

8.3 DIRECTIONS FOR FURTHER REROUTING OF METRO MANILA PUBLIC TRANSPORT

8.3.1 General

- The efforts of the JUMSUT study have been devoted primarily to the preparation of a rerouting plan for immediate implementation, with particular regard to the scheduled opening of the LRT Line No. 1. The plan must be acceptable not only to the various government implementing agencies but also to the public transport operators concerned. Its aim is not to present an optimum solution but to provide the first step towards achieving a better coordinated public transport system. This is, probably, the first comprehensive planned rerouting scheme for Metro Manila.
- Accordingly, it would be also an important task for the government to further look into more effective functional splits among available public transport modes and to prepare plans, particularly from mid-term and economic viewpoints.
- A preliminary exercise was made in this study to identify possible directions for further rerouting of bus and jeepney based on the available data. The methodology applied in this exercise is to find a better modal-split between bus and jeepney and to provide a more effective route structure for major corridors on the basis of comparative analysis of demand and supply characteristics by corridor.

8.3.2 Identification of Demand/Supply Characteristics and Gap

- Public transport demand was estimated by corridor for the entire Metro Manila as shown in Table 8.11. In this table, three types of demand are shown in terms of two-way passenger traffic volume per hour; namely:
 - a) **Actual Flow:** is estimated by assigning the 1980 OD trips of public transport passengers onto the existing road and public transport network with actual constraints.
 - b) **Demand on Fixed Route:** is estimated by assigning the above trips on existing road and public transport network with no capacity restraint nor transfer penalty. This is mainly to identify the supply/demand gap due to allocated vehicle capacity rather than route structure.
 - c) **Demand on Free Flow:** is estimated by assigning the same trips on the existing road network alone without any capacity nor route constraint. The demand is assigned on road network simply on a least cost path basis. This is to identify the supply/demand gap due to the route structure.

For example, Table 8.11 shows that passenger traffic demand along Quirino Avenue and South Super Highway is distributed more or less as they are supposed to be, while that along P. Quirino is considerably distorted. Actual flow is only 1,000 passengers/hour, while free-flow demand is as much as 23,900. Free flow demand on existing route structure is 3,900. This implies that public transport routes along P. Quirino need to be restructured. Potential demand is also very high.

- Similarly, private transport demand in terms of vehicles was also estimated as shown in Table 8.12.
 - a) **Actual Flow** : is estimated by assigning the 1980 OD trips of private vehicles onto the existing road network wherein the capacity restraint of each road section and incremental loading technique are considered. This represents the actual traffic flow on the existing road network.

- b) Demand Flow : is estimated by assigning the above trips onto the shortest time paths of the road network without capacity restraint. This is done to identify how the demand is distributed on the existing road network.

By comparing the volume-capacity ratio for actual flow and demand flow basis, it can be roughly identified whether the demand is distributed as it is supposed to be. For example, Taft Avenue has a large potential private transport demand.

- One of the important areas to be looked into is the distortion of demand distribution on many corridors in Metro Manila. In other words, the current public transport demand is not distributed on the roads as it is supposed to be. Due to the limitations on road capacity and the current traffic control measures or existing route structure, passenger demand, sometimes, has to be diverted away from the shortest corridor to other detour corridors.
- This typically appears along EDSA, where a high potential demand is indicated on a free flow basis while the same demand largely decreases on a fixed route basis.
 - a) The high potential demand along EDSA on free flow basis shows the existence of a sizeable volume of passenger demand which wants to use EDSA as a part of its shortest path. EDSA in this manner is utilized as if it were a feeder road.
 - b) The decrease in the potential demand along EDSA on a fixed route basis results from the fact that passenger demand seeks for a short-cut route to its destination, especially when it crosses Pasig River.

The former can be solved by constructing C3 and other circumferential roads. C3 is considered indispensable not only to relieve EDSA but also to rationalize the public transport route structure of Metro Manila.

The latter is one of the major reasons to construct the LRT, which connects the north and the south of Metro Manila for a shorter distance and time. Since the LRT is supposed to absorb some passengers travelling along EDSA, this will also relieve EDSA from the former problem.

- The demand distribution on C2 is also distorted. Although C2 shows a large potential demand both on free flow basis and on fixed route basis, the actual traffic flow of public transport passengers is negligible. Since this corridor can play an important role in rationalizing the route structure of public transport, new routes should be developed in conjunction with other corridors.
- Aside from the distortion of demand distribution, another essential problem is the functional split among public transport modes. Judging from the current role of each mode, jeepney and bus are directly competing on some corridors. Although it is difficult to clearly determine the roles of these two modes, considering the capacity-efficient line-haul characteristics of the bus and the para-transit feeder characteristics of the jeepney, the following are advisable.
 - a) shorten long-distance intracity jeepney routes for the corridors where the functional split between jeepney and bus is not clear.
 - b) limit the entrance of intercity jeepney up to outside of EDSA.
 - c) develop new bus routes to cover the demand gap caused by the above measures.
- In addition, it is recommended that new premium bus routes be developed for congested corridors where private traffic demand is high. This aims to absorb private car users in

more capacity-efficient and economical public transport. Because a considerable percentage of Love Bus passengers were formerly car users, this measure is considered to be an effective one to promote the diversion from private transport to public transport.

Table 8.11
Public Transport Potential Demand by Corridor

Corridor Name ^{1/}	Two-Way Hourly Passenger Traffic Volume (Morning Peak)		
	Actual Flow (Ratio)	Demand on Fixed Route Basis (Ratio)	Demand on Free Flow Basis (Ratio)
Quirino Avenue	10,600 (100)	8,900 (84)	9,100 (86)
South Super Highway	18,100 (100)	19,900 (106)	18,600 (103)
Taft Avenue ^{2/}	39,100 (100)	45,700 (116)	31,200 (80)
Mabini/Harrison ^{2/}	9,000 (100)	9,400 (104)	6,800 (76)
Roxas Blvd.	1,300 (100)	0 (0)	10,000 (769)
Buendia/Ayala	14,700 (100)	10,000 (68)	7,800 (53)
J.P. Rizal	9,700 (100)	11,000 (113)	7,700 (79)
Shaw Blvd.	12,000 (100)	15,900 (133)	10,500 (88)
Ortigas Avenue	9,100 (100)	6,300 (69)	18,700 (205)
Aurora Blvd. (Inside EDSA)	12,600 (100)	10,800 (86)	12,500 (99)
Aurora Blvd. (Outside EDSA)	11,400 (100)	11,000 (96)	8,900 (78)
R. Magsaysay	24,800 (100)	20,300 (82)	23,200 (93)
E. Rodriguez	11,500 (100)	10,400 (90)	17,000 (148)
Quezon Avenue	38,200 (100)	44,600 (117)	34,800 (91)
D.M. Marcos Avenue	8,700 (100)	8,600 (99)	7,200 (83)
Quirino Highway	10,900 (100)	14,300 (131)	13,800 (127)
North Diversion Road	7,900 (100)	3,300 (42)	3,200 (41)
McArthur Highway	21,600 (100)	24,400 (113)	25,400 (118)
A. Bonifacio	10,600 (100)	13,800 (130)	18,800 (177)
Rizal Avenue	18,700 (100)	16,300 (87)	11,100 (59)
J.A. Santos Avenue	9,100 (100)	4,100 (45)	4,400 (48)
J. Luna Avenue	7,100 (100)	14,300 (210)	17,300 (244)
EDSA	42,600 (100)	37,700 (88)	57,300 (135)
P. Quirino	1,000 (100)	3,900 (390)	23,900 (2,390)
C.M. Recto	16,000 (100)	15,900 (99)	12,300 (77)

Note: ^{1/}Representative section only

^{2/}Estimated based on the "before LRT construction" situation

Table 8.12
Estimated Volume/Capacity Ratio by Corridor
(Morning Peak Hour)

Corridor	Road Capacity (pcu's/hr., two-way)	Actual Flow		Demand Flow	
		Vol./Cap. Ratio	Section where the ratio exceeds 1.0	Vol./Cap. Ratio	Section where the ratio exceeds 1.0
1. Roxas Blvd.	5,400 - 7,200	0.1 - 0.9		0.1 - 0.2	
2. Quirino Avenue	2,100 - 2,900	0.7 - 1.2	MIA Rd. - Kabisnasan	0.7 - 1.2	MIA Rd. - Kabisnasan
3. Taft Avenue	3,600 - 7,200	0.9 - 1.0		0.8 - 2.2	Ayala Blvd. - EDSA
4. South Super Highway	5,400	0.2 - 1.0		0.2 - 0.8	
5. Buendia/Ayala Ave.	3,600 - 7,200	0.3 - 1.1	P. Tamo - Makati Ave.	0.0 - 1.2	SSH - P. Tamo
6. Shaw Blvd.	2,100 - 5,400	0.4 - 1.4	Kalantong - EDSA	0.4 - 2.1	Kalantong - Pasig Blvd.
7. Ortigas Avenue	2,900 - 3,600	0.2 - 0.7		0.2 - 0.5	
8. C.M. Recto	2,100 - 9,000	0.4 - 2.1	Boni Drive - J. Luna	0.3 - 2.0	Bonifacio Drive - J. Luna
9. R. Magsaysay	3,600 - 5,400	0.5 - 1.0		0.7 - 0.8	
10. Aurora Blvd. (Inside EDSA)	3,600 - 5,400	0.0 - 1.1	V. Mapa - Gilmore	0.4 - 0.9	
11. Aurora Blvd. (Outside EDSA)	2,100 - 3,600	0.1 - 2.2	EDSA - Gen. Romulo	0.3 - 1.5	Gen. Romulo - Katipunan
12. E. Rodriguez Ave.	2,900	0.9 - 1.0		0.3 - 1.2	Espana - T. Morato
13. Quezon Avenue	7,200	0.4 - 1.1	E. Rodriguez - Timog	0.4 - 1.3	A. Mendoza - E. Rodriguez
14. D. M. Marcos Avenue	5,400 - 7,200	0.1 - 0.9		0.1 - 0.9	
15. A. Bonifacio	2,100 - 5,400	0.5 - 1.1	Tayuman - Del Monte	0.6 - 1.8	Plaza Lawton - Tayuman
16. North Diversion Road	3,600	0.1		0.1	
17. Quirino Highway	2,100 - 3,600	0.4		0.4	
18. Rizal Avenue	2,900 - 5,400	0.7 - 1.0		0.6 - 1.1	Quezon Blvd. - C.M. Recto
19. J.A. Santos Avenue	5,400	0.3 - 0.8		0.2 - 0.9	
20. McArthur Highway	2,900 - 3,600	0.1 - 0.4		0.1	
21. J. Luna Avenue	1,400 - 2,900	0.3 - 1.1	Plaza Lawton - C.M. Recto	0.3 - 0.9	
22. P. Quirino Avenue	2,100 - 5,400	0.1 - 1.0		0.0 - 1.1	Andalucia - Espana
23. EDSA	2,900 - 9,000	0.3 - 0.6		0.2 - 0.6	
24. J.P. Rizal	2,100 - 2,900	0.3 - 1.4	P. Quirino - Palumpung	0.3 - 2.1	P. Quirino - EDSA
25. Mabini/Harrison	2,100 - 2,900	0.1 - 1.5	T.M. Kalaw - Buendia	0.6 - 1.5	T.M. Kalaw - Buendia

8.3.3 Directions for Further Rerouting

- This section summarizes the directions used for further rerouting of public transport, which will be the basis for further study and discussions. The following are preliminary findings which were made on the basis of the foregoing analysis:

Quirino Avenue/South Super Highway: Basically the demand in both corridors is distributed as it is supposed to be. However, considering the high load factor of intercity bus and the low service level of public transport, intercity bus and intracity jeepney should be developed along South Super Highway.

Taft Ave./Mabini Harrison/Roxas Blvd.: As a whole, these corridors have a large potential demand for both public and private transport. Taking the proposed banning of jeepneys along Taft Avenue into account, bus routes and LRT feeder jeepney routes must be developed to a considerable extent. It is also important to develop premium bus routes in order to absorb the high potential demand for private transport.

Buendia Ayala/J.P. Rizal: These corridors have a strong potential demand for private transport. Although Buendia/Ayala is considered to have an oversupply of public transport vehicles, it is important for J.P. Rizal to develop premium bus routes to rationalize the functional split between jeepney and bus for J.P. Rizal.

