspects, the Center Management is contemplating on the following steps:
- The number of Love Bus using the terminal along Gen. Romulo street will be limited to approximately 28 at any given time.
 - Public transport vehicles may be barred from entering the center in the future. Private cars and tourist buses are favored more.
 - The free car parks will eventually be transformed into pay car parks when and where warranted to suit circumstances.
 - To service the access needs of the Omega Complex, a new road will be constructed from Gen. McArthur to 7th Avenue.

3.5 CONSOLIDATION OF PENDING PROPOSALS

All the pending proposals have been consolidated and sorted out into short or long-term categories and discussed in the following chapter. (see Tables 4.1 and 4.2)

4.0 TRANSPORT SYSTEM ANALYSIS

4.1 SPECIFICATION OF THE PROBLEMS

4.1.1 General Observation

The overarching objective is to transform Cubao into a vibrant yet pleasant center of commercial activities with its own nucleus of urban services within the Metro Manila region's multi-CBDs development framework. Central to this objective is the resolution of its transportation problems which act as bottleneck to its future growth. Broadly speaking, these problems stem from an imbalance between the prevailing pattern and volume of trip demands and the existing road network, with the latter farther constrained as to below its full capacity.

Principal reasons for the concentration of traffic demand in Cubao are two-fold but intertwined. For one, the Araneta complex of commercial shops offer numerous attractions which are by themselves, major traffic generators. It is, for all intents and purposes, another CBD in Metro Manila. Of the total road traffic in the area, 20 to 55% are Araneta-bound. The second reason is that this provides a convenient transfer point for commuters bound to other parts of the Metro region. Latest estimates indicate 690 thousand passengers/day board and alight at Cubao - a level second only to Quiapo. A good 28% and 40% of public transport passengers switch in Cubao on a weekend and weekday, respectively.

With this background, it is useful to view the problems on transportation of Cubao as a system with short and long-term dimensions and in terms of the inter-related actions in traffic, public transport, road, and land development.

4.1.2 Short-term Problems

It is not difficult to imagine that some of the prevailing problems are amenable to short-term solutions. Others will require a sustained effort and evolutionary implementation over time and may only be feasible after the short-term proposals succeed. For analytical convenience, the short-term deficiencies have been specified in Table 4.1, and summarized as follows:

Traffic Component

- a) Recurring conflict between pedestrian movements, through traffic, and vehicles bound for the Araneta Complex.
- b) Ineffective pedestrian facilities, particularly in road crossings, in the face of undisciplined pedestrians.
- c) Lack of traffic signals to control critical intersections while a number of existing signals malfunction. The result is long queues with vehicles tending to occupy both sides of the road.

- d) Weak traffic enforcement, probably due to lack of manpower and training; and when available adds to the traffic confusion.
- e) Through traffic inside residential zones (north and south of the Center) which creates noise and pollution within quiet neighborhoods.
- f) Extraneous traffic within the center caused by vehicles in search of "free" parking to avoid the pay parks.

Road Component

- g) Deterioration of road pavements in important thoroughfares such as Arayat and P. Tuazon, thus contributing to the reduced link capacity.
- h) As a secondary road, the carriageway of P. Tuazon is too narrow while overall collector routes between the primary roads and the Araneta Complex are inadequate.

Public Transport Component

- i) Uncontrolled loading/unloading of jeepneys along Aurora and of buses along EDSA service roads.
- j) Scattered provincial bus terminals around the Cubao area and in the periphery of the Center which operate without defined turning points.
- k) Overlapping of many jeepney routes (from Marikina, Quiapo, San Juan, other parts of Quezon City) that converge on Cubao and exacerbate congestion at crowded intersections.

Without being parochial nor piecemeal, the special tasks of JUMSUT II are to develop comprehensive solutions vis-a-vis the public transport-related problems.

4.1.3 Long-term Problem

Compared to the present, the anticipated problems look more formidable if not alarming. The planned expansion of the Araneta Center would boost commercial space by 582,000 square meters (vs. current levels of about 350,000 sq.m.) This would more than double the business activities in the area and create a more than proportionate increase in traffic. Obviously, this intensification of land use cannot be supported by the existing road network within and without the Center. As it is, the capacity of EDSA - Aurora intersection has already reach saturation flow.

