社会開発調査部報告書

No. 102

Republic of the Philippines
Metro Manila Development Authority

SSTRIMM

The Study on the Formulation of Small Scale Traffic Improvement Measures for Metro Manila

FINAL REPORT - Main Text

November 2001

Japan International Cooperation Agency

Transportas Consulting Co.
NCTS Foundation Inc.

Japan International Cooperation Agency (JICA)
SSTRIMM
Small Scale Traffic Improvement Measures for Metro Manila
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PREFACE

In response to a request from the Government of the Republic of the Philippines, the Government of Japan, through the Japan International Cooperation Agency (JICA) decided to conduct the Study on the Formulation of Small Scale Traffic Improvement Measures for Metro Manila (SSTRIMM).

JICA selected and engaged the services of the associated firms of Transportas Consulting Co. and the U.P. National Center for Transportation Studies Foundation, Inc. to form the Study Team headed by Engr. Rene S. Santiago, for the period November 2000 to November 2001. In addition, JICA also appointed Mr. Seiya Matsuoka of ALMEC Corporation to act at SSTRIMM Study Advisor.

The SSTRIMM Study was conducted by a team composed entirely by Filipino consultants. The Study Team held numerous discussions with concerned officials from the Philippine Government, in particular officials from the Metro Manila Development Authority (MMDA), the Department of Transportation and Communications (DOTC), the Department of Public Works and Highways (DPWH), the Philippine National Police (PNP), the UP National Center for Transportation Studies (NCTS), and officials and staff from the seventeen (17) cities and municipalities comprising Metro Manila. The main thrust of the study has been to impart on local government officials and staff the ability to formulate measures that may be small-scale, but with big impacts on traffic conditions in their respective jurisdictions, and would be well within their financial capabilities to implement.

The Study proper included guiding city and municipality planning staff, traffic engineers and traffic managers and enforcers in the technical aspects of formulating traffic improvement measures, from problem identification, to data gathering, analysis, and solutions formulation. A highlight of the SSTRIMM study was the implementation of Pilot Projects selected from among those nominated by the cities and municipalities.

This report represents the Study Team's findings on the various identified traffic problem areas, their assessment of the institutional aspects of traffic management, and the recommended improvement measures for the traffic problem areas included in the study. A second component of this is a model Traffic Ordinance that the cities and municipalities may wish to follow in enacting their own city or municipal traffic ordinances. A "Traffic Management Manual", included as a separate report in this Study, has been designed to assist and guide staff from the cities and municipalities involved in traffic management, in order to enhance and sustain their traffic management capabilities.

I hope this Report will contribute to the betterment of the Metro Manila community, and to the enhancement of a more friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the concerned officials of the Philippine Government for their close cooperation extended to the study.

November 2001

Hideo Ono
Resident Representative
Japan International Cooperation Agency

transportas

UP NCTSFI

30 November 2001

Mr. Hideo Ono
Resident Representative
Japan International Cooperation Agency
12/F Pacific Star Building
Corner Senator Gil J. Puyat and Makati Avenues
Makati City

LETTER OF TRANSMITTAL - SSTRIMM FINAL REPORT

Dear Sir,

We are pleased and honored to submit herewith the Final Report of the "Study on the Formulation of Small-Scale Traffic Improvement Measures for Metro Manila (SSTRIMM)".

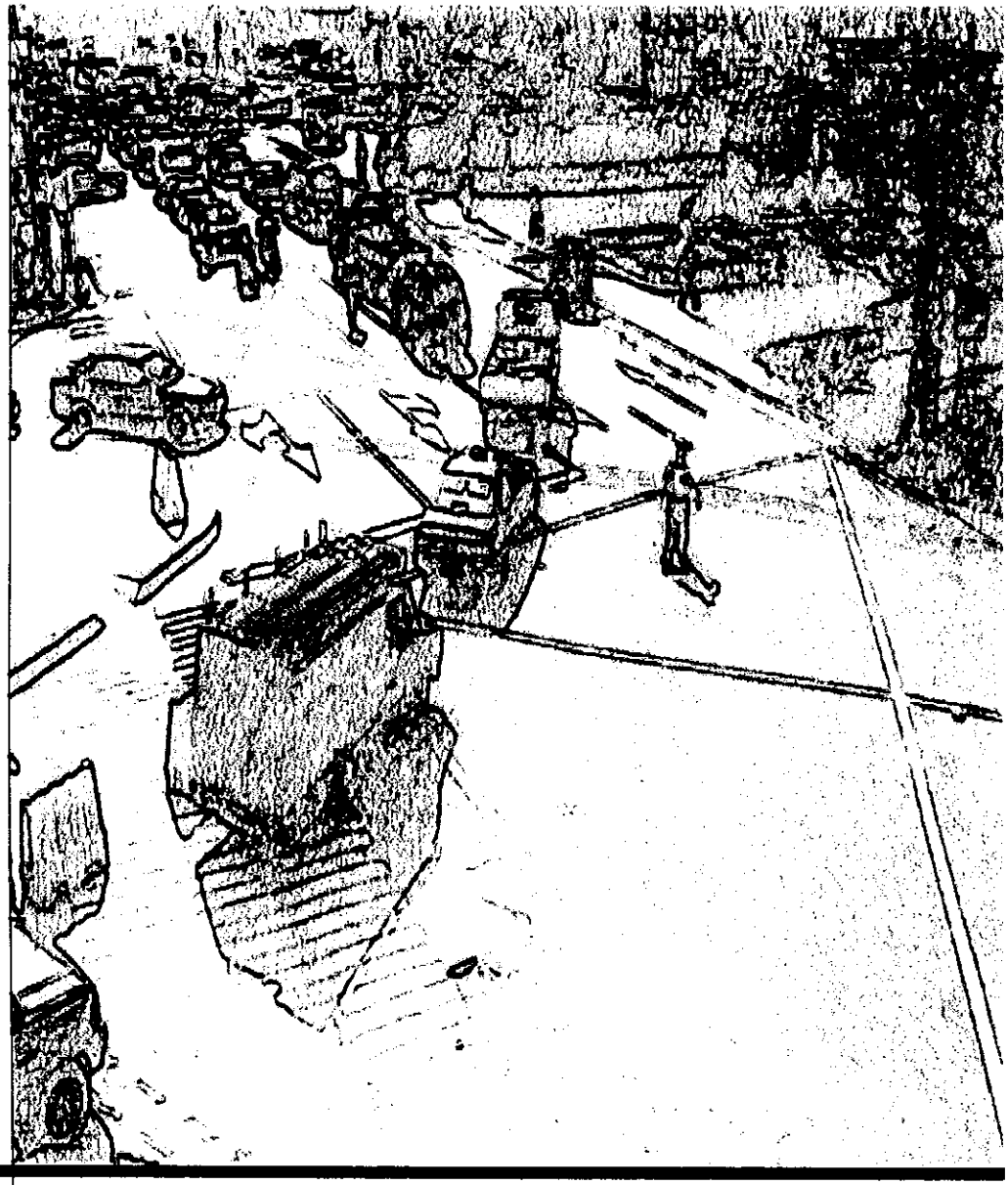
This report compiles the results of the SSTRIMM Study which was conducted in Metro Manila, Philippines between November 2000 and November 2001 by the Study Team of Filipino consultants from Transportas Consulting and the U.P. National Center for Transportation Studies Foundation, Inc. Included with this transmittal is a "Model Traffic Ordinance" which the Metro Manila LGUs may use as a pattern to draft their own traffic ordinances, and the "Local Traffic Management Manual" drafted to enhance and sustain the benefits derived from the Study.

We wish to express our gratitude to the officials and staff of the Japan International Cooperation Agency, for allowing us the opportunity to take part in this worthy endeavor, in coming up with traffic improvement measures that cities and municipalities can implement on their own. We also would like to thank the assistance, support and cooperation of the various Philippine government agencies and local government units involved in this Study.

We wish the SSTRIMM Study and this report will be able to continue to contribute to the improvement not only of traffic conditions in Metro Manila, but to the pool of talent in traffic management this country critically needs.