Shaw Blvd./Ortigas Ave./Aurora Blvd. (Inside EDSA): Among these corridors, it is Shaw Blvd. that shows a strong potential demand for both public and private transport. Considering its road capacity, it is desirable for Shaw Blvd. to develop premium bus routes to absorb private transport demand as well as to develop new bus routes to replace jeepneys. In relation to Ortigas Ave., the roles of intercity bus and intercity jeepney need to be clearly determined.

Aurora Blvd. (Outside EDSA): The functional split between jeepney and bus is not well attained for the intercity transport. The intercity bus should be promoted with due consideration of the traffic situation.

R. Magsaysay: This corridor is a combination of Shaw Blvd., Ortigas Ave. and Aurora Blvd.

E. Rodriguez/Quezon Avenue: E. Rodriguez shows a high potential demand for private transport while Quezon Ave., for public transport. Considering the traffic situation, bus routes need to be developed in these corridors. The premium bus is necessary to cope with the high private transport demand.

D.M. Marcos Ave./Quirino Highway/North Diversion Road/McArthur Highway: Among these corridors, Quirino Highway and McArthur Highway show a high potential demand for public transport. For North Diversion Road, the intercity transport also needs to be strengthened. On the other hand, intracity jeepney and bus are directly competing along D.M. Marcos Avenue. Although these corridors seem to be able to accommodate more traffic, bus service should be strengthened considering its interrelation with other corridors. Quirino Highway and McArthur Highway need a total upgrading of bus service, while D.M. Marcos Avenue needs shifting from long-distance intracity jeepney to intracity bus. North Diversion Road on the other hand, needs an improved intercity bus service on an adjustment with other public transport modes.

A. Bonifacio/Rizal Ave./J. Abad Santos/J. Luna: A. Bonifacio and J. Luna have a strong potential demand for public transport compared to other corridors. In addition, A. Bonifacio shows a strong potential demand for private transport. Although intracity jeepney shares an overwhelming majority on all these corridors, the role of intracity bus, which is now negligible and unclear, should be strengthened considering the severe traffic situation. Presumably, the proposed banning of jeepneys on Rizal Avenue can trigger the promotion of this situation. For A. Bonifacio, the introduction of premium bus will be necessary in order to absorb the increasing private transport demand.

EDSA: Although the potential demand for public transport is still large, it is expected that a need will arise for some bus routes from this corridor to be transferred to radial streets, upon completion of the LRT. The receiver of these transferred routes should be Rizal Ave., A. Bonifacio, Quezon Ave., Nagtahan/P. Quirino and Taft Avenue. However, the combination of Rizal Avenue and Taft Avenue will not be allowed due to its possible competition with LRT.

P. Quirino: This is the most underutilized corridor in Metro Manila. An overall improvement of bus service is required for this corridor. However, in developing new routes, combination with other corridors must be taken into account.

C.M. Recto: No special rerouting scheme is required so far. However, due to the proposed limitation of intercity jeepneys on various corridors, the development of new intercity bus routes will become necessary.

- Based on the above discussions, rerouting guidelines were initially prepared by corridor, as shown in Table 8.13. Although this needs to be verified in the future, the following can be expected from the implementation of the guidelines.
 - a) No. of LRT passengers will further increase by approximately 10%.
 - b) No. of jeepney passengers will decrease by approximately 10%, while that of bus will increase by approximately 30%.
 - c) Average trip length of jeepney passengers will become shorter.
 - d) Total passenger-kms. and passenger-hours will be reduced slightly.
 - e) No. of transfers will not change largely.

Table 8.13
Further Rerouting Guidelines by Corridor

Corridor	Preliminary Rerouting Guideline	Other Corridors to be Linked
Quirino Avenue	– Transfer of some jeepney routes to South Super Highway	Roxas Blvd., Taft Ave. Buendia/Ayala, MIA Road
South Super Highway	– Development of jeepney feeder routes from Sucat and Alabang – Development of new routes of intercity bus – Transfer from Quirino Avenue of some jeepney routes	Taft Avenue/Quezon Blvd. EDSA, Buendia/Ayala
Taft Avenue	– Development of LRT-feeder jeepney Transfer from EDSA of some bus routes via A. Bonifacio/P. Quirino and/or Quezon Ave./P. Quirino – Transfer from Buendia/Ayala of some bus routes – Development of premium bus routes	Buendia/Ayala, Quezon Blvd., Rizal Avenue
Mabini/Harrison		Bonifacio Drive, South Super Highway
Roxas Blvd.	– Development of new routes of intercity and premium bus	Quirino Avenue
Buendia/Ayala	– Transfer of some bus routes to Taft Avenue	EDSA, Shaw, Ortigas, Aurora
J.P. Rizal	– Shortening of long distance jeepney routes Increase the no. of units of intracity bus routes – Development of new premium bus routes	Taft, P. Tamo, P. Quirino, Kalentong
Shaw Blvd.	– Limitation of intercity jeepney entrance up to Crossing – Development of new bus routes including those which connect Shaw Blvd. with Taft Ave. via Kalentong – Development of premium bus routes	R. Magsaysay, EDSA, Buendia/Ayala
Ortigas Avenue	– Limitation of intercity jeepney entrance up to EDSA (Crossing) – Increase the number of units of intercity bus	R. Magsaysay, EDSA
Aurora Blvd. (Inside EDSA)	(Subject to the rerouting of Aurora outside EDSA)	R. Magsaysay, EDSA Aurora Blvd. (Outside EDSA)
Aurora Blvd. (Outside EDSA)	– Increase the no. of units of intercity bus – Limitation of intercity jeepney entrance up to Cubao – Development of new intercity bus routes including those going to Taft Ave. via Nagtahan/P. Quirino	Aurora Blvd. (Inside EDSA), EDSA, Buendia/Ayala, E. Rodriguez, Quezon Ave.
R. Magsaysay	(Subject to the rerouting of Shaw, Ortigas and Aurora)	C.M. Recto, Aurora, Shaw, Ortigas
E. Rodriguez Ave.	– Development of new premium bus routes including those going to the direction of Tayuman	España/Quezon Blvd., Kamuning/Kamias, Aurora Blvd. (Outside EDSA) Mayon, Róces

Table 8.13 Cont'd.

Corridor	Preliminary Rerouting Guideline	Other Corridors to be Linked
Quezon Avenue	<ul style="list-style-type: none"> - Development of new intracity bus routes including those going to Taft Ave. via Nagtahan/P. Quirino 	España/Quezon Blvd., Roosevelt, D.M. Marcos Kamuning/Kamias, EDSA
D.M. Marcos	<ul style="list-style-type: none"> - Development of new intracity bus routes - Development of jeepney feeder routes from QMC and Fairview - Shortening of long distance jeepney routes 	Quezon Ave., EDSA
Quirino Highway	<ul style="list-style-type: none"> - Transfer from N. Diversion Rd. of some jeepney routes and some bus routes - Limitation of intercity jeepney entrance up to Balintawak - Development of new intercity bus routes 	A. Bonifacio/Dimasalang, EDSA/Samson Rd.
N. Diversion	<ul style="list-style-type: none"> - Transfer of some jeepney routes to Quirino Highway - Transfer of some bus routes to Quirino Highway - Increase the no. of units of intercity bus routes - Limitation of intercity jeepney entrance up to Balintawak 	A. Bonifacio/Dimasalang EDSA, Paso de Bras
McArthur Highway	<ul style="list-style-type: none"> - Limitation of intercity jeepney entrance up to Monumento - Development of new bus routes 	Rizal Ave. Ext /Rizal/ J.A. Santos, EDSA, Samson Rd.
A. Bonifacio Ave.	<ul style="list-style-type: none"> - Development of new bus routes including those going to Taft Ave. via Nagtahan/P. Quirino - Limitation of intercity jeepney entrance up to Balintawak - Shortening of long distance jeepney routes - Development of new premium bus routes 	Blumentritt/Rizal, Quirino Highway, Quezon Blvd./Taft North Diversion Rd.
Rizal Avenue	<ul style="list-style-type: none"> - Development of LRT feeder jeepney routes - Limitation of intercity jeepney entrance up to Monumento - Development of new bus routes including those bound for South Super Highway via Nagtahan/P. Quirino - Transfer of some jeepney routes to H. Lopez/ J. Luna 	Rizal Ave. Ext., McArthur Highway, Samson Rd., Blumentritt/A. Bonifacio/Quirino Highway
J. A. Santos Avenue	<ul style="list-style-type: none"> - Development of new intracity bus routes 	Rizal Avenue Ext /McArthur Highway, C.M. Recto, Taft, Tayuman, Blumentritt, Quirino Hwy.
J. Luna Ave.	<ul style="list-style-type: none"> - Development of new jeepney routes - Development of new intracity bus routes 	N. Bay Blvd., EDSA, Taft/Mabini/Roxas
EDSA	<ul style="list-style-type: none"> - Transfer of some intracity bus routes to other corridors 	Buendia/Ayala, South Super Hwy., Shaw, Ortigas, Aurora, D.M. Marcos, Boni, Quirino Highway, J.P. Rizal
P. Quirino Ave.	<ul style="list-style-type: none"> - Development of new bus routes 	Espana, J.P. Rizal, C.M. Recto, R. Magsaysay, South Super Highway, Taft, United Nations
C.M. Recto	<ul style="list-style-type: none"> - Development of new intercity bus routes 	R. Magsaysay, Quezon Blvd. J. Luna

Chapter 9.
RELATED PUBLIC TRANSPORTATION
FACILITY PLANNING

CHAPTER 9 RELATED PUBLIC TRANSPORTATION FACILITY PLANNING

9.1 INTRODUCTION

- In order for the rerouting plans (as described in Chapter 8) to be effectively implemented, it is necessary to pinpoint possible problem areas and to prepare plans on the improvement of relevant facilities. The areas to be looked into and approaches to be taken in this study are given as follows:
 - a) Identification of congested road sections; this intends to calculate volume/capacity ratio by section for both cases of "before" and "after" rerouting, and to determine problem sections where the volume/capacity ratio is expected to be high even after the rerouting.
 - b) Assessment of road surface condition by section; which was surveyed mainly by reconnaissance on road surface condition and other related road facilities.
 - c) Identification of problem intersections; which was done by evaluating the capacity of intersections based on the estimated traffic volume for the "after rerouting" situation.

9.2 IDENTIFICATION OF PROBLEM AREAS

9.2.1 Identification of Congested Road Sections

- For all roads related to the rerouting plan along LRT, capacity was calculated based on the methodology as explained briefly in Appendix 9.1. Traffic volume data were prepared for each section as shown in Appendices 9.2, 9.3 and 9.4 according to the following considerations:
 - "Before Rerouting" Case: Considering the possible deviation of vehicles during the LRT construction, when the JUMSUT surveys were conducted, the traffic data from MMTEAM were used.
 - "After Rerouting" Case: Jeepney and bus traffic volume was estimated for each section based on the LRT impact analysis as described in Chapter 8. Likewise, for estimating private traffic volume, the result of traffic assignment as mentioned in Chapter 8 was used as a calculation basis.
- Figure 9.1 and Table 9.1 show road sections where congestion is anticipated after the proposed rerouting. The volume/capacity ratio exceed 1.1 for all these sections. It is to be noted that the anticipated congestion on the major roads such as Rizal Avenue and Taft Avenue is caused by private vehicles which have shifted from other roads to fill the gap created by the decrease of public transport vehicles.

9.2.2 Assessment of Road Surface Condition

- The deterioration of road surfaces cause not only discomfort and inconvenience to passengers but also economic loss to the country. This is due to the slowdown of vehicle running speed and the resultant traffic congestion. In order to classify road sections by surface condition, a reconnaissance survey was conducted. The result is shown in Figure 9.2., where road surface condition is classified as follows:
 - a) Good: No deterioration of pavement and good drainage.
 - b) Fair: Minor cracks and other defects which, however, do not hinder traffic. No flood is seen.

- c) Poor: Cracks spread and potholes exist which affect smooth traffic. Roads become flooded when it rains so hard.
- d) Very Poor: Hard or impossible to pass without significant slowdown due to major cracks, subsidence or other defects. Frequent flooding when it rains.
- Table 9.2 shows the road sections where surface condition is “poor” or “very poor”. These need to be improved or rehabilitated as soon as possible.
- In addition, the LRT corridor (Taft Avenue and Rizal Avenue) was excluded from this analysis, considering the restoration only of the roads which deteriorated due to the LRT construction itself.