Another danger sign with mid-term implication is the antipathy of Araneta Center management against public transport vehicles (especially jeepneys and mini-buses). As mentioned in Section 3.4, the management of Araneta Center envisions a radical shift of modes in favor of private cars and eventual banning and PU vehicles to spill over and overload further the access roads (consisting of P. Tuazon, Aurora, EDSA, E. Rodriguez) into Cubao. Consequently, less buses and jeepneys mean an exponential jump in the number of private cars just to carry the same volume of passengers. This prospect, of course, would require a greater amount of road space than is currently available. Without new access roads, such a shift will be counterproductive to the commercial viability of the Center.

Perhaps, a minor consolation is that these problems can be avoided. Table 4.2 lists down the long-term problems of Cubao. These are mainly in roads and public transport.

- a) Limited number and capacity of access roads to and from the Center. Put another way, the existing land development is already straining the existing roads and additional build-up would be difficult to support transport-wise.
- b) Absence of well-defined hierarchy of roads to support and sustain future growths. The capacity of roads must be expanded consistent with the timing of Cubao's development.
- c) Possible dislocation of PU vehicles from the Center, if the contemplated ban and removal of terminal space happens.
- d) Probable expansion and proliferation of provincial bus mini-terminals around the area. Although this may seem remote (see Section 2.3.2 for example), the continued growth of Cubao may induce other companies to converge there and complete.
- e) Lack of well-defined public transport terminals to facilitate transfers.

JUMSUT II's brief is to develop alternative solutions (and alter) for problems c), d), and e) above.

Table 4.1
Short-term Issues

	PROBLEM STATEMENT	DISCUSSIONS	POSSIBLE SOLUTIONS
TRAFFIC COMPONENT	<ul style="list-style-type: none"> Recurring conflict between pedestrians, through traffic and Centerbound vehicles. Inadequate pedestrian facilities coupled with unruly behavior at street crossings Lack of traffic signals to control critical intersections while a number of existing signals malfunction. Weak traffic enforcement, and when available adds to the confusion. Through traffic inside residential zones which causes noise and pollution. Extraneous traffic caused by vehicles looking for free parking within the Araneta Complex. 	<p>Severe during peak periods along Aurora. Vehicles desiring to enter the Center create obstacles to through traffic, while PUJs occupy both sides of streets.</p> <p>Not functioning properly are signals at 2 intersections: Aurora-Yale and P. Tuazon-15th Avenue.</p> <p>3 more signals needed along Aurora plus 2 along P. Tuazon.</p> <p>Motorists get confused by conflicting manual directions of police and traffic signals.</p> <p>Particularly annoying along Main Avenue and Liberty Avenue South of the Complex; and St. Mary, Cambridge, and Oxford Streets north of the Complex</p> <p>Probably because of the transition of car parks into pay parks.</p>	<ul style="list-style-type: none"> Median and pedestrian barrier along Aurora plus same channelization for turning movements. One-way scheme for entry/exit to Araneta Center. TEAM II is evaluating the installation of new traffic signals and the improvement in the phasing of existing ones. Review of signalization and geometry at Aurora-EDSA and EDSA-New York. Training of traffic enforcers on proper handling of signalized intersections and congested streets. Possible closing of street segments to through traffic or diversion of vehicular flow to secondary arterials. Designation of parking zones with limited time duration coupled with enforcement within the Araneta Complex.
ROAD COMPONENT	<ul style="list-style-type: none"> Deterioration of road pavements along Arayat, P. Tuazon, and other secondary streets leading to the Center. Narrow carriageway of P. Tuazon and lack of collector routes between primary roads and the Araneta Center. 	<p>Cause by poor road maintenance and inadequate drainage, compounded by occasional flooding along Arayat and Aurora/15th Avenue.</p> <p>Existing road network is already heavily used. Local roads are functioning as secondary arterials.</p>	<ul style="list-style-type: none"> Rehabilitate road surface. Pinpoint continuing responsibility among MPWH-NCR, Quezon City government, and MMC. No short-term solutions except parking prohibitions and improved traffic management.
PUBLIC TRANSPORT COMPONENT	<ul style="list-style-type: none"> Uncontrolled loading/unloading of jeepneys along Aurora and of buses along EDSA. Scattered provincial bus terminals around the Cubao area without defined turning points. Overlapping of many jeepney routes converging on Cubao. 	<p>Slows down traffic flow considerably along primary roads and increases risks to commuters.</p> <p>Terminal location per se is not a problem but choice of turning points of buses (e.g., P. Tuazon interrupt other traffic).</p> <p>PUJs coming from Marikina, San Juan and Manila cross paths unnecessarily especially at congested intersections.</p>	<ul style="list-style-type: none"> More effective enforcement against standing PUJs. Adopt self-policing via route associations. Designation of loading/unloading zones. Designation of turning points and/or declaration of off-limits zones for provincial buses. Self-imposed discipline among bus companies Redesign route turning points to minimize jeepney volumes at Aurora-EDSA intersection and decentralize termini.