Very truly yours,

Rene S. Santiago
Team Leader, SSTRIMM Study Team



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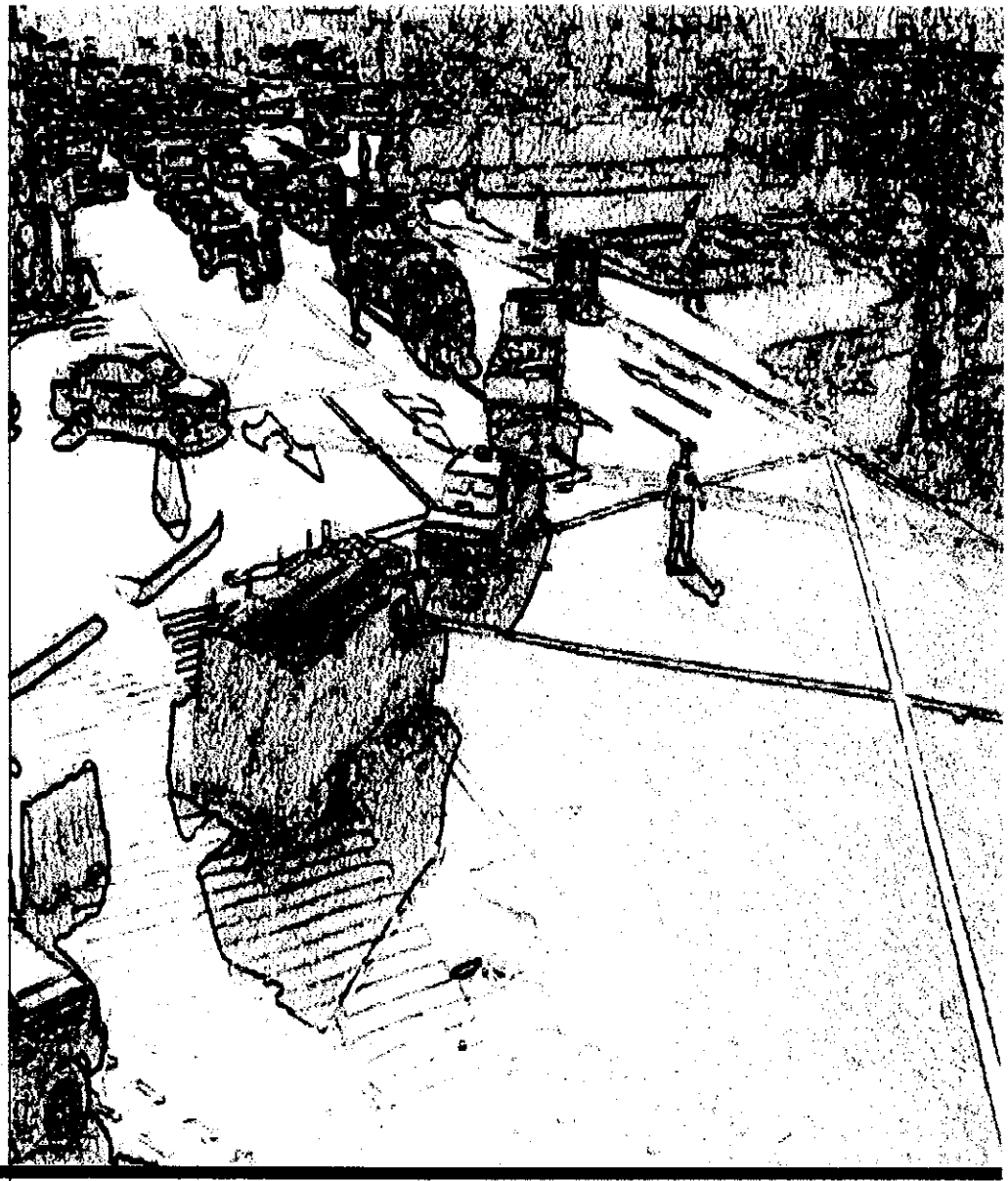
Abbreviations used

DOTC	Department of Transportation and Communications
DPWH	Department of Public Works and Highways
JICA	Japan International Cooperation Agency
LOS	Level of Service
LGU	Local Government Unit
MM	Metro Manila
MMDA	Metro Manila Development Authority
MMURTRIP	Metro Manila Urban Transportation Improvement Project (World Bank)
MMUTIS	Metro Manila Urban Transportation Integration Study (JICA)
PCU	Equivalent Passenger Car Unit
PNP	Philippine National Police
TBP	Traffic Bottleneck Point
TIP	Traffic Improvement Project
TM	Traffic Management
SSTRIMM	Small Scale Traffic Improvement Measures for Metro Manila



Executive Summary

SSTRIMM Final Report

November 2001

Executive Summary

Small-Scale Traffic Improvement Measures In Metro Manila

"How the 17 local government units comprising Metropolitan Manila can tackle their respective traffic problems" might as well have been the sub-title to this study funded by the Japan International Cooperation Agency (JICA). Coordinated by an inter-agency steering committee chaired by the Metro Manila Development Authority, SSTRIMM was conducted from November 2000 to November 2001 to:

- Identify and prepare do-able traffic management measures at the LGU level;
- Develop local traffic management capabilities through seminars, workshops, and learning-by-doing exercises;
- Demonstrate, in at least two pilot projects, a more systematic way of dealing with traffic bottleneck points from planning to implementation;
- Enhance and sustain that capability through an easy-to-use traffic management manual.

More than a study

Calling it a study may also be a misnomer, for SSTRIMM is an exercise that walked the 17 LGUs through the systematic phases of identifying the more severe congestion problems in their jurisdictions, characterizing each of these problems with hard data gathered from traffic surveys, analyzing and formulating practical solutions, consulting the community prior to and as an intrinsic aspect of implementation, thence evaluating the schemes to improve

on the first-cut solutions and learn from these experiences – successful or otherwise - to enhance future traffic management efforts. This process has been dubbed as the "3T Method" for Think before (and after) Tinkering with Traffic, and distilled into a Local Traffic Management Manual for future reference by LGU staff.

Identifying and defining the problems

One hundred twenty (120) traffic bottleneck points (TBPs) were identified by the 17 LGUs, but only 80 hurdled the guidelines on what makes for small-scale. The exclusion criteria were: (a) occurring on local roads, or national with local roads; (b) entail no major dislocations of informal/formal occupants; (c) no right-of-way acquisition; and (d) can be started and completed in a short period of weeks or a few months. On the other hand, the inclusion criteria were: (a) slow-moving, bumper-to-bumper, traffic that recurs throughout the day; (b) heavy volumes of vehicular and/or pedestrian traffic; (c) an area of recurring headaches to local traffic authorities; (d) often require police intervention to avoid or dis-entangle gridlocks; (e) subject of many complaints and/or accidents; and (f) congestion that affects or cascades to other streets.

Although not necessarily the most severe, the identified TBPs were fairly representative of the range of traffic problems one would find in Metro Manila. They can be classified into: 3-legged intersections (35.4%), 4-way intersections (48.1%), intersection with 5 or more approaches (5.1%), mid-block (5.1%), and other configurations (6.3%).

The most common factors causing congestion in those TBPs were as follows:

- Indiscriminate loading / unloading 45 out of79
- Encroachment of sidewalks / roadways 35 / 79
- Illegal or lack of parking spaces 28 / 79
- Tricycles / pedicabs issue 31 / 79
- Physical inadequacies 46 / 79

The first four are susceptible to enforcement solutions while the fifth one is amenable to engineering solutions.

Selecting the most worthy

Out of the 80 TBPs, a priority list of 20 was drawn up – 17 chosen by the LGUs and 3 more thrown in by the study team. With the assistance of the LGUs, traffic surveys were immediately conducted for these 20 TBPs, and other information assembled to guide the analysis and formulation of improvement schemes. The schemes were extensively discussed with the respective LGUs, and modified accordingly. With complete information, the 20 were then ranked according to five criteria, viz.:

- Traffic volume
- Degree of potential improvement or change
- Social and environmental conditions
- Financial capability of the LGUs
- Institutional receptivity

The chosen ones

With a weight of 60% for the ratings of the 17 LGUs and 40% for the study team, 5 TBPs (instead of 2) were chosen for pilot implementation against a budget of P3 million. These are shown below with their respective costs (in thousands of pesos):

MT-01	Montillano -Montillano Ext–National Rd	₱ 1, 770
MD-01	Shaw Boulevard- Wackwack-Lee Street	265
VL-01	Karuhatan-A. Pablo-McArthur Highway	207
TG-01	Gen. Santos Avenue – East Service Road	218
PQ-01	Canaynay Avenue – Dr. A. Santos Avenue	233

It was decided also to utilize as much of the residual amount as possible for strengthening the traffic capability of Malabon by way of traffic materiel consisting of 100 pieces of reflectorized vests and gloves, 142 pieces of raincoats and boots, 35 traffic signs, and 10 portable megaphones. Malabon was chosen for several reasons: it ranked high on institutional receptivity, had the 2nd to the lowest income among the 17 LGUs, and was not among the 5 beneficiaries.

Implementation blues

Implementation of the traffic improvement measures for the five pilot TBPs took longer than originally anticipated. As part of the "3T Method", the 5 were subjected to consultations with local stakeholders under the auspices of the local traffic authorities. The installation of the pavement markings and construction of minor civil works had to consider the weather – which was rainy from June to October – and timed to minimize disruption to traffic. In addition to these exogenous variables, site-specific factors stretched out the implementation period. For Muntinlupa, it was due to the pavement rehabilitation works commenced by a DPWH contractor at the intersection. For Mandaluyong, there were three delaying factors: building materials parked on portions of Lee Street, sudden objection over the scheme from a resident, and ambivalence of local traffic authorities. Taguig suffered a revamp of traffic personnel. Leaking pipes on MacArthur Highway pushed back pavement markings at Valenzuela, coupled with the addition and corollary programming of an automatic signal controller for the intersection. Parañaque waited vainly for the ordinance supporting the one-way street scheme.

Evaluating the impacts

Did the implemented schemes actually improve the situation in the TBPs? Two of the five pilot TBPs were subjected to 'before' and 'after' assessments in terms of observed time delays, social and other factors.

The results for Muntinlupa are quite encouraging. Despite the 195% increase in traffic volume on Montillano Street between the two comparison periods, average delays per approach vehicle declined from 21 to 18 seconds, or 14% improvement. On the northern section of the National Highway, traffic rose by 51% but delays went down by 25%. In addition, surveys results showed marked improvements in perceptions about loading and unloading practices of public transport vehicles, incidents of illegal parking, and movements of pedestrians. The downside impacts are: uneasiness over the vendors evicted from the sidewalks and grumblings from some business establishments about direct access to their frontage.