9.2.3 Identification of Problem Intersections

- For the major intersections and other intersections where traffic volume is expected to increase, traffic signal, traffic volume (before and after the rerouting) and existing improvement plan (mainly of MMTEAM) were surveyed and compiled as presented in Appendix 9.5.
- After analyzing the relationship between estimated traffic volume and intersection capacity for these 51 intersections, 10 intersections were identified where traffic signals must be installed. Figure 9.3 shows the location of these 10 intersections. The result of analysis, which was done according to “A Guide to Traffic Engineering and Management Techniques” (MMTEAM), is shown in Appendix 9.6 for the 10 intersections.

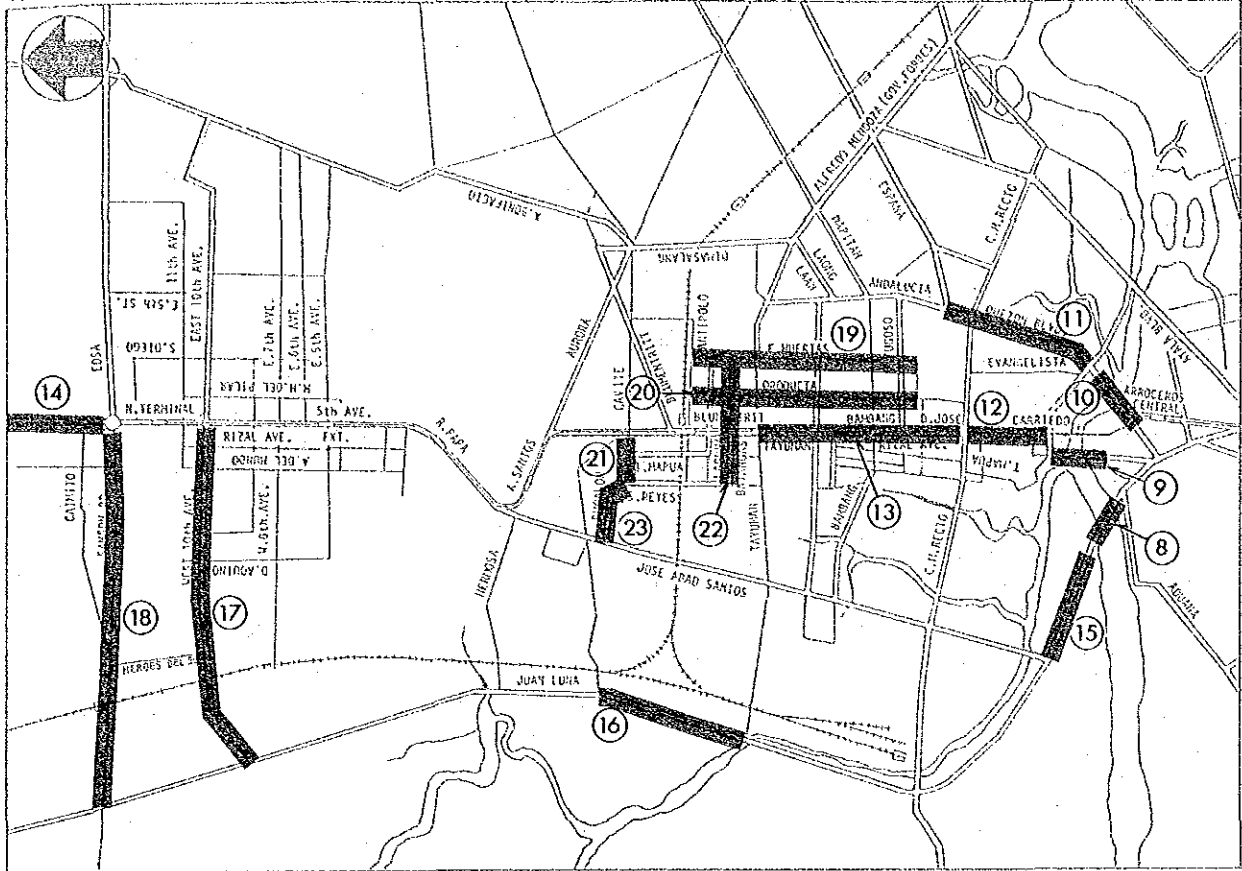
Table 9.1
Congested Road Sections after Rerouting

Ref. No.	Road Section		Length (kms.)	Width (m.)		Before Rerouting			After Rerouting		
	Road Name	Name		Carriageway Road (No. of Lanes)	Traffic Volume	P.T./Total Vol./Cap. Ratio(%)	Ratio	Traffic Volume	P.T./Total Vol./Cap. Ratio(%)	Ratio	
1.	Quirino Avenue	Redemptorist - MIA Road (one-way)	1.6	20.8	14.0 (4)	1,349 (2,136)	72.4	0.95	2,158 (3,823)	64.2	1.33
2.	Quirino Avenue	MIA Road - Real	7.4	14.0	14.0 (4)	2,820 (3,476)	34.3	1.45	2,459 (3,081)	60.0	1.28
3.	Taft Avenue	P. Quirino - Vito Cruz	0.9	20.0	13.8 (4)	2,773 (3,822)	55.0	1.73	3,625 (3,865)	4.4	1.75
4.	Buendia	Taft Avenue - SSH	0.6	17.9	14.4 (4)	3,262 (3,847)	19.2	1.4	3,761 (4,356)	15.2	1.60
5.	F. B. Harrison	Libertad - Buendia	0.7	15.1	10.1 (2)	1,371 (1,918)	74.8	1.84	1,771 (2,416)	72.8	2.32
6.	Vito Cruz	Roxas Blvd. - Taft Avenue	0.8	15.7	10.0 (2)	1,094 (1,422)	44.1	1.37	1,009 (1,327)	40.8	1.28
7.	San Andres	Roxas Blvd. - Taft Avenue (One-way)	0.9	14.7	9.1 (2)	804 (852)	4.0	0.59	1,652 (2,217)	68.4	1.54
8.	Jones Bridge		0.1	-	(4)	3,586 (4,088)	25.8	1.53	3,525 (3,847)	16.7	1.28
9.	McArthur Bridge		0.1	-	(4)	3,645 (4,707)	52.4	1.32	5,261 (5,934)	24.7	1.66
10.	Quezon Bridge		0.1	-	(4)	2,425 (4,081)	59.4	1.57	3,888 (5,412)	67.3	1.54
11.	Quezon Blvd.	Quezon Bridge - Lerma	0.9	23.2	23.2 (6)	4,773 (6,359)	45.7	1.45	4,266 (5,430)	39.3	1.23
12.	Rizal Avenue	McArthur Br. - C.M. Recto	0.4	19.0	15.0 (4)	2,605 (3,787)	84.6	1.65	3,272 (3,680)	23.6	1.60
13.	Rizal Avenue	C.M. Recto - Tayuman	1.8	19.0	15.0 (4)	2,488 (3,605)	80.6	1.44	3,293 (3,908)	27.6	1.63
14.	McArthur Hwy.	EDSA - Malvar Bridge	2.9	19.4	12.4 (4)	2,384 (4,052)	62.6	1.91	2,542 (3,332)	57.9	1.39
15.	J. Luna	Jones Bridge - Binondo	0.6	16.8	12.0 (2)	1,998 (2,302)	28.9	1.60	2,173 (2,440)	22.0	1.69
16.	J. Luna	Tayuman - Hermosa	1.1	20.4	16.2 (4)	2,522 (3,315)	53.9	1.35	2,396 (3,110)	51.0	1.27
17.	10th Avenue	Rizal Avenue Ext. - J. Luna	1.1	13.0	11.0 (2)	979 (1,289)	49.1	1.24	941 (1,252)	51.1	1.20
18.	Samson Road	Rizal Ave. Ext. - Sangandaan	1.3	18.5	15.0 (4)	1,592 (2,507)	67.7	1.11	1,628 (2,542)	66.2	1.12
19.	F. Huertas	Antipolo - Lope de Vega	1.0	15.3	12.0 (2)	730 (913)	50.0	0.63	1,170 (1,655)	82.9	1.15
20.	Oroquieta	Antipolo - C.M. Recto	1.0	16.3	12.0 (2)	756 (945)	50.0	0.66	1,170 (1,655)	82.9	1.15
21.	Cavite	Rizal Ave. - J.A. Santos	0.4	12.0	12.0 (2)	756 (945)	0	0.91	1,260 (1,790)	84.1	1.72
22.	Batangas	Ipil - F. Huertas (one-way)	0.3	16.5	12.0 (2)	473 (526)	26.8	0.51	1,192 (1,710)	83.2	1.19
23.	Bugallon	Cavite - J.A. Santos	0.3	15.0	11.0 (2)	765 (945)	0	0.91		84.1	1.72

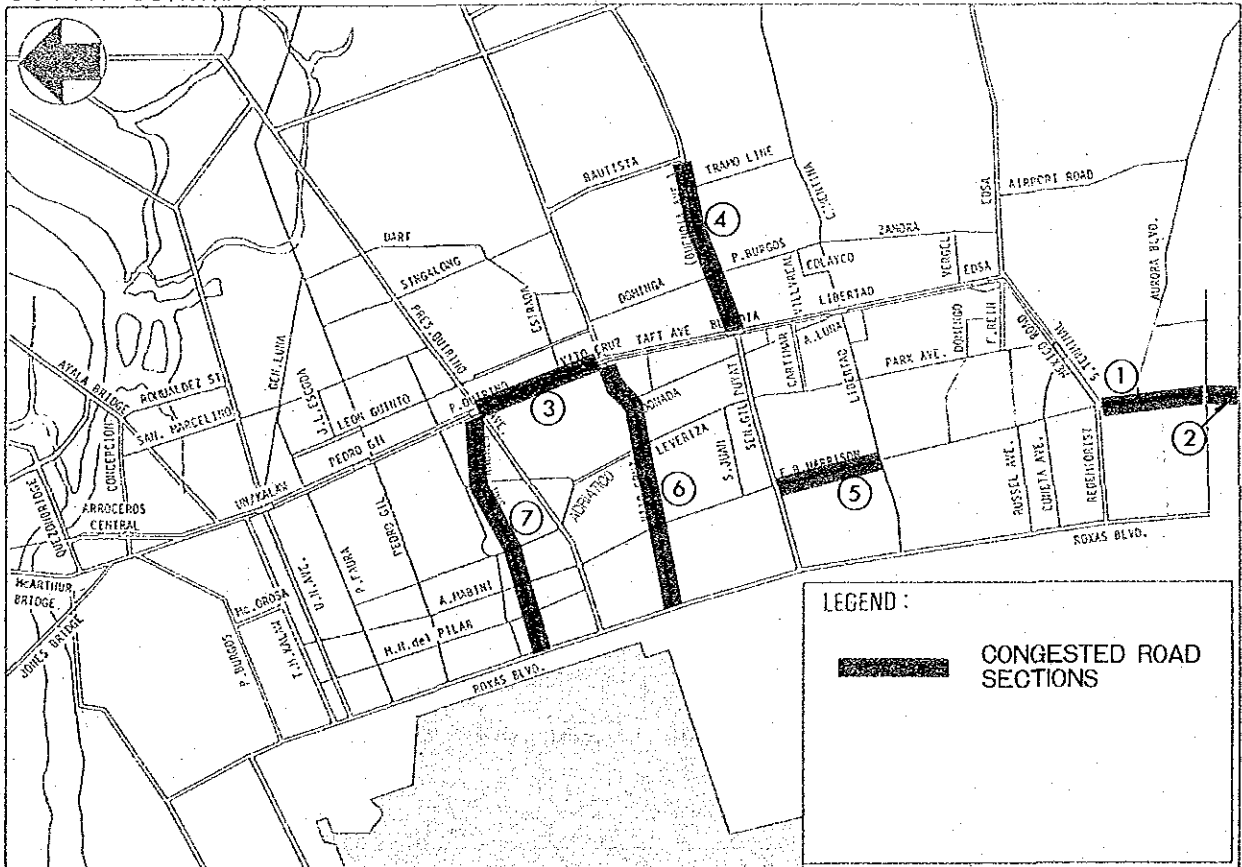
Note: Figures in parentheses under the traffic volume column represents P.C.U.