Table 4.2
Long Term Issues

	PROBLEM STATEMENT	DISCUSSIONS	POSSIBLE SOLUTIONS
ROAD COMPONENT	<ul style="list-style-type: none"> Limited number and capacity of access roads to and from the Center. Land development not-in-balance with road infrastructure. Absence of a well defined hierarchy of roads to support and sustain future growths. 	<p>This is particularly true for the influence areas East and North-east of Cubao</p> <p>Vehicle intrusion into residential areas will probably get worse.</p>	<ul style="list-style-type: none"> Construction of bridge and new link across Diliman Creek, connecting Aurora to Kamias via K-J street. Construction of new road link to open up Mirasol Road to 15th Ave. Open up Banahaw crossing EDSA combined with one-way pair with P. Tuazon.
TRAFFIC COMPONENT	<ul style="list-style-type: none"> Internal traffic circulation of Araneta Center not in harmony with surrounding flow. 	<p>Presently observable at the interface of Araneta Complex with Aurora and EDSA.</p> <p>Outflow to EDSA interrupted by bus traffic in front of Farmers Plaza.</p>	<ul style="list-style-type: none"> Possible widening of P. Tuazon via ROW on the side of Araneta property. Construction of new road link from Gen. McArthur to 7th Avenue perpendicular to P. Tuazon. Joint planning of traffic circulation.
PUBLIC TRANSPORT COMPONENT	<ul style="list-style-type: none"> Possible banning and consequent dislocation of PU vehicles from the Center. Lack of well-defined public transport terminals to facilitate transfers. Probable expansion/proliferation of provincial bus terminals around the Area. 	<p>Will reduce further available off-street terminal space and worsen congestion.</p> <p>Present situation causes difficulties to transfer passengers.</p> <p>May convert present annoyance into a real problem in the future.</p>	<ul style="list-style-type: none"> Persuade private developer to incorporate, retain or expand public transport facilities within the Center. Construct new mode interchange facility near Arayat across EDSA and opposite the Center. Improve pedestrian overpasses and other facilities. Regulate terminal construction so as to minimize traffic impact.

4.2 DEVELOPMENT OPTIONS

4.2.1 Plans

The planning parameters developed by JUMSUT II were delivered from a thorough review of existing plans and past studies, reinforced by additional topical surveys and investigations. Instead of defining solution alternatives on the assumption that the transportation sector, is the most critical, the approach taken was to consider all proposals from whatever sectors as competing alternatives on the same footing initially. Thus, from a system analysis of the situation in Cubao, the harmonious combination of seemingly separate but integrated solutions have been prescribed. It is from this perspective that the JUMSUT II specific recommendations on public transport improvements and mode interchange facilities should be viewed. They cannot stand alone. Corollarily, the other proposals consistent with the resultant overall plan can be endorsed or revised accordingly. For ease of implementation, all these correlative measures have been grouped into short and long-term actions.