On the other hand, the results for Mandaluyong are mixed, if not quite negative. Average delay per approach vehicle on Lee Street went up by 52% (from 25 to 38 seconds) on Lee Street on the back of 86% jump in traffic volume. For Shaw Boulevard, the figures are 25% longer delays against the backdrop of 53% increase in vehicle volumes. One could interpret the results positively, since the increase in time delays was less than proportionate to the increase in traffic volumes and if findings from other sources are contradictory. There was 50% improvement in perceptions about loading and unloading practices of jeepneys near the intersection. The scheme had become less taxing to traffic enforcers, aside from the reduced likelihood of gridlock at the intersection when enforcers are not around.

The Other TBPs

Similar to what had been done to the 20 TBPs in the first tranche, the 60 TBPs in the second tranche went through the process of traffic surveys, analysis, formulation of solutions, discussions with the LGUs, and cost estimations. Unlike the first tranche, however, the staff of the LGUs were asked to participate more intensively and assume greater responsibility in the process. For one reason or another, not all LGUs were able to.

In the subsequent analysis, one of the 60 got merged with another TBP. Together with the 15 TBPs (which is the balance from the 1st tranche), a possible Traffic Improvement Package – consisting of 74 TBPs with detailed solutions and costs – has been produced under SSTRIMM. With an aggregate cost of P22 million, this package can be implemented by the 17 LGUs using their own resources. With the exception of Malabon and Pateros, the other 15 have adequate incomes to fund their implementation. Nevertheless, it is advisable for MMDA to provide a matching grant of 50% towards their implementation – not only to encourage their early realization but also to strengthen the traffic management capabilities of the 17 LGUs.

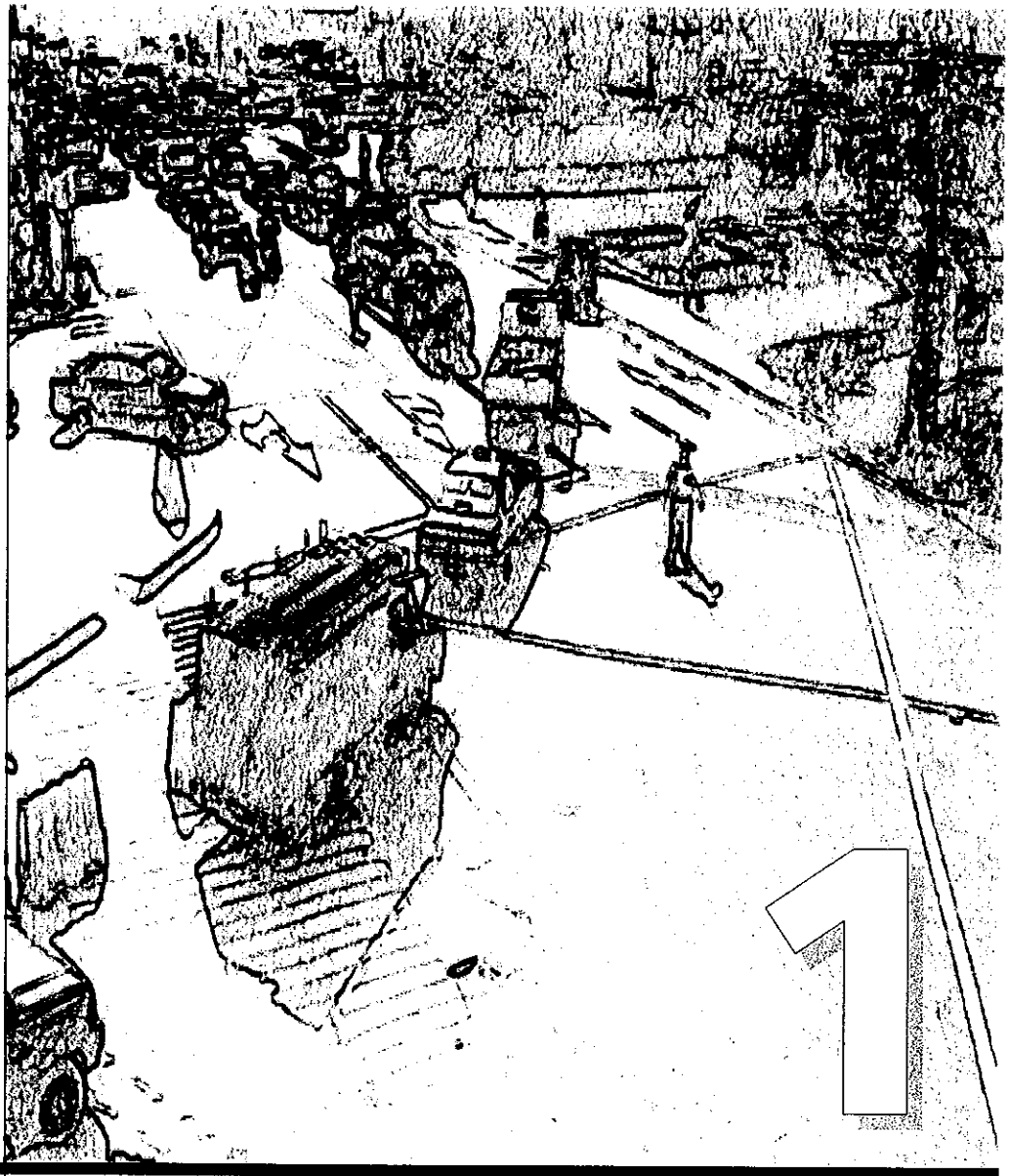
Towards More Effective TM by LGUs

Not all the 17 LGUs are the same when it comes to traffic management (TM) capabilities.

They follow three organizational models: (a) split among traditional departments, (b) integrated under one management set up, (c) adjunct to police traffic enforcers. While there is no single model correlated with effectiveness, it is recommended that all the activities in the traffic management process be assigned – and orchestrated - properly. Along this line, SSTRIMM came out with a model organization with its attendant list of functions.

Of the 17 LGUs, those that showed effectiveness also had mayors taking active interests in traffic management. It is important, therefore, for mayors to put traffic on top of their agenda. Without their support, their organizational units would be ineffectual.

The quality and scope of traffic and traffic-related ordinances differ markedly across the 17 LGUs. The only way that these can be harmonized is for each of the 17 LGUs to enact a comprehensive traffic ordinance based on a common draft. Toward this end, SSTRIMM has produced a Draft Traffic Code as a take-off point by the 17 Sanggunians (or legislative councils) of Metro Manila. Without a common set of rules of road decorum, it is impossible for traffic enforcers to establish order in the streets of Metro Manila. Lastly, the enactment of such a code will institutionalize the "3T Method" demonstrated in the course of SSTRIMM and amplified in the Local Traffic Management Manual.



1

Introduction

1 Introduction

1.1 Rationale

Apart from the long-range and capital-demanding solutions envisioned under the programs of the Department of Public Works and Highways (DPWH) and the Department of Transportation and Communications (DOTC), or the large-scale schemes contained in the Metro Manila Urban Transportation Integration Study (MMUTIS) and the Metro Manila Urban Transport Improvement Project (MMURTRIP), there are many places in Metro Manila where small-scale measures would alleviate local traffic problems. These measures may include such works as geometric improvement of intersection, provision of off-street parking space, removal of on-street parking, traffic flow control, including one way and turn prohibitions, provision of pavement markings, adjustment of signal timing, and improvements at loading and unloading zones of buses, jeepneys and tricycles.

This study on Small Scale Traffic Improvement Measures for Metro Manila (SSTRIMM) was borne out of the realization that doable traffic management schemes should be identified, formulated, and implemented to address the local traffic problems in Metro Manila. These doable traffic management schemes can be considered as small-scale short-term measures – broadly characterized as measures not needing right-of-way acquisition, entail at most minor civil works, entail no major dislocations of informal occupants, can be implemented with resources available to local government units (LGUs), and can be started and completed in a relatively short time of a few weeks or months.

In nearly all traffic engineering and management programs, the LGUs have often been bystanders or passive observers, rather than active participants or players in the formulation and implementation of solutions. Without discounting the prominent roles of the Metro Manila Development Authority (MMDA), the DPWH, the DOTC, or the Philippine National Police (PNP), the magnitude of traffic congestion in Metro Manila is such as to require the contributions of everybody. The resources of the 17 LGUs may be small individually, but when combined could represent a potent force. This is the rationale behind this study – to harness the energies of the LGUs into becoming positive forces for traffic improvement.

1.2 Study Scope and Objectives

The fundamental objective of the study is to launch small-scale initiatives for improving traffic in, and by, the 17 local government units of Metro Manila. This entailed the following work modules:

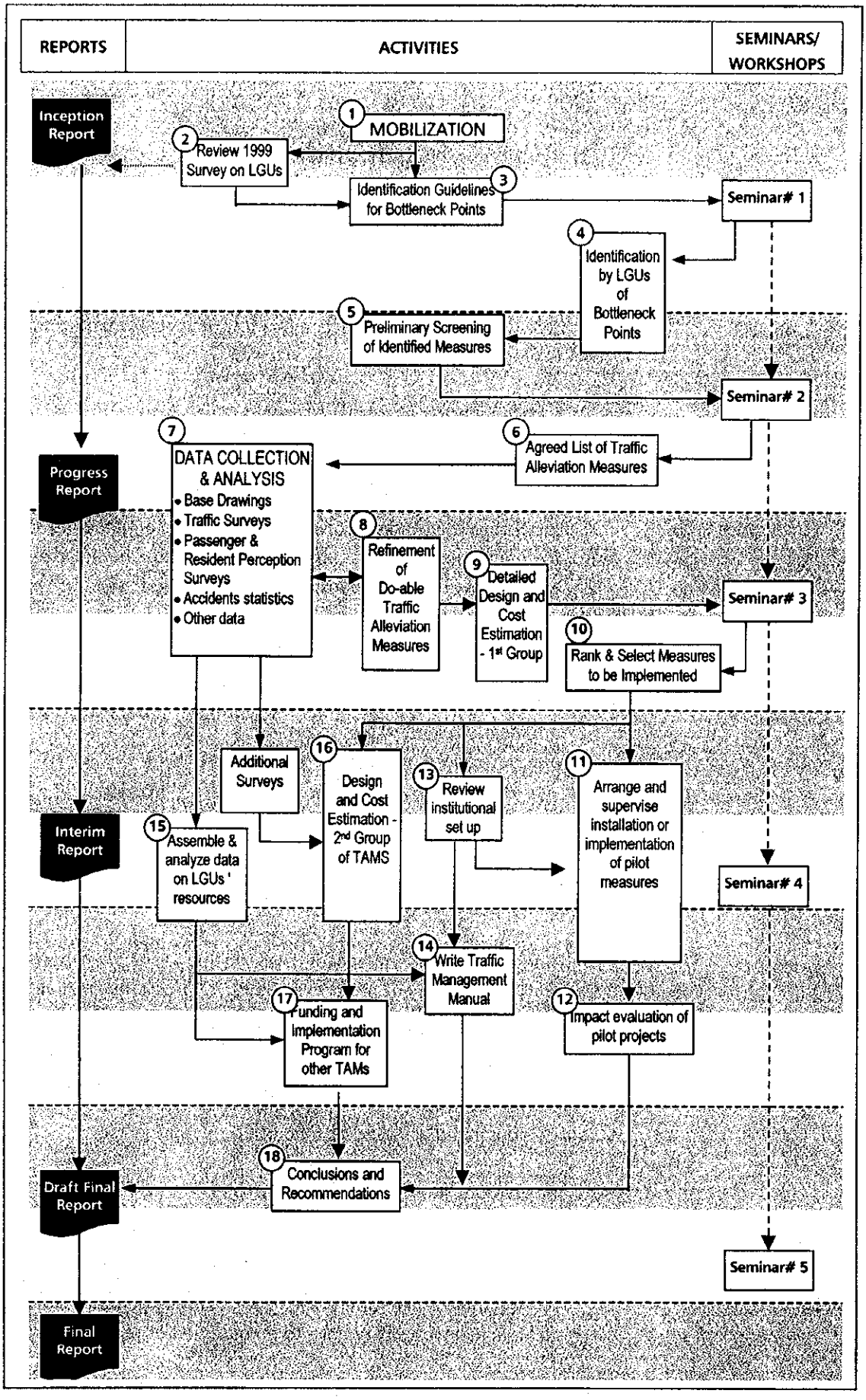
a) Identification and preparation of do-able traffic management measures at the local government level;
b) Development of local traffic management capabilities through seminars and workshops, and learning-by-doing exercises; and
c) Enhancing and sustaining that capability through an easy-to-use traffic management manual, including appropriate management models and guides, for the targeted LGUs.

1.3 Overall Approach

The study methodology is depicted in Figure 1.1, which shows three major streams (or columns). On the left side are the required reports – five in all; and on the right side are the required seminars / workshops – also five in number. In the middle column is the sequence of activities that had been undertaken.

During the course of SSTRIMM, the aforesaid methodology was tested and refined into the "3T Method" – short for "*Think before Tinkering with Traffic*". The 3T method is explained in more detail in a separate volume called the "Local Traffic Management Manual".

Figure 1.1 **SSTRIMM Study Methodology**



Essentially, the 3T Method comprised six components in one activity cycle, viz.:

1) Identifying the traffic problem

LGUs were asked to identify their problem areas based on some guidelines, rather than imposed or identified by an 'omniscient' Study Team. While traffic statistics are the preferred foundation for problem identification, it is recognized that most LGUs do not yet have these data. Hence, a qualitative checklist would suffice to start the process.

2) Data gathering and traffic surveys

The second stage of the 3T method is data gathering. This can be as simple as a reconnaissance survey of the problem area, or more expanded tasks involving field surveys – engineering surveys to characterize the roads, and traffic surveys to characterize the traffic flows on those roads.

3) Formulation of improvement measures

Empirical data, when viewed through the trained eye of a traffic engineer or planner, sets the stage for the formulation of alternative schemes to solve the problem. With the added element of past experiences, the various options are then hammered into a proposed traffic improvement plan or project. A cost estimate or a budget is developed thereafter.

4) Setting priorities

Under normal circumstances, there will be as many proposed traffic improvement projects as there are problems. Not all can be implemented at once, because of resource and time constraints. Selecting priorities becomes a matter of ranking which among the many deserve a first crack at available funds. During SSTRIMM, a systematic method of setting priorities was demonstrated using a portfolio of 20 mini-projects.

5) Implementation of traffic mini-projects

Preparation of working drawings, public consultations, information drive, traffic advisories, deciding the schedule of works, and the like form part of project implementation. In the field, actual works may have to be modified or rescheduled.

6) **Evaluating the impact**

The 3T method also means 'Think after Tinkering with Traffic'. It entails answers to the basic question: "Did the traffic improvement project produce the desired results or effects?"

An evaluation of "before" and "after" conditions for two of five pilot projects of SSTRIMM was performed as an example to the LGUs about the 6th step of the 3T Method .

1.4 Seminar series

Table 1.1 summarizes the contents and schedules of the five (5) seminar-workshops conducted by SSTRIMM. Lecture type sessions were deliberately minimized in favor of more case studies.

1.5 Issues

Several key issues arose unexpectedly in the course of SSTRIMM.

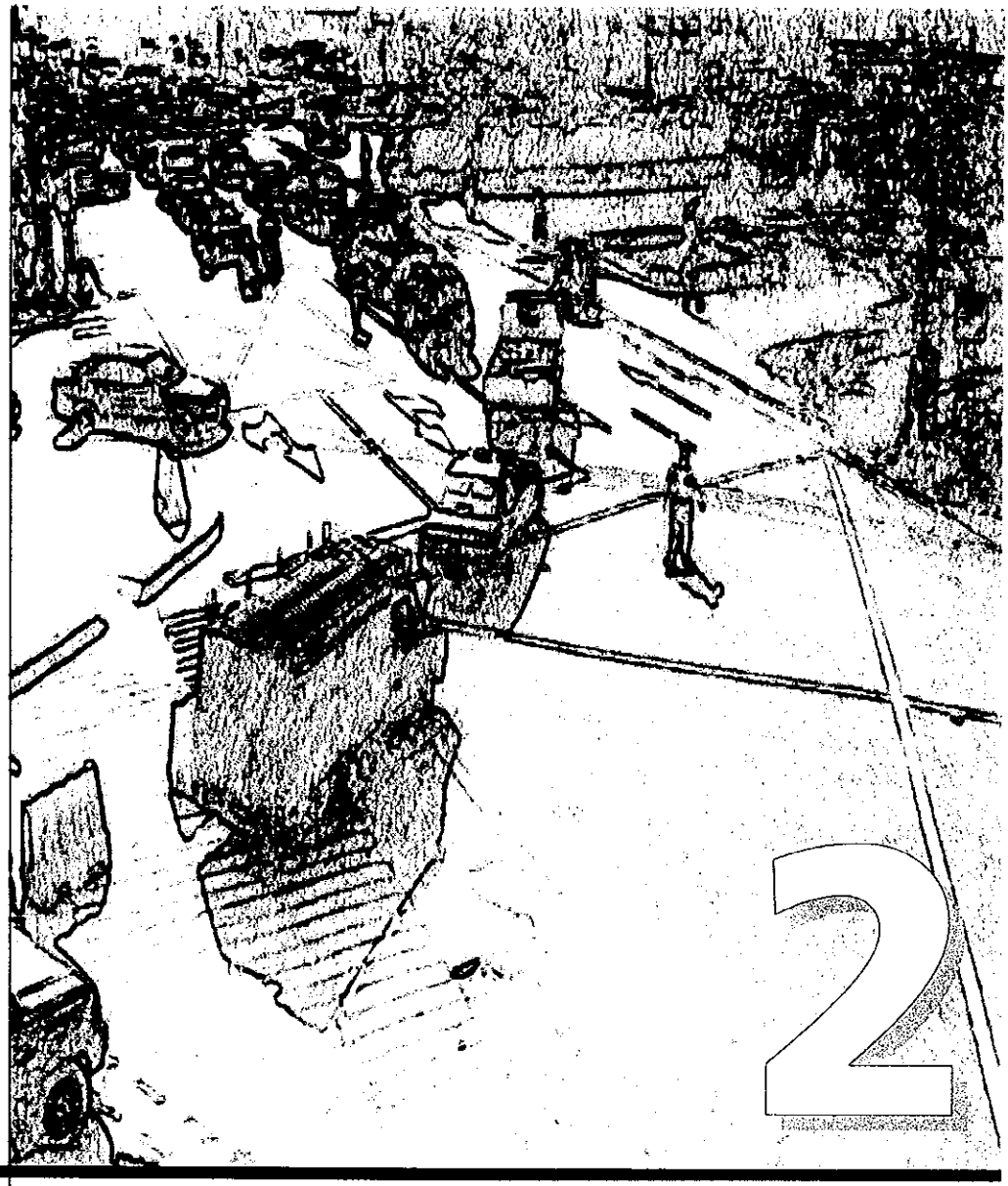
Who are the study counterparts? Usually, the participating agencies represented in the Steering Committee contribute counterpart staff to the Study Team. However, the represented agencies are national entities – whose mandates and interests are non-local in scope. As the implementing body for the side of the Government of the Philippines (GOP), MMDA has the closest affinity to the objectives of the study, but its staff are pre-occupied with non-local roads that had been excluded *a priori* from the coverage of SSTRIMM. The spirit and intent of SSTRIMM point to the traffic management staff of the 17 LGUs as the real study counterparts.

Capacity-building has been directed to the 17 LGUs, as required by the Terms of Reference of the SSTRIMM Study. The preceding resolution of the counterpart issue is consistent with this target. However, not all the 17 LGUs are equal. Some have the organization and staff assigned to traffic management functions, several rely essentially on the traffic police. Most spread their responsibilities across several units. SSTRIMM sought the inclusion of staff from three departments of the LGUs – planning, engineering, and enforcement – to ensure that capacity building takes deeper and wider roots within each of the 17 LGUs. Unfortunately, technology

transfer can only germinate in 'fertile soils' – on the willingness and enthusiasm of the LGUs. Makati, Manila and Quezon City sent in the most number of participants to the five seminar workshops. Localized working sessions, however, transpired only with eight (8) of the LGUs, viz. Malabon, Mandaluyong, San Juan, Parañaque, Marikina, Valenzuela, Muntinglupa, and Las Piñas. Taguig had enthusiastic response at the beginning, but its entire traffic management personnel got replaced on the final months of SSTRIMM. Not all the 17 LGUs will be in a position to implement their respective shares of the 79 TBPs finalized under SSTRIMM.

Table 1.1 **Content and Schedules of the Seminar-Workshops**

Series No.	Seminar-Workshop # 1	Seminar-Workshop # 2	Seminar-Workshop # 3	Seminar-Workshop # 4	Seminar-Workshop # 5
Date	21 November 2000	25 January 2001	24 April 2001	26 July 2001	18 October 2001
Topics: First Half	• Introduction to SSTRIMM scope and objectives • Results of the 1999 MM Traffic Administration Capability Survey	• Case Study: Public-Private Partnership in Makati's Traffic Management • Marikina Case: Local Government Resources for Traffic	• Method for ranking the 20 TBPs • Details of Proposed Schemes for 1st Batch of TBPs • Details of Proposed Schemes for 2nd Batch of TBPs	• Implementation status of the 5 Pilot TBPs • Case Study on Parañaque Local Area Traffic Improvement Plan • Counter-productive practices in MM	• Traffic Surveys – Methods and Practical Guidelines • Assessing Impact of the Two Pilot TBPs
Topics: Second Half	• Institutional models from other cities on local traffic management • Guidelines for identifying traffic bottleneck points • Group Exercises on traffic congestion management	• Typical Measures Applied in Metro Manila and other Cities • Review of the Identified Traffic Bottleneck Points • Selection of the Top 20 Priority TBPs	• Details of Proposed Schemes for 3rd Batch of TBPs • Details of Proposed Schemes for 4th Batch of TBPs • Rating by LGU participants	• Common denominators of the 80 TBPs • Social control through traffic management • Initial recommendations on LGU traffic institutions	• Key Features of the Traffic Management Manual • Key Features of the model Traffic Code • Wrap up of SSTRIMM: Conclusions and Recommendations
Purpose	To acquaint LGU participants about the scope, objectives, methodology, schedules of SSTRIMM. Also, on what LGUs can expect at the end of the Study.	To finalize the list, and refine the problem definitions, of the identified traffic bottleneck points. Secondarily, motivate participants about 'success stories.	Rank the top 20 TBPs to select the pilot projects to be funded by JICA. Secondarily, educate participants on setting priorities	Educate LGUs about 'good' and 'bad' practices in traffic management; Preview of SSTRIMM recommendations and outputs	Presentation of the Draft Traffic Management Manual, Model Ordinance, and Draft Final Report; Other topics in traffic management (not covered in previous sessions)



2

Identification of Traffic Bottleneck Points

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2

Identification of Traffic Bottleneck Points

2.1 Simplified Criteria

At the beginning, several quantitative indicators were mooted that can guide the LGUs in identifying their respective traffic bottleneck points. A more simplified (and qualitative) set of guidelines was subsequently adopted in response to comments and in recognition of where LGUs are coming from.

A traffic bottleneck point (TBP) is understood to refer to an intersection, or a section of a busy road, or a block bounded by several roads where severe congestion occurs throughout the day or during peak hours. What delimits further the coverage is the exclusion of national roads – unless it is an intersection of a city / municipal road with a national road.

A TBP satisfies many of the following criteria:

- Heavy volumes of motor vehicles and/or pedestrians;
- Slow-moving traffic, bumper-to-bumper conditions that recur throughout the day;
- Often requires intervention of traffic enforcers to avoid or unblock gridlocks;
- Cause of many complaints from motorists and pedestrians;
- Site of many vehicular accidents, or nightmarish traffic jams;
- Congestion or delays in that point often cascades (in a chain-reaction) to other streets;

- Too many conflicts (e.g., left turns, U-turns, right turns, etc.) in traffic flows;
- An area of recurring headaches, if not exasperations, to local traffic authorities

To qualify as small-scale measures, the anticipated solutions should:

- Exclude or eschew right-of-way acquisition;
- entail at most minor civil works;
- entail no major dislocations of informal occupants, if any;
- can be implemented with resources available to LGUs; and
- be started and completed in a relatively short time of a few weeks or months.

2.2 Minimum Inputs from the LGUs

Each of the 17 cities/municipalities that comprise Metro Manila were asked to identify their respective traffic bottleneck points or choke points. To ensure that there will be enough candidates, at least four (4) such points were to be identified, sketched on a map, numbered according to their degree of importance or severity.

Also requested as inputs, but with negligible responses, are descriptions of the physical conditions of each choke point, viz.:

- Width of the road, in meters, or number of lanes (if an intersection, include all the roads);
- Pavement type and condition (poor/good, concrete/asphalt);
- Median, island, or separator if any;
- Sidewalk conditions, and presence of road-side frictions like street vendors;
- Presence of hump, potholes, obstacles;
- Presence (or absence) of such traffic control devices as traffic signals, pavement markings, delineators, traffic signs, pedestrian barriers, pedestrian overpasses, etc.
- Presence of bus / jeepney / tricycle / pedicab terminals (on-street / off-street) or loading / unloading;
- Estimated volume of vehicles and pedestrians, if available.

2.3 Long List of TBPs

The preliminary list of traffic bottleneck points submitted by the LGUs totaled 120, inclusive of the ones identified during the Second Seminar-workshop. The breakdown by municipality is shown on Table 2.1.

Table 2.1 **Summary of Identified TBPs**

LGU	SSTRIMM LGU Code	No. of TBPs	Non-Qualifying
Caloocan	CC	14	3
Las Piñas	LP	10	5
Makati	MK	21	17
Malabon	ML	8	9
Mandaluyong	MD	4	7
Manila	MN	18	3
Marikina	MR	7	3
Muntinlupa	MT	4	4
Navotas	NV	3	1
Parañaque	PQ	5	5
Pasay	PY	4	2
Pasig City	PG	3	3
Pateros	PT	2	2
Quezon City	QC	5	4
San Juan	SJ	2	2
Taguig	TG	4	4
Valenzuela	VL	6	6
	Total	120	80

The first cut trimmed down the long list from 120 to 80, since forty of the TBPs did not meet the requirement for a local road(s) component.

To be sure, a better set of TBPs might have been identified by the Study Team based on available data on traffic volumes and volume-capacity ratios, but that would have defeated the purpose of direct LGU involvement in the Study.

2.4 Grouping the Long List into Two Tranches

The TBPs in the long list were grouped into two: (i) a first tranche comprising the priority list of 20 TBPs from which the pilot projects were to be chosen, (ii) the rest of the 60 TBPs constitute the second tranche. The grouping was a convenient way to advance the implementation of the pilot projects, and to divide the workload between the Study Team and the counterpart members from the LGUs. Work on the first tranche was to be borne more by the Study Team as a way of demonstrating the traffic management process. On the other hand, the second tranche was supposed to rely more on the LGUs as their problem exercises.

2.5 The Short List of 20 Priority TBPs

The selection process for coming up with the short list of 20 TBPs involved polling the LGUs on what is their priority TBPs from the list of 80. This netted 17; three more were added by the Study Team to ensure that those with the most severe problems get included in the first tranche.

One of the 17 TBPs identified by the LGUs, the junction of Kingspoint Road corner Quirino Avenue in Quezon City, was subsequently disqualified. Upon inspection of the site, it turned out to be on a national road with no intersection, having been previously closed by traffic authorities. This was replaced by another TBP, also in Quezon City.

The 20 TBPs comprising the first tranche are shown on Table 2.2.