FIGURE 9.1 CONGESTED ROAD SECTIONS AFTER REROUTING

NORTH CORRIDOR



SOUTH CORRIDOR



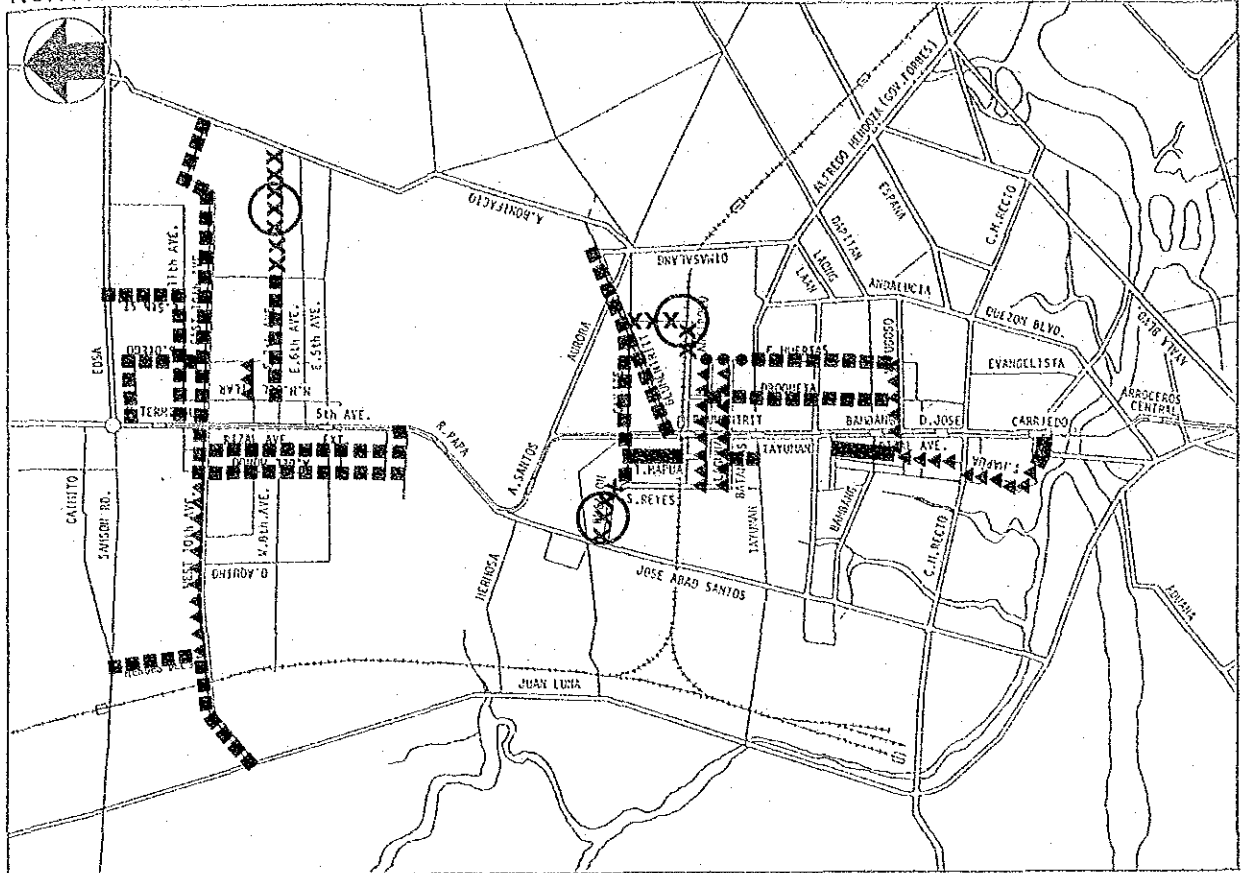
NOTE: NO. CORRESPONDS TO THAT OF TABLE 9.1

Table 9.2
Road Sections of Poor Surface Condition

Road Name	Carriageway Width (m.)	Section to be Improved			
		Name	Length (meters)	Pavement Type	Current Status
Quirino Avenue	14.0	Airport Rd. – Mexico Rd.	550	concrete	Cracks spread, poor surface
Redemptorist	14.0	Roxas Blvd. – Mexico Rd.	350	asphalt	Cracks spread, poor surface
Mexico Road	13.0	Quirino Avenue – EDSA	400	concrete	Nearly impassable and constantly flooded due to the construction work
A. Luna	7.3	Cartimar – Libertad	250	asphalt	Poor surface
F. B. Harrison	10.1	Ortigas – Mexico Rd.	250	asphalt	Poor surface, deficiency of drainage
F. B. Harrison	10.1	Vito Cruz – Estrella	250	concrete	Extremely poor surface, deficiency of drainage
Dominga	6.4	Southward 200 m. from Vito Cruz	200	asphalt	Extremely poor surface
Leveriza	5.0	Pres. Quirino – Jose Rizal Memorial Stadium	300	asphalt	Extremely poor surface
P. Faura	11.0	Florida – Taft Avenue	200	asphalt	Poor surface, deficiency of drainage
T. Mapua	10.0	Lope de Vega – C.M. Recto	400	asphalt	Cracks spread, poor surface
T. Mapua	7.0	C.M. Recto – Ongpin	300	asphalt	Cracks spread, poor surface
Batangas	12.0	S. Reyes – F. Huertas	370	asphalt	Cracks spread, poor surface
Laguna	12.0	S. Reyes – F. Huertas	370	asphalt	Cracks spread, poor surface
Antipolo	9.0	F. Huertas – L. Rivera	150	asphalt	Extremely poor surface, deficiency of drainage
L. Rivera	8.0	Cavite – Antipolo	200	asphalt	Cracks spread, poor surface
Bugallon	11.0	J.A. Santos – Cavite	300	asphalt	Extremely poor surface
6th Avenue	6.0	Ma. Clara – A. Bonifacio	850	concrete	Extremely poor surface however, it seems road improvement work is ongoing
7th Avenue	7.0	M.H. del Pilar – 3rd Street	250	concrete	Cracks spread, poor surface
10th Avenue	12.0	F. Sevilla – Heroes del 96	500	asphalt	Extremely poor surface however, it seems road improvement work is ongoing

FIGURE 9.2 SURFACE CONDITION OF SIDE STREETS ALONG LRT

NORTH CORRIDOR



SOUTH CORRIDOR

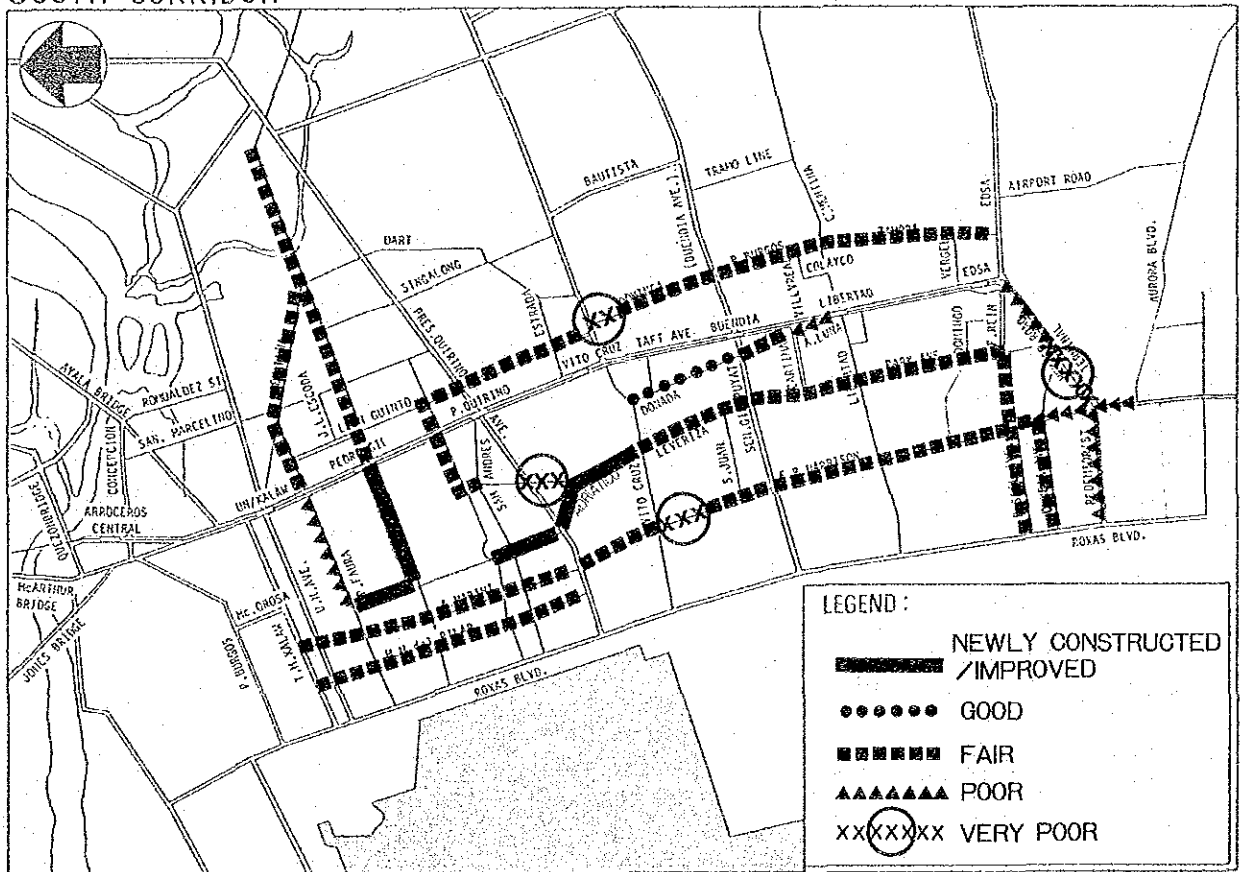
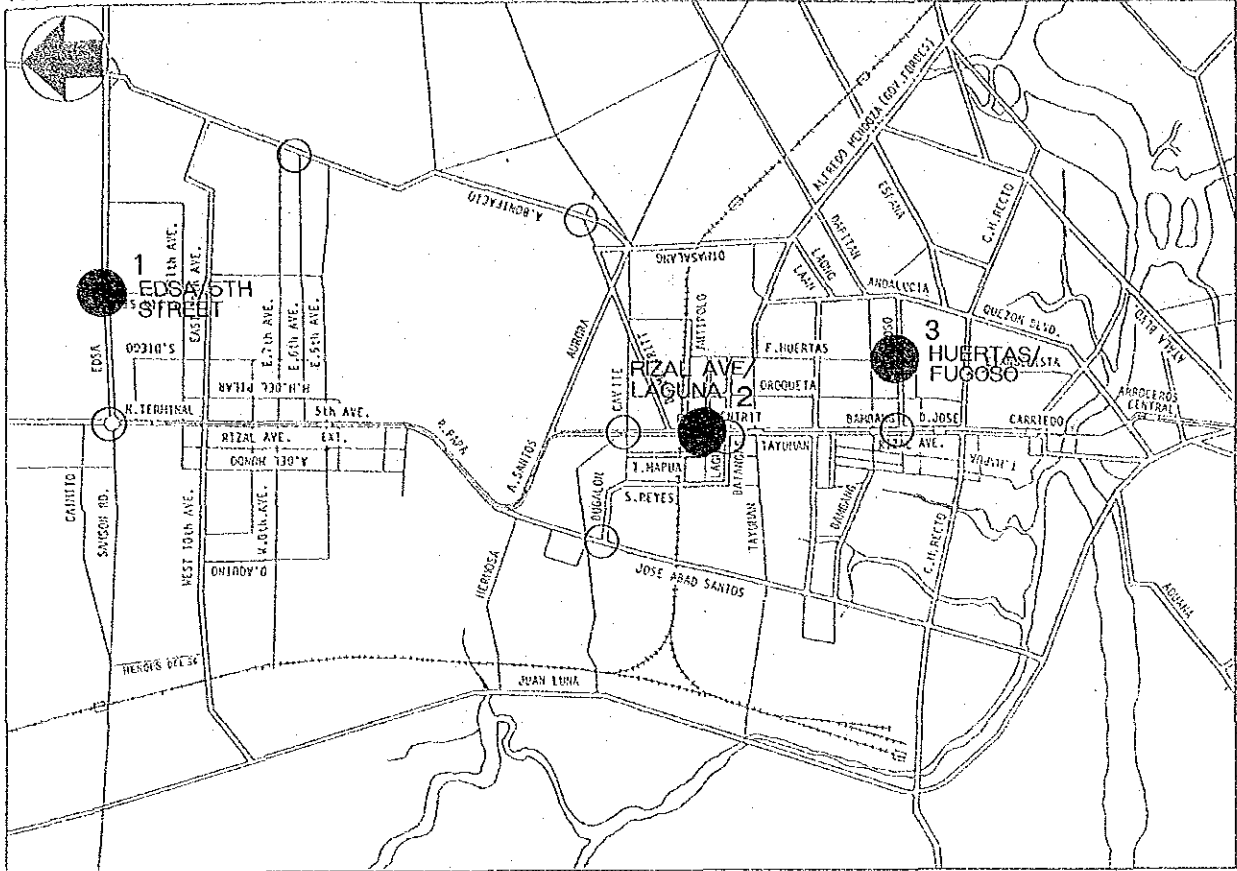
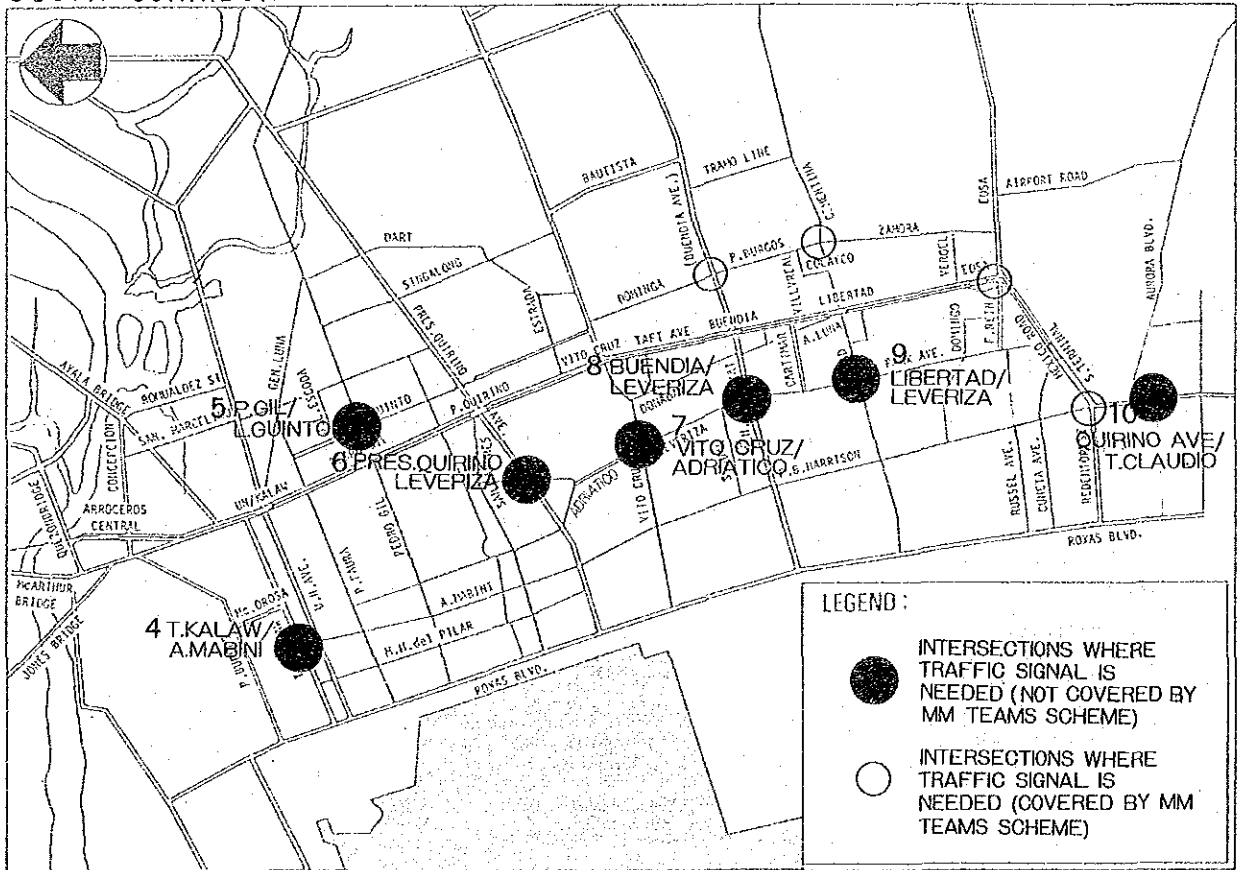