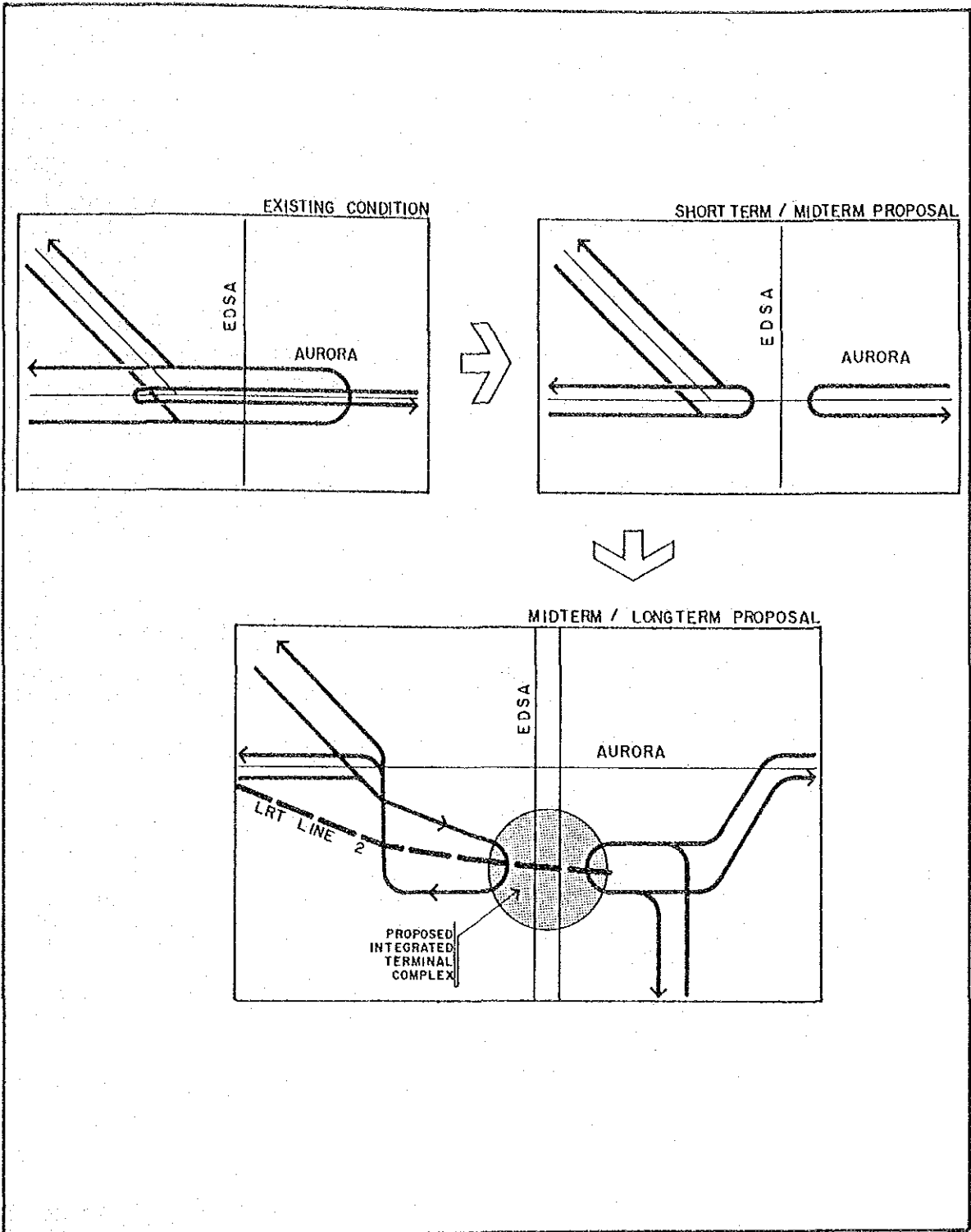
4.2.2 Short-term Plans

Principal determinants in classifying proposals as short-term is whether it can be done in less than two years. Such a rule implies the exclusion of any proposal that requires an extraordinary outlay of investment funds or the construction of physical structures without earlier budgetary allocation. Thus, the listings and classification of Table 4.1.

The guiding concept in the short-term period is to extract as much throughput from the existing transportation facilities as possible. Survey data (see Section 2.0) about the present conditions suggest very limited relief on the major roads without transferring some of the traffic loads on secondary and local road network. This means that intrusion of public transport vehicles into residential neighborhoods cannot be avoided.

The elements of such a tactical plan for Cubao are as follows:

- a) Reduction of PU vehicles on the heavily congested Aurora-EDSA intersection through dispersal of various route turning/ending points into several minor streets without degradation in the passenger service levels. This is schematically shown in Figure 4.1.
- b) Step-wise rerouting or changes in jeepney routes in order to avoid public inconvenience and forestall strong objections. This would also permit the completion of supportive civil works.
- c) Improved descriptive of buses along the EDSA service roads thru judicious combination of self-management, enforcement, and minor engineering works.



LEGEND:

→ JEEPNEY ROUTE

Figure 4.1
Rerouting Concept
of PUVs