Table 2.2 **Summary of Priority TBPs**

Code	Location	Traffic Bottleneck Points
CC-01	Caloocan	A Mabini / JP Rizal
LP-01	Las Piñas	Marcos Alvarez Rd / Alabang-Zapote Road
MK-01	Makati	Nicanor Garcia / Jupiter St
ML-01	Malabon	P Aquino Ave / Sanciangco / P Borromeo
MD-01	Mandaluyong	Shaw Blvd / Lee St / Wack-wack Rd / Old Wack-wack Rd
MD-02	Mandaluyong	Shaw Blvd / Sheridan St / San Miguel Ave
MN-01	Manila	Legarda / Bustillos
MR-01	Marikina	BG Molina St / G del Pilar St
MT-01	Muntinlupa	Montillano St / Montillano Ext / National Road
MT-02	Muntinlupa	Muntinlupa City Hall / MCM Hospital / Bruger Subd
NV-01	Navotas	M Naval / Tangos / F Pascual / L Santos / Gov Pascual
PQ-01	Parañaque	Canaynay Avenue / Dr A Santos Ave
PY-01	Pasay	Burgos St / Libertad St
PG-01	Pasig	Plaza Rizal / Plaza Col Flores
PT-01	Pateros	B Morcilla / P Herrera
QC-01	Quezon City	Boni Serrano St / Benitez St / Valentina St
QC-02	Quezon City	Anonas St / Molave St
SJ-01	San Juan	Wilson St / P Guevarra St
TG-01	Taguig	Gen Santos Ave / East Service Rd
VL-01	Valenzuela	Karuhatan / A Pablo / MacArthur Hwy

2.6 The Remaining 60 TBPs

The remaining 60 TBPs that were not included in the initial tranche of 20 priority ones are listed in Table 2.3

Table 2.3 **60 Remaining TBPs**

LGU	SSTRIMM Code	Location	Count
Caloocan	CC-02	Rizal Avenue / 4th Avenue	1
	CC-03	Baesa Road / Sta Quiteria	2
Las Piñas	LP-02	Zapote Junction / Alabang-Zapote Road	3
	LP-03	CV Starr Avenue / Alabang-Zapote Road	4
	LP-04	CAA Road / Alabang-Zapote Road	5
	LP-05	Pilar Road / Alabang-Zapote Road	6
Makati	MK-02	Kamagong / Vito Cruz	7
	MK-03	Metropolitan Ave / Ayala Ave	8
	MK-04	Malugay / Ayala Ave	9
	MK-05	Makati Ave / Jupiter	10
	MK-06	Malugay / Mayapis	11
	MK-07	Kalayaan Ave / Makati Ave	12
	MK-08	Dela Rosa St / Pasong Tamo	13
	MK-09	Javier / Pasong Tamo	14
	MK-10	Pasay Road / Evangelista	15
	MK-11	JP Rizal / Sampaguita	16
	MK-12	Kalayaan / JP Rizal	17
	MK-13	JP Rizal @ Pamantasan ng Makati	18
	MK-14	JP Rizal / Sgt Fabian Yabut	19
	MK-15	Kalayaan / Sgt Fabian Yabut	20
	MK-16	P Burgos / Sgt Fabian Yabut	21
	MK-17	JP Rizal / Cloverleaf	22
Malabon	ML-02	F Sevilla Blvd	23
	ML-03	Estrella St (Bgy Tañong)	24
	ML-04	Gen Luna St / Gov Pascual Ave	25
	ML-05	Don B Bautista Blvd / M Blas St	26
	ML-06	Gov Pascual Ave / Sisa St	27
	ML-07	MH del Pilar / Panghulo Rd	28
	ML-08	MH del Pilar / Rodriguez St	29
	ML-09	Gen Luna / Sacristia	30

Continued

Table 2.3 **60 Remaining TBPs** (continued)

LGU	SSTRIMM Code	Location	Count
Mandaluyong	MD-03	Boni Ave / Barangka Dr	31
	MD-04	Libertad St / Calbayog St	32
	MD-05	Boni Ave / P Cruz St	33
	MD-06	Coronado St / San Francisco	34
	MD-07	Libertad St / Arayat St / Bonifacio Dr	35
Manila	MN-02	Quintin Paredes / Dasmariñas / San Vicente	36
	MN-03	P Casal / J Nepomuceno / Arlegui	37
Marikina	MR-02	J Sumulong Hwy / MacDonald's Dr	38
	MR-03	J Sumulong Hwy / A Tuazon St	39
Muntinlupa	MT-03	Rizal St / Manila South Road	40
	MT-04	Susana Heights / Manila South Road	41
Parañaque	PQ-02	Quirino Ave / Kabihasnan Rd	42
	PQ-03	Ninoy Aquino Ave / Medina Ave	43
	PQ-04	Dr A Santos Ave / San Antonio Rd / Squaremart	44
	PQ-05	Dr A Santos Ave / President Ave	45
Pasay City	PY-02	Redemptorist Rd / Taft Ave Ext / Quirino Ave	46
Pasig	PG-02	San Joaquin Junction / Elisco Rd	47
	PG-03	A Mabini St	48
Pateros	PT-02	B Morcilla / M Almeda	49
Quezon City	QC-03	Visayas Ave / Road 1	50
	QC-04	Zabarte Road / Quirino Hwy	51
San Juan	SJ-02	Ortigas Ave / Xavier St / Madison St	52
Taguig	TG-02	Gen Santos Ave / ML Quezon	53
	TG-03	Bagong Tanyag / East Service Road	54
	TG-04	ML Quezon @ Bagumbayan – Sucat Boundary	55
Valenzuela	VL-02	MacArthur Hwy / A Fernando St	56
	VL-03	MacArthur Hwy / P Valenzuela St	57
	VL-04	MacArthur Hwy / Tamaraw Hills	58
	VL-05	Fatima Ave / Serrano St	59
	VL-06	MacArthur Hwy / Poblacion Road	60

Figures 2.1a to 2.1g show the locations of the 80 TBPs, which include the first tranche of 20 priority TBPs and the second tranche of 60 covered in the SSTRIMM Project.

Figure 2.1a **Traffic Bottleneck Points in Caloocan, Malabon, Valenzuela and Navotas**