FIGURE 9.3 LOCATION OF INTERSECTIONS WHERE TRAFFIC SIGNAL IS NEEDED

NORTH CORRIDOR



SOUTH CORRIDOR



LEGEND:

- INTERSECTIONS WHERE TRAFFIC SIGNAL IS NEEDED (NOT COVERED BY MM TEAMS SCHEME)
- INTERSECTIONS WHERE TRAFFIC SIGNAL IS NEEDED (COVERED BY MM TEAMS SCHEME)

9.3 Proposed Countermeasures

- Based on the previous discussion, the problems anticipated after the rerouting can be classified into the following four (4) categories:

- Type I : congestions in road links
- Type II : congestions at intersections
- Type III : poor road surface condition
- Type IV : reduction of road capacity due to curbside parking, street vendors, etc.

- For these problems, various countermeasures can be considered depending upon the nature of each individual problem or combination hereof. Types of countermeasures can be shown as follows:

- Type A: Traffic control/management including one-way, parking control and more efficient use of available road spaces in road links
- Type B: Increase in traffic capacities at intersections by installing traffic signals
- Type C: Maintenance/rehabilitation of deteriorated road surface
- Type D: Restriction of private cars

Although they are not the aims of the study, the following countermeasures would have to be also considered from medium/long-term points of view:

- Type E: Construction/upgrading of new/existing roads and grade separated intersections
- Type F: Promotion of diversion from jeepneys to buses/LRT

- Figure 9.4 illustrates the summary of problems and relevant possible countermeasures. Table 9.3 summarizes the problems and recommended countermeasures by road link, while their locations are shown in Figure 9.5.

Figure 9.4
Summary of Problems and Possible Countermeasures

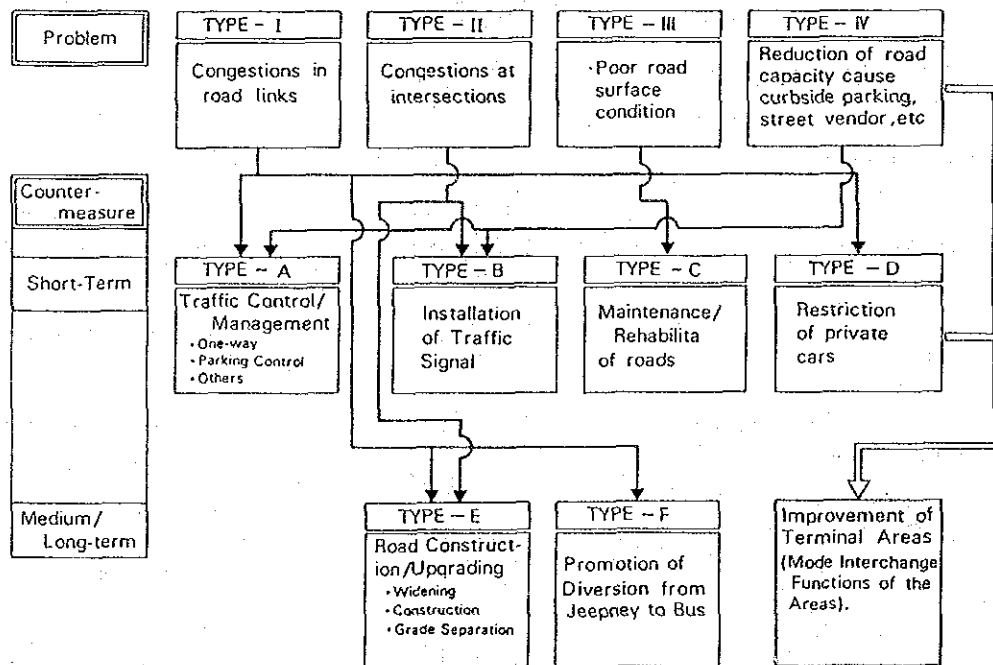


Table 9.3
Problem Areas to be Improved
along LRT Corridor

Location of Problem Road Section/Intersection	Type of Problems	Recommended Countermeasures
1. Quirino Ave. (Redemptorist – MIA Road)	– Poor road surface – Traffic congestion	– Diversion of private cars to Roxas Boulevard – Control of curbside parking and street vendors – Rehabilitation of road
2. Quirino Ave. (MIA Rd. – Real)	– Poor road surface – Lack of road capacity	– Road maintenance – (Proposed Manila-Cavite Coastal Road Project)
3. T. Claudio/Quirino Ave.	– Traffic congestion	– Installment of traffic signal
4. Redemptorist (Roxas Blvd. – Mexico Road)	– Poor road surface	– Improvement of pavement
5. Mexico Rd. (Quirino Ave. – EDSA)	– Poor road surface and flood	– Rehabilitation of drainage system
6. A. Luna (Cartimar – Libertad)	– Poor road surface	– Improvement of pavement
7. Libertad/Leveriza	– Traffic congestion anticipated	– Installment of traffic signal
8. Buendia (Taft Ave. – SSH)	– Lack of road capacity	– (Widening of road)
9. Buendia/Leveriza	– Traffic congestion anticipated	– Installment of traffic signal
10. Taft Ave. (P. Quirino – V. Cruz)	– Traffic congestion anticipated	– Parking control
11. Vito Cruz/Adriatico	– Traffic congestion anticipated	– Installment of traffic signal
13. Vito Cruz (Roxas Blvd. – Taft Avenue)	– Traffic congestion anticipated	– Parking control
13. Pres. Quirino/Leveriza	– Traffic congestion anticipated	– Installment of traffic signal
14. Leveriza (P. Quirino – J.P. Rizal M.A.)	– Poor road surface	– Improvement of pavement
15. Dominga (200 m. Southward from V. Cruz)	– Poor road surface	– Improvement of pavement
16. F. B. Harrison (Libertad – Buendia)	– Traffic congestion anticipated	– Diversion of private cars to Roxas Blvd. – Parking control
17. F. B. Harrison (Ortigas – Mexico Road)	– Poor road surface and flood	– Improvement of pavement – Rehabilitation of drainage system

Table 9.3 Cont'd.