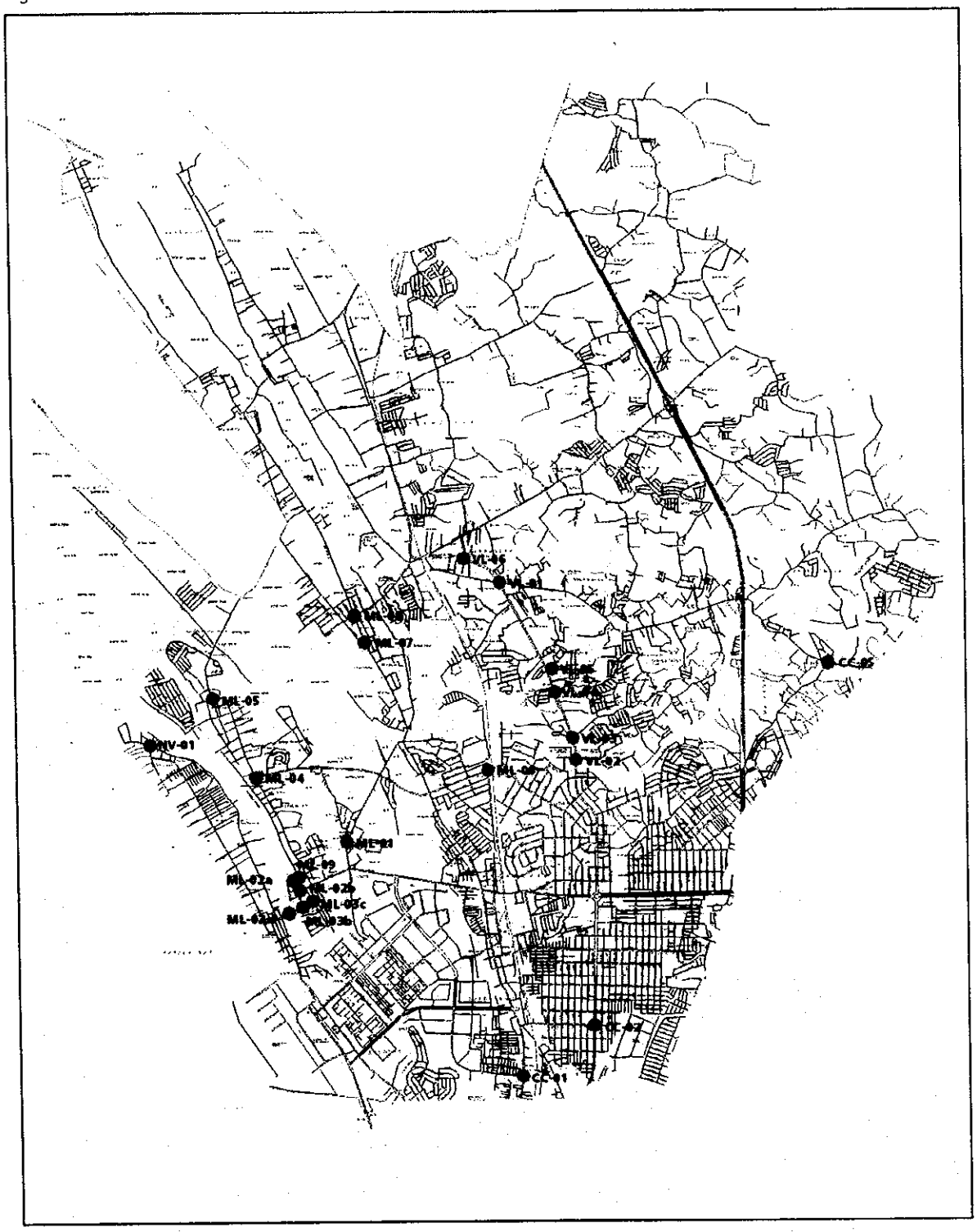


Figure 2.1b **Traffic Bottleneck Points in Makati and Pasay**

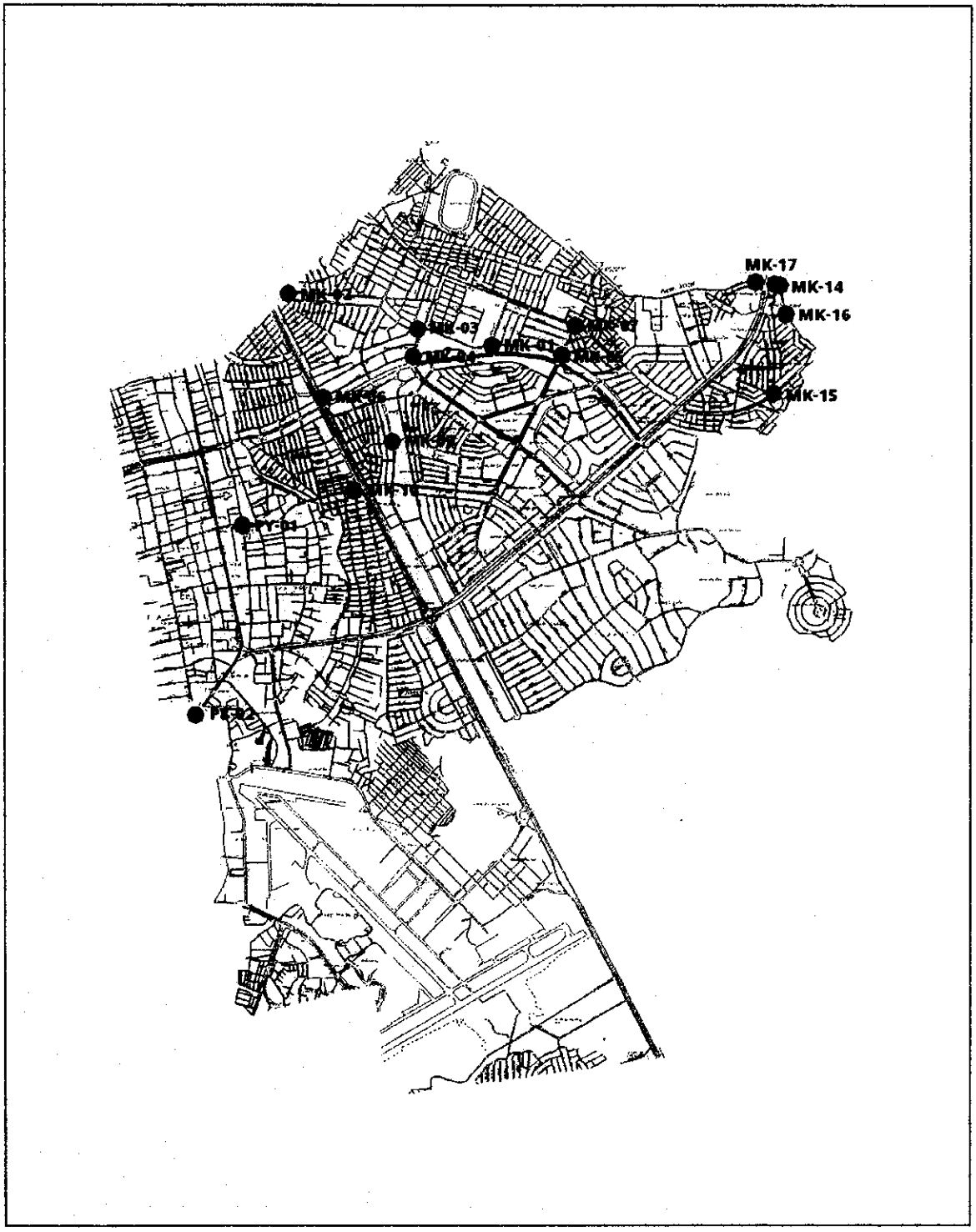


Figure 2.1c **Traffic Bottleneck Points in Manila, San Juan and Mandaluyong**

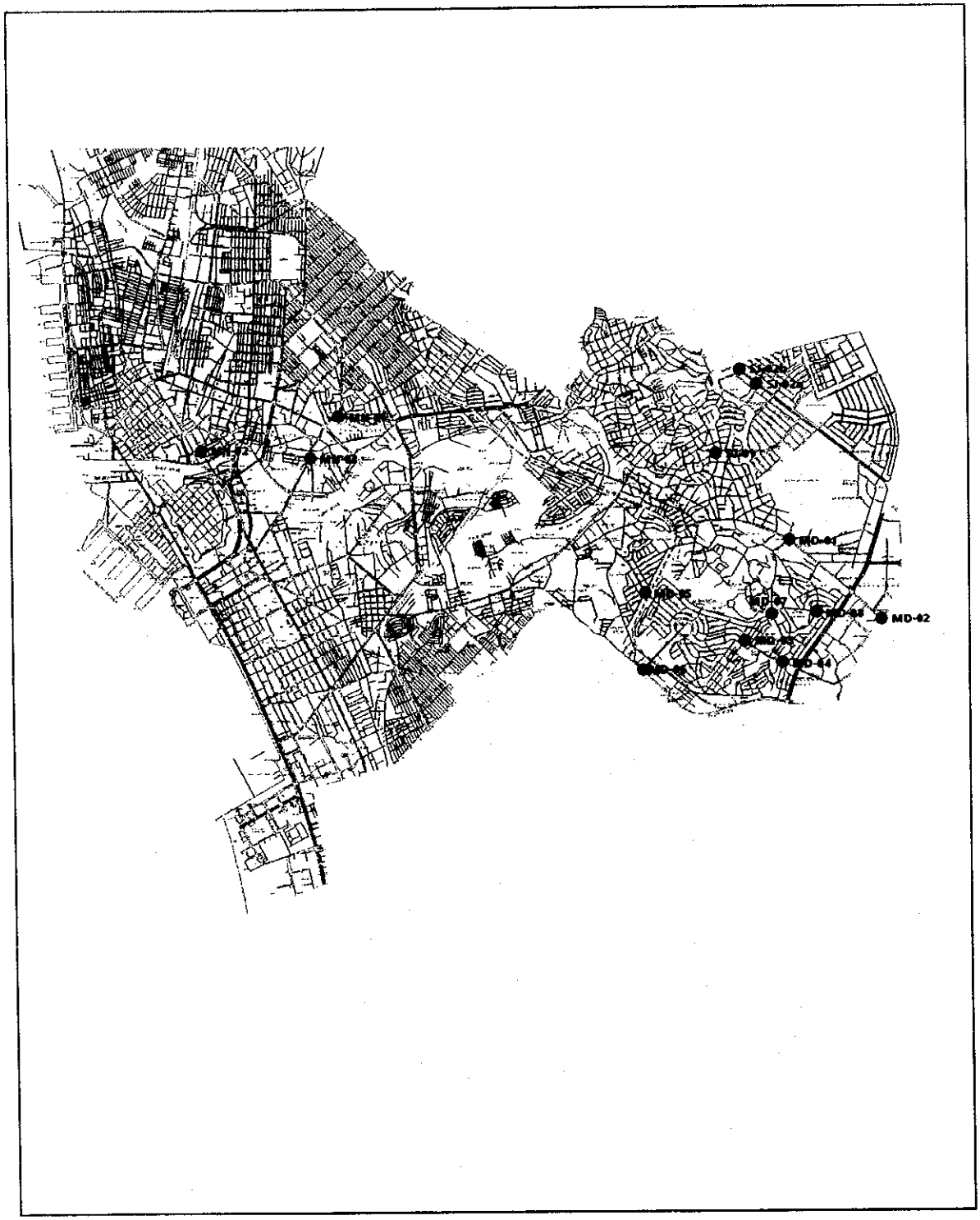


Figure 2.1d **Traffic Bottleneck Points in Las Piñas and Muntinlupa**