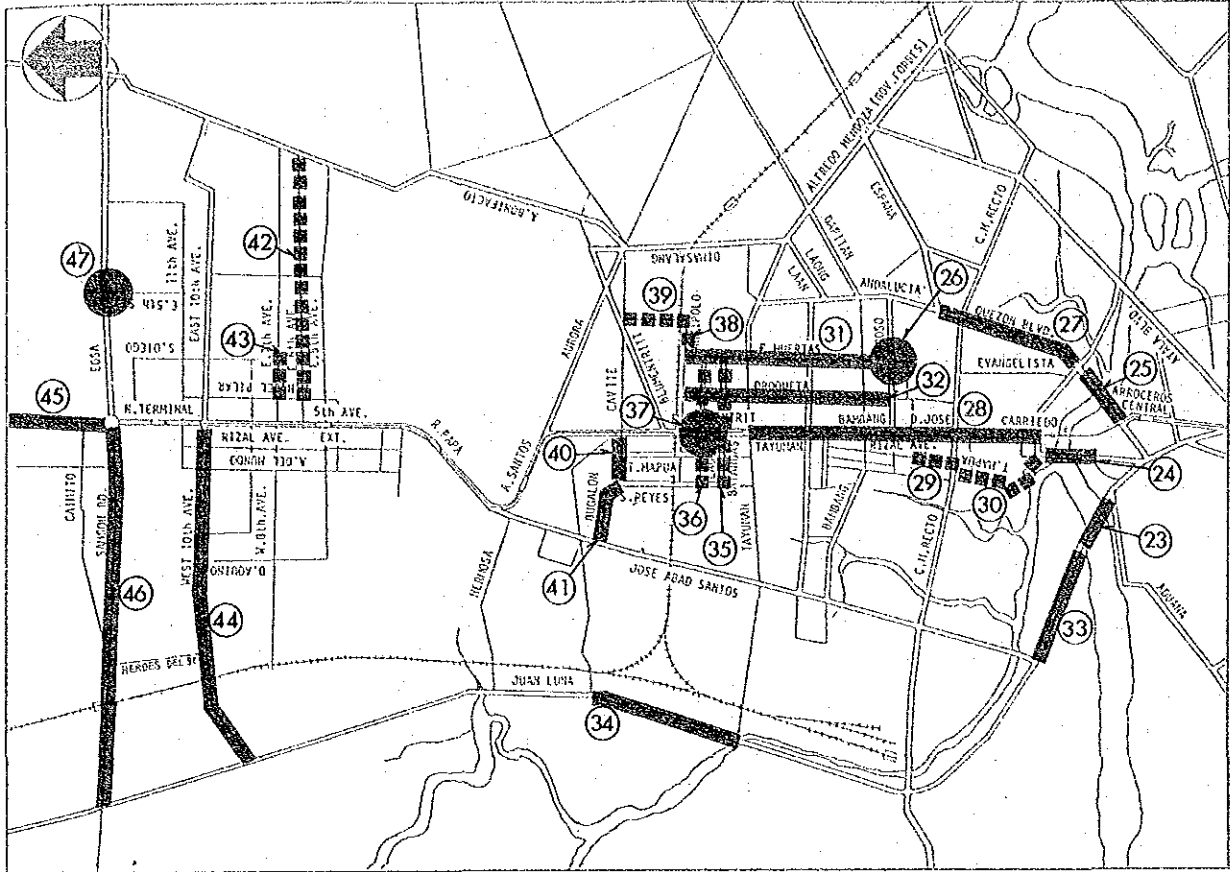
Location of Problem Road Section/Inter- section	Type of Problems	Recommended Countermeasures
18. F. B. Harrison (Vito Cruz – Estrella)	– Poor road surface, and flood	– Improvement of road pavement – Rehabilitation of drainage system
19. San Andres (Roxas Blvd. – Taft Avenue)	– Traffic congestion	– One-way control – Parking control
20. P. Gil/L. Guinto	– Traffic congestion	– Installment of traffic signal
21. T.M. Kalaw/A. Mabini	– Traffic congestion	– Installment of traffic signal
22. P. Faura (Florida – Taft Ave.)	– Poor road surface and flood	– Improvement of road pavement – Rehabilitation of drainage system
23. Jones Bridge	– Lack of capacity	– (Diversion of private cars to Del Pan Bridge after completion of missing link of C.M. Recto related with R-10 project)
24. McArthur Bridge	– Lack of capacity	– (Diversion of private cars to Del Pan Bridge after completion of missing link of C.M. Recto related with R-10 project)
25. Quezon Bridge	– Lack of capacity	– Diversion of private cars to Nagtahan Bridge
26. F. Huertas/V. Fugoso	– Traffic congestion anticipated	– Installment of traffic signal
27. Quezon Blvd. (Quezon Bridge – Lerma)	– Traffic congestion anticipated	– Control of curbside parking, street vendors and waiting passengers
28. Rizal Ave. (McArthur Bridge – Tayuman)	– Traffic congestion	– Diversion of private cars to J. A. Santos – Parking control
29. T. Mapua (Lope de Vega – C.M. Recto)	– Poor road surface	– Improvement of pavement
30. T. Mapua (C.M. Recto – Ongpin)	– Poor road surface – Traffic congestion anticipated	– Improvement of pavement – One-way control – Parking control
31. F. Huertas (Antipolo – Lope de Vega)	– Traffic congestion anticipated – Poor road surface	– One-way with three lanes – Improvement of pavement – Parking control
32. Oroquieta (Antipolo – Lope de Vega)	– Traffic congestion anticipated – Poor road surface	– One-way with three lanes – Improvement of pavement – Parking control

Table 9.3 Cont'd.

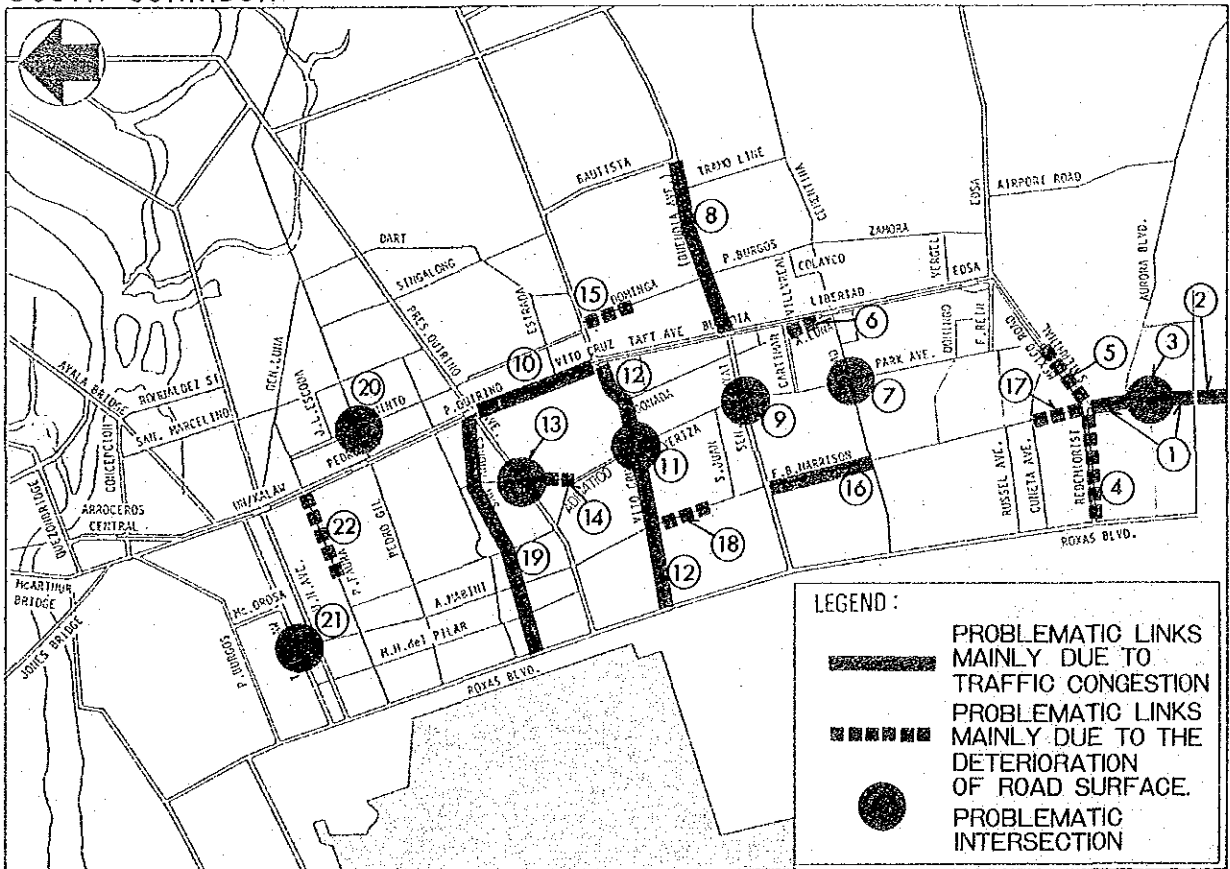
Location of Problem Road Section/Inter- section	Type of Problems	Recommended Countermeasures
33. J. Luna (Jones Bridge – Binondo)	– Traffic congestion	– (Diversion to R-10 after completion) – Parking control
34. J. Luna (Tayuman – Hermosa)	– Traffic congestion	– (Diversion to R-10 after completion)
35. Batangas (S. Reyes – F. Huertas)	– Poor road surface	– Improvement of pavement
36. Laguna (S. Reyes – F. Huertas)	– Traffic congestion anticipated – Poor road surface	– One-way with three lanes – Improvement of pavement – Parking control
37. Rizal Avenue/Laguna	– Traffic congestion anticipated	– Installment of traffic signal
38. Antipolo (F. Huertas – L. Rivera)	– Poor road surface	– Improvement of pavement
39. L. Rivera (Cavite – Antipolo)	– Poor road surface	– Improvement of pavement
40. Cavite (Rizal Ave. – S. Reyes)	– Traffic congestion anticipated – Poor road surface	– Parking control – Improvement of pavement – Two-way with four lanes
41. T. Bugallon (Cavite – J.S. Santos)	– Traffic congestion anticipated – Poor road surface	– Parking control – Improvement of pavement – Two-way with four lanes
42. 6th Avenue (Ma. Clara – A. Bonifacio)	– Poor road surface and flood	– Improvement of pavement – Rehabilitation of drainage system
43. 7th Avenue (M.H. del Pilar – 3rd Street)	– Poor road surface	– Improvement of pavement
44. 10th Avenue (Rizal Avenue – J. Luna)	– Traffic congestion anticipated – Poor road surface	– Two-way with four lanes – Improvement of pavement
45. McArthur Hwy. (EDSA – Meycauayan)	– Traffic congestion	– Parking control
46. Samson Road (Rizal Ave. – Sangandaan)	– Lack of road capacity	– Banning of roadside parking – Extension of EDSA with six lanes
47. EDSA/5th Street	– Traffic congestion	– Installment of traffic signal

NORTH CORRIDOR




FIGURE 9.5 PROBLEM AREAS IDENTIFIED



SOUTH CORRIDOR



LEGEND :

-  PROBLEMATIC LINKS MAINLY DUE TO TRAFFIC CONGESTION
-  PROBLEMATIC LINKS MAINLY DUE TO THE DETERIORATION OF ROAD SURFACE.
-  PROBLEMATIC INTERSECTION

NOTE: NO. CORRESPONDS TO THAT OF TABLE 9.3

Chapter 10. IMPLEMENTATION PROGRAM

CHAPTER 10 IMPLEMENTATION PROGRAM

10.1 GENERAL

- Various plans worked out with particular regard to the rerouting along the LRT corridor include the following:
 - 1) Rerouting of bus and jeepney routes
 - 2) Physical improvement of the road surface where jeepneys are to be rerouted
 - 3) Installation of signals at intersections as required by predicted traffic flow/volume
 - 4) Enforcement of traffic control measures, particularly on one-way and curbside parking.
- Although the implications among the above activities are not complicated, the following points would have to be considered:
 - a) Various work needed in relation with the rerouting would have to be modified when the rerouting plan changes.
 - b) The recommended activities were worked out only from a short-term point of view. They would have to be carried out before or upon the implementation of the rerouting plan (or the opening of the LRT).
- Coordination with other relevant government agencies is very important. Since MOTC is not an implementing agency, the plan needs close coordination and cooperation with other government agencies for implementation of the following aspects:
 - a) Rerouting : BOT
 - b) Traffic Signal Installation : MMTEAM/MPWH
 - c) Road Maintenance/Rehabilitation : MPWH and Local Governments
 - d) Traffic Control/Management : TCC/MPWH
 - e) Control on On-Road Market and Street Vendors : MMC
 - f) Traffic Law Enforcement : INP

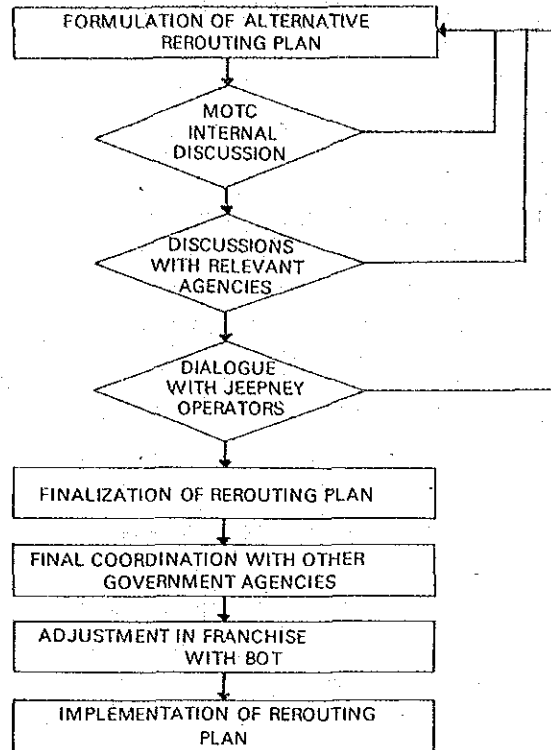
10.2 IMPLEMENTATION OF REROUTING PLAN

- Figure 10.1 shows the implementation process of the proposed plans. To date, the progress is at the stage of "dialogue with jeepney operators". It is to be noted that the proposed plan might be modified to a minor extent depending upon discussions with jeepney operators. However, the basic consensus has been reached already between MOTC and other relevant government agencies.
- In order to facilitate the various tasks at the different levels of implementation, the following tools have been prepared:
 - 1) Individual route list which includes:
 - a) Route name (before and after rerouting)
 - b) Route length (before and after rerouting)
 - c) No. of units running (before and after rerouting)
 - d) Hourly service frequency (before and after rerouting)
 - e) Load factor (before rerouting)
 - f) Relevant BOT Code (before rerouting)

The list clearly indicates the relationship between the routes before and after the rerouting.

- 2) Route location map which corresponds to the above individual route list.
- 3) List of possible (proposed) new jeepney routes in relation with the LRT operation.

Figure 10.1
Implementation Process of
the Proposed Rerouting Plan



- As explained in Chapter 8, it is anticipated that there will be a surplus of approximately 3,000 to 4,000 jeepney units when the LRT is opened for traffic. Since the jeepney operators are concerned more on profitability rather than on where they operate, the following points are to be taken into account:
 - 1) Control of colorum vehicles/colorum operation: A limited sample survey indicates that approximately 20 to 30% of the existing jeepneys are not properly registered. It is also identified that among 332 jeepney routes which relate more directly to the LRT (Type I, II, and III), 62 routes are not included in the BOT list. Approximately 1,200 units operate along these routes daily. (see Table 10.1)
 - 2) Diversion to new routes: The proposed new 31 routes (13 LRT feeders and 18 others) would be able to absorb approximately 700 units
 - 3) A natural increase of public transport demand: The demand which has been suppressed due to the traffic congestion along the LRT corridor would absorb a considerable number of units.

Table 10.1
Jeepney Routes and Units by Legal Status

		Route Type				Route Type				Total
		I	II	III	Sub-Total	IV	V	VI	Sub Total	
No. of Routes	Authorized	30	123	177	270	172	21	266	399	669
	Colorum	16	32	14	82	10	2	1	13	75
	TOTAL	46	155	131	332	182	23	207	412	744
No. of Units Running	Authorized	1,835	5,300	5,102	12,237	11,221	1,366	9,314	21,901	34,138
	Colorum	566	430	235	1,231	147	7	4	158	1,389
	TOTAL	2,401	5,730	5,337	13,468	11,368	1,373	9,318	22,059	35,527

10.3 IMPLEMENTATION OF ASSOCIATED IMPROVEMENT WORK

- The associated improvement work were grouped according to the degree of urgency as summarized in Table 10.2. Since these physical improvements require considerable time in financing and construction, necessary actions have to be started based on their level of priority. The high priority projects were determined considering the magnitude of current problems and the relative importance of road section/intersection in the public transport route configuration. Non-physical countermeasures are shown in Table 10.3
- Fourteen (14) traffic signals need to be installed as soon as possible. Although 6 signals are already covered by the existing scheme of the MMTEAM for 1985, it is important for these signals to be installed by the time LRT starts its operation. The remaining 8 signals should be installed as well, after discussions with MMTEAM.

Eight (8) traffic signals of the second priority also need to be installed. However, the implementation can be, though undesirable, deferred to a later stage considering the relatively small influence.

- In relation to road maintenance/rehabilitation, 6 road sections should be rehabilitated before the rerouting plan is implemented. Two (2) out of six (6) will be taken care of by MPWH and the remaining 4 will be done by the local government according to the instructions of MPWH.

The second priority 9 road sections should also be rehabilitated after the first priority road sections.

- As shown in Table 10.4, the total amount of cost required for the improvement of road surface and installation of signals is roughly estimated to be ₱15 million. This can be broken down into ₱6 million and ₱9 million for the first and second priority group projects, respectively.

In addition to the above, an additional cost has to be allocated mainly for traffic signs and road markings. This is in relation to the traffic control measures which includes one-way curbside parking and restriction of on-road markets and street vendors. The cost is estimated to be ₱420,000.

Table 10.4
Estimated Level of Costs Required
for Associated Improvements (₱000)

	First Priority	Second Priority	Total
1) Traffic Signal Installation:			
— MMTEAM Existing Scheme	1,524	1,270	2,794
— JUMSUT Proposal	2,032	762	2,794
Subtotal	3,556	2,032	5,588
2) Road Maintenance/Rehabilitation:			
— National Road	1,533	4,955	6,488
— Local Road	644	1,873	2,517
Subtotal	2,177	6,828	9,005
3) Traffic Control Measures:			
— One-way	—	—	210
— Control of curbside parking/street vendors	—	—	210
TOTAL [(1) + (2) + (3)]	—	—	15,013

Table 10.2
Associated Improvements Required
for Rerouting (Physical)

1. Road Sections where Maintenance/Rehabilitations are Required:

	National Roads	Other Roads
First Priority Group: Immediate Action Needed	1) Mexico Road 2) F.B. Harrison (V. Cruz-Estrella and Ortigas-Mexico Rd)	1) Leveriza (P. Quirino-J. Rizal M.S.) 2) Dominga (200m. southward from V. Cruz) 3) T. Bugallon (Cavite-J.A. Santos) 4) Laguna (S. Reyes-F. Huertas)
Second Priority Group: Detailed Investigation Needed Immediately	1) Quirino Ave. (Redemptorist-Real) 2) P. Faura (Florida-Taft) 3) Oroquieta (Antipolo-Lope de Vega)	1) Redemptorist 2) A. Luna (Cartimar-Libertad) 3) Batangas (S. Reyes-F. Huertas) 4) 6th Ave. (M. Clara-A. Bonifacio) 5) 7th Ave. (M.H. del Pilar-3rd St.) 6) 10th Ave. (Rizal Ave.-J. Luna)

2. Intersections where Traffic Signals are to be Installed:

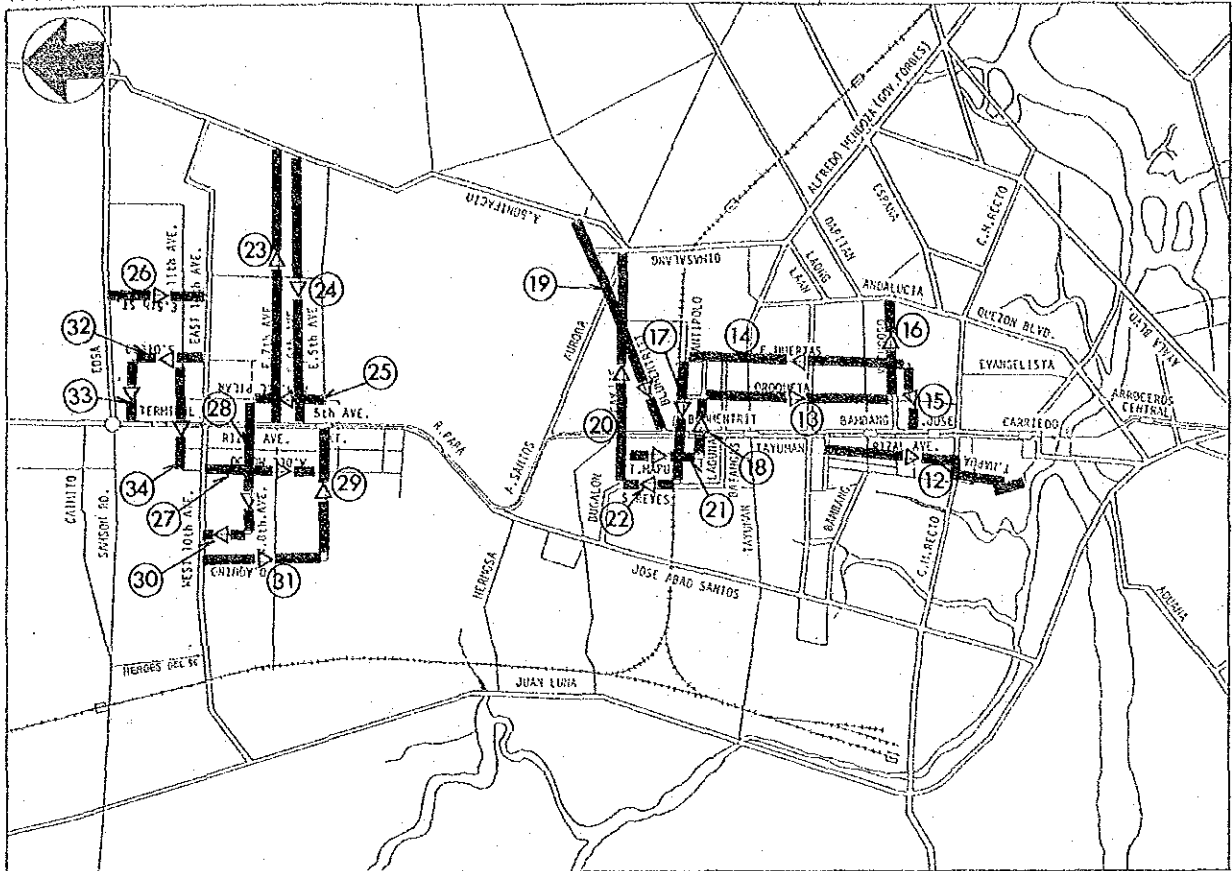
	Covered by MMTEAM Scheme	Additional JUMSUT Proposal
First Priority Group: Immediate Action Needed	1) J.A. Santos/T. Bugallon 2) Buendia/Dominga 3) Taft/EDSA 4) Mexico Rd./Redemptorist 5) Libertad/P. Burgos 6) Blumentritt/Dimasalang	1) EDSA/5th St. 2) Rizal Ave./Laguna 3) P. Gil/L. Guinto 4) P. Quirino/Leveriza 5) V. Cruz/Adriatico 6) Libertad/Leveriza 7) T. Claudio/Quirino Ave. 8) Buendia/Leveriza
Second Priority Group: Detailed Investigation Needed Immediately	1) EDSA/Rizal Ave. Ext. 2) A. Bonifacio/7th Ave. 3) Rizal Ave./Cavite 4) Rizal Ave./Batangas 5) Rizal Ave./V. Fugoso	1) T.M. Kalaw/Mabini 2) F. Huertas/V. Fugoso

Table 10.3
Associated Countermeasures Required
for Rerouting (Non-Physical)