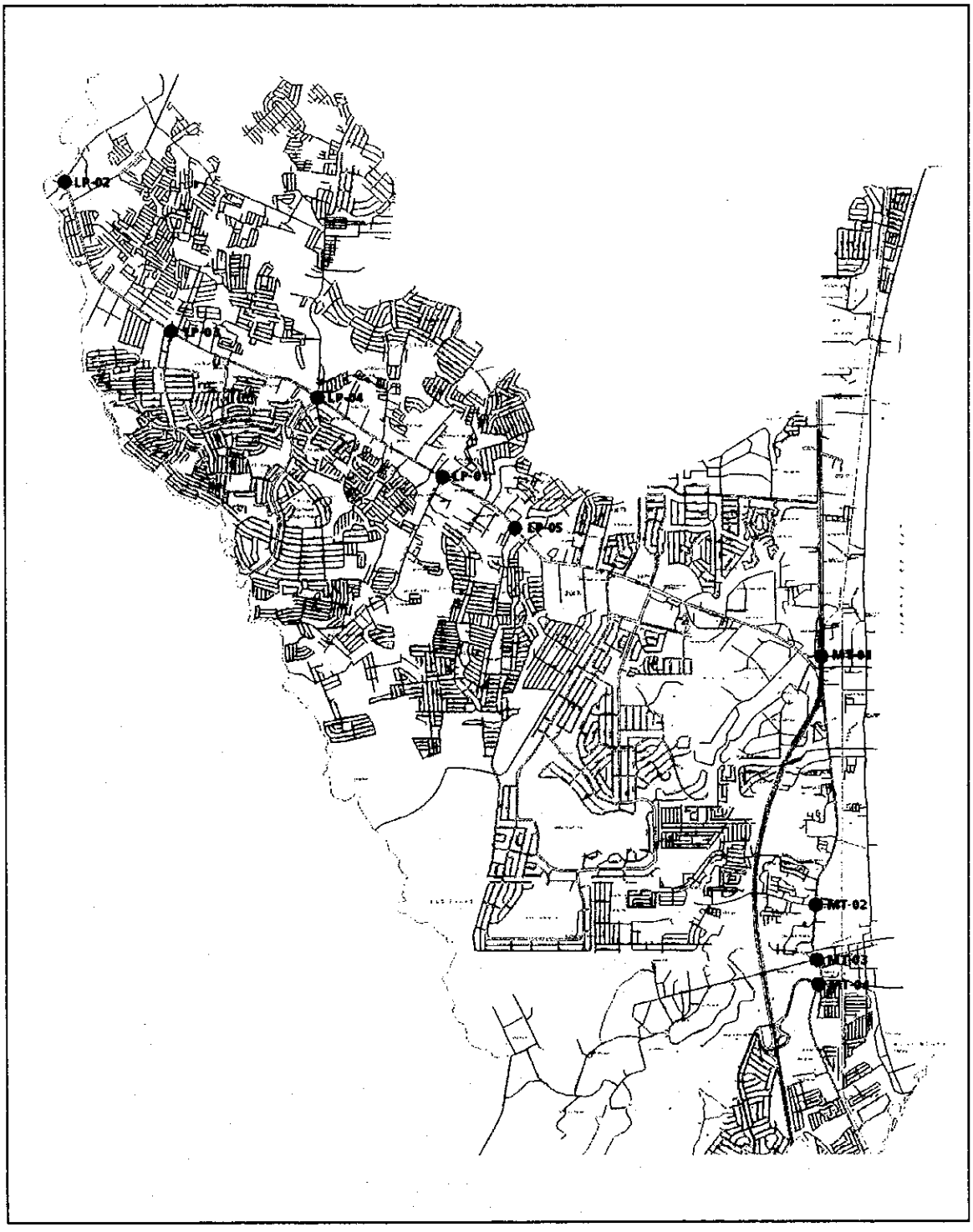


Figure 2.1e **Traffic Bottleneck Points in Makati, Taguig, Pateros and Parañaque**

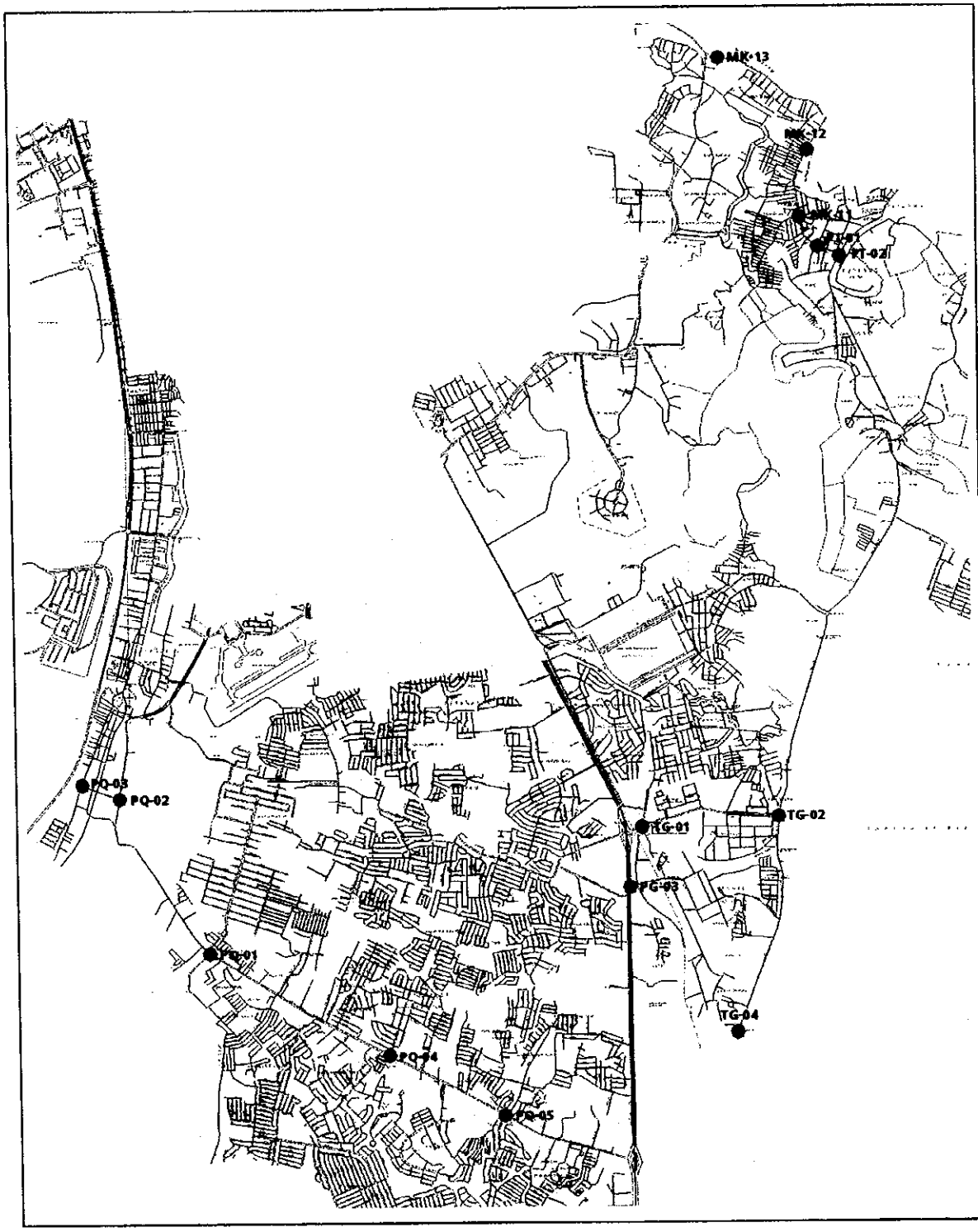


Figure 2.1f **Traffic Bottleneck Points in Marikina and Pasig**

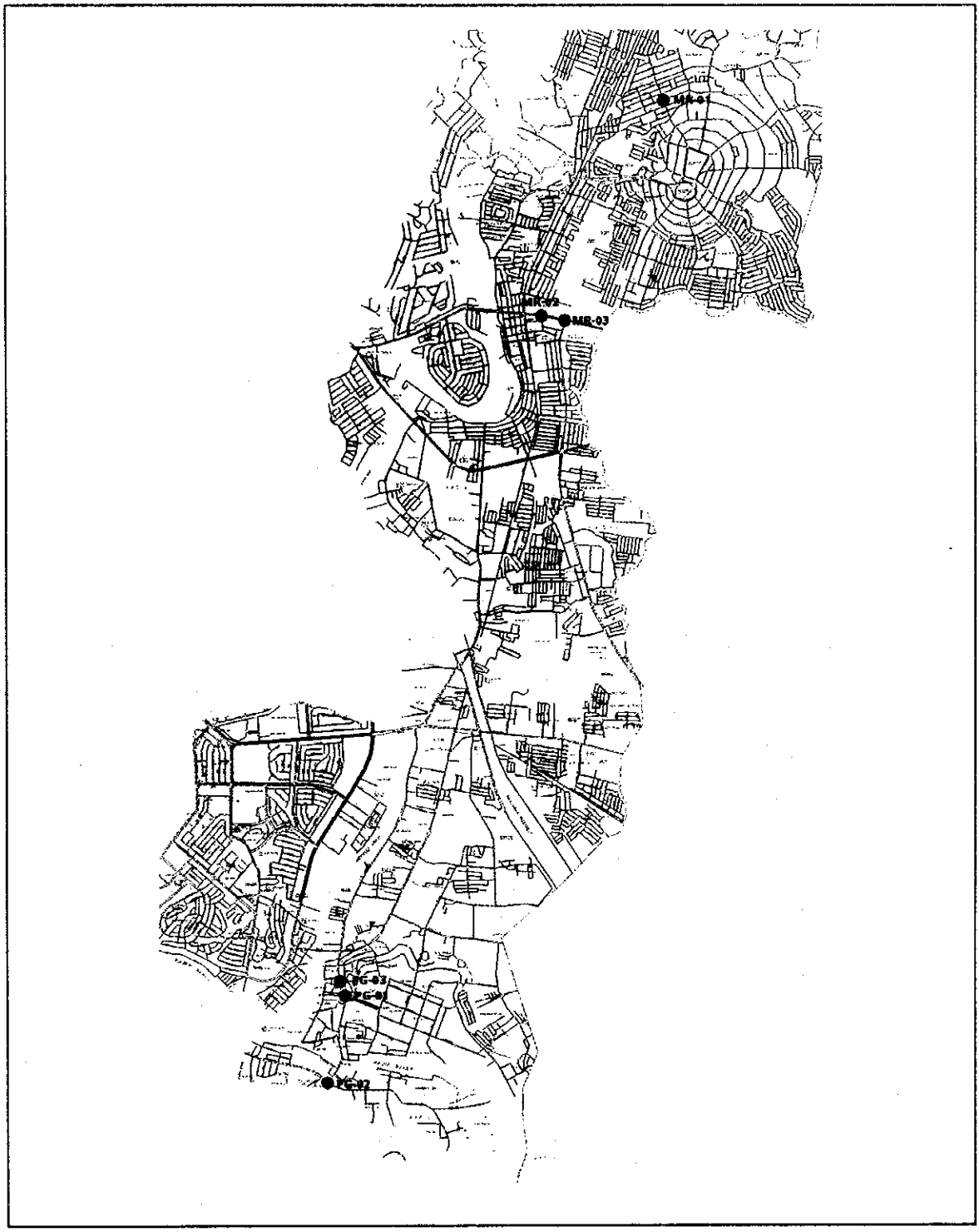