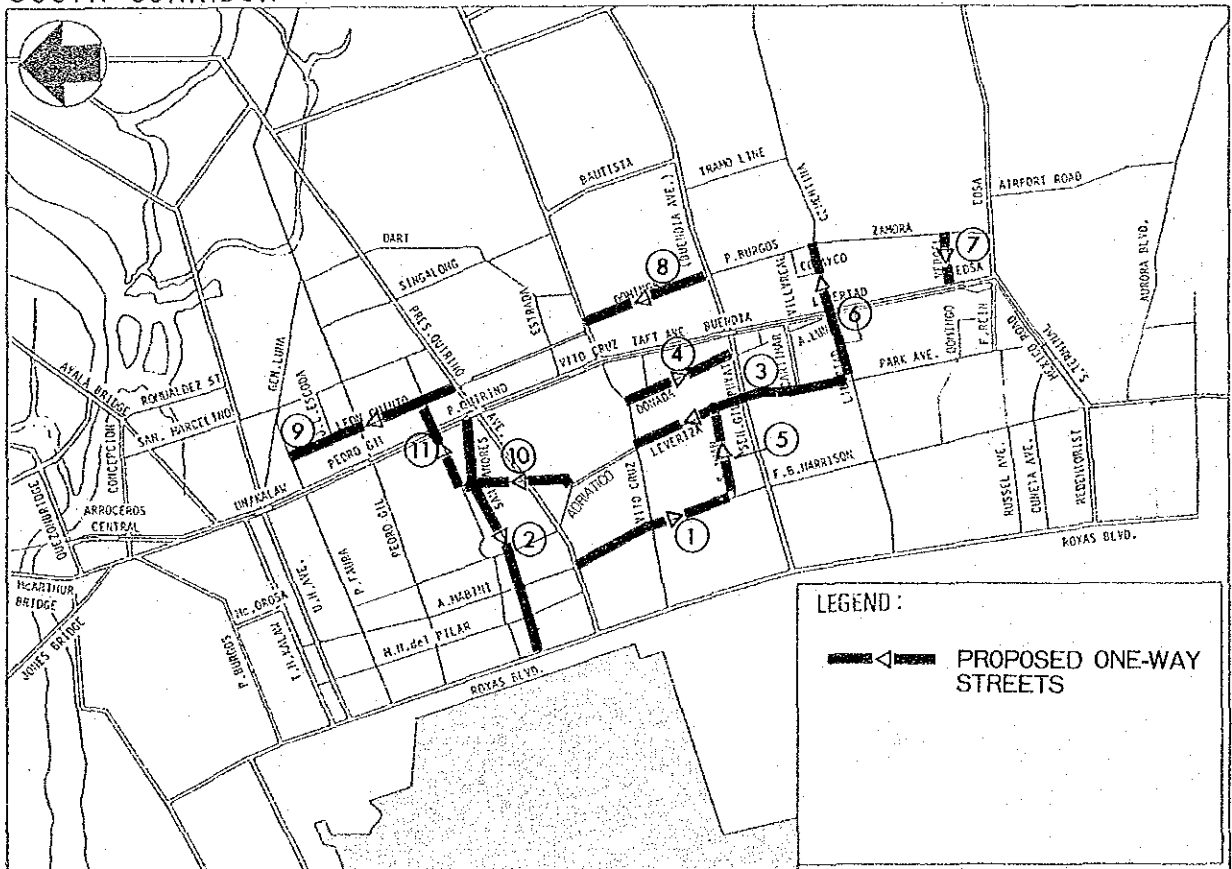
<u>1. Proposed One-way Road Sections :</u>	
1. F.B. Harrison (P. Quirino - San Juan)	18. Laguna (T. Mapua - Oroquieta)
2. San Andres (Roxas Blvd. - Taft)	19. Blumentritt (Rizal Avenue - A. Bonifacio)
3. Leveriza (Vito Cruz - Libertad)	20. Cavite (S. Reyes - Dimasalang)
4. Donada	21. T. Mapua (Cavite - Laguna)
5. San Juan (F.B. Harrison - Leveriza)	22. S. Reyes (Antipolo - Cavite)
6. Libertad (Leveriza - Zamora)	23. East 7th Avenue
7. Vergel	24. East 6th Avenue
8. Dominga	25. M.H. del Pilar (5th Avenue - 8th Avenue)
9. L. Guinto (P. Faura - P. Quirino)	26. East 5th Street (EDSA - 10th Avenue)
10. Leveriza (Adriatico - Remedios)	27. A. del Mundo (5th Avenue - 10th Avenue)
11. Remedios (Leveriza - L. Guinto)	28. 8th Avenue (M.H. del Pilar - F. Sevilla)
12. T. Mapua (Bambang - Ongpin)	29. West Avenue (D. Aquino - Rizal Ave. Ext.)
13. Oroquieta (Antipolo - V. Fugoso)	30. F. Sevilla (8th Avenue - 10th Avenue)
14. F. Huertas (Antipolo - Lope de Vega)	31. D. Aquino (5th Avenue - 10th Avenue)
15. Lope de Vega (Rizal Avenue - F. Huertas)	32. San Diego
16. V. Fugoso (Oroquieta - Quezon Blvd.)	33. Bustamante
17. Antipolo (L. Rivera - S. Reyes)	34. 11th Avenue (A. del Mundo - San Diego)
<u>2. Control of Curbside Parking :</u>	
1. Taft Avenue (P. Quirino - EDSA)	11. T. Mapua (Bambang - Ongpin)
2. F.B. Harrison (P. Quirino - Mexico Road)	12. San Andres (Taft - Mabini)
3. Rizal Avenue (Plaza Sta. Cruz - Aurora Avenue)	13. Donada (Vito Cruz - Buendia)
4. T. Bugallon (Cavite - J.A. Santos)	14. Leveriza (Vito Cruz - Libertad)
5. Cavite (T. Bugallon - Dimasalang)	15. Park Avenue (Libertad - F. Rein)
6. T. Mapua (Cavite - Laguna)	16. Zamora (EDSA - Libertad)
7. Laguna (S. Reyes - Oroquieta)	17. P. Burgos (Libertad - Buendia)
8. Antipolo (S. Reyes - L. Rivera)	18. Dominga (Buendia - Vito Cruz)
9. Bambang (Oroquieta - T. Mapua)	19. L. Guinto (Vito Cruz - P. Faura)
10. Lope de Vega (Rizal Avenue - F. Huertas)	
<u>3. Control of On-Road Market and Street Vendors :</u>	
20. Monumento	22. Libertad
21. Blumentritt	23. Baclaran


FIGURE 10.2 LOCATION OF PROPOSED ONE-WAY STREETS

NORTH CORRIDOR



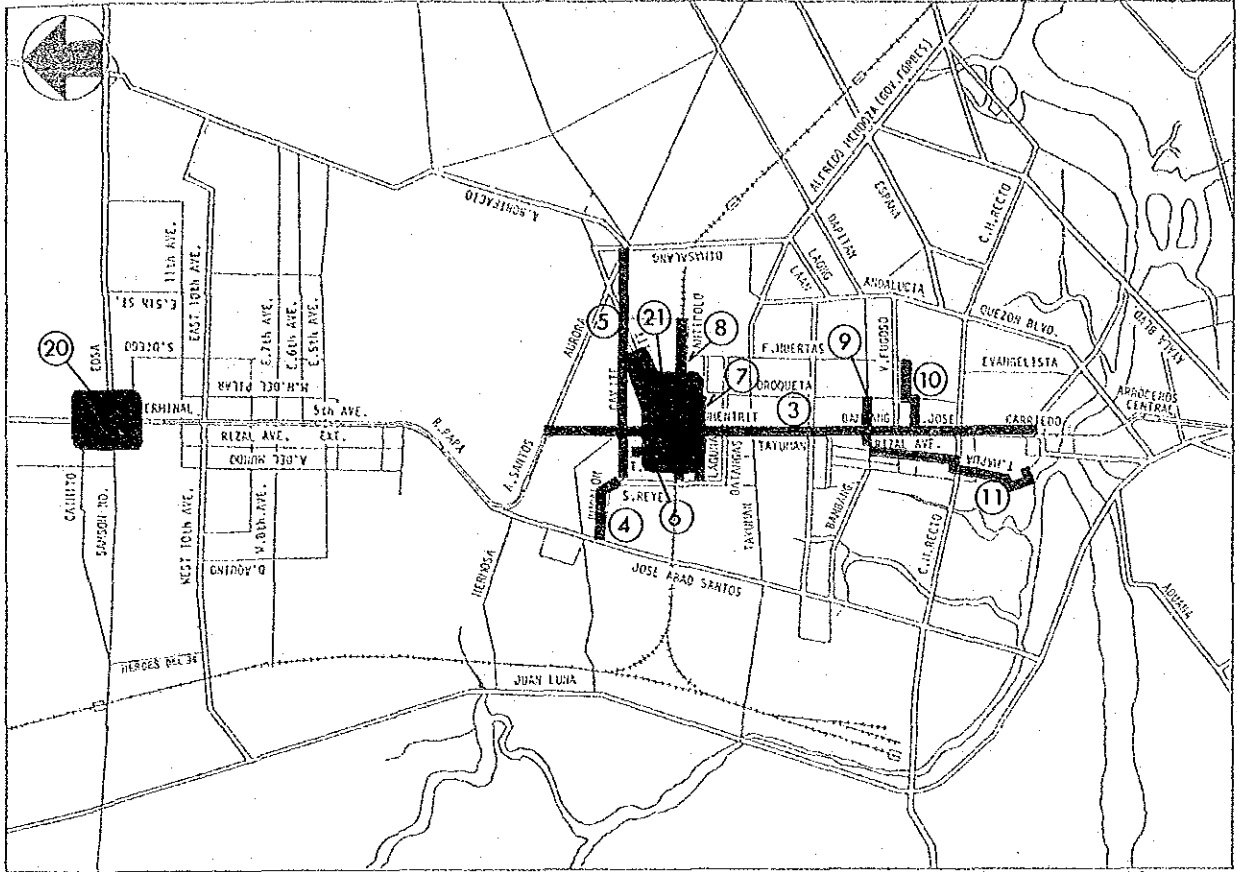
SOUTH CORRIDOR



LEGEND:
 PROPOSED ONE-WAY STREETS

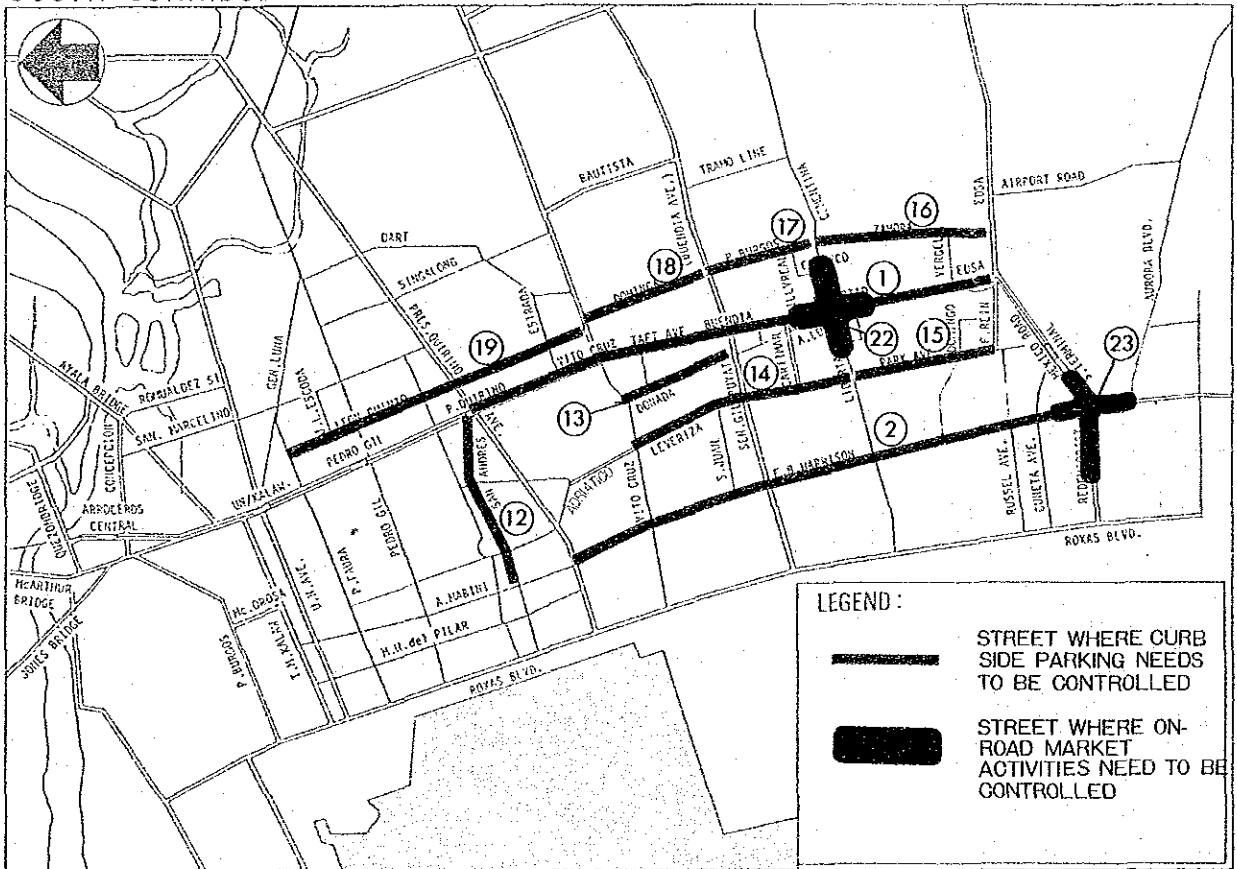
NOTE. NO. CORRESPONDS TO THAT OF TABLE 10.2

FIGURE 10.3 LOCATION OF STREETS WHERE CURBSIDE PARKING AND ON-ROAD MARKET ACTIVITIES NEED TO BE CONTROLLED



NORTH CORRIDOR

SOUTH CORRIDOR



NOTE: NO. CORRESPONDS TO THAT OF TABLE 10.3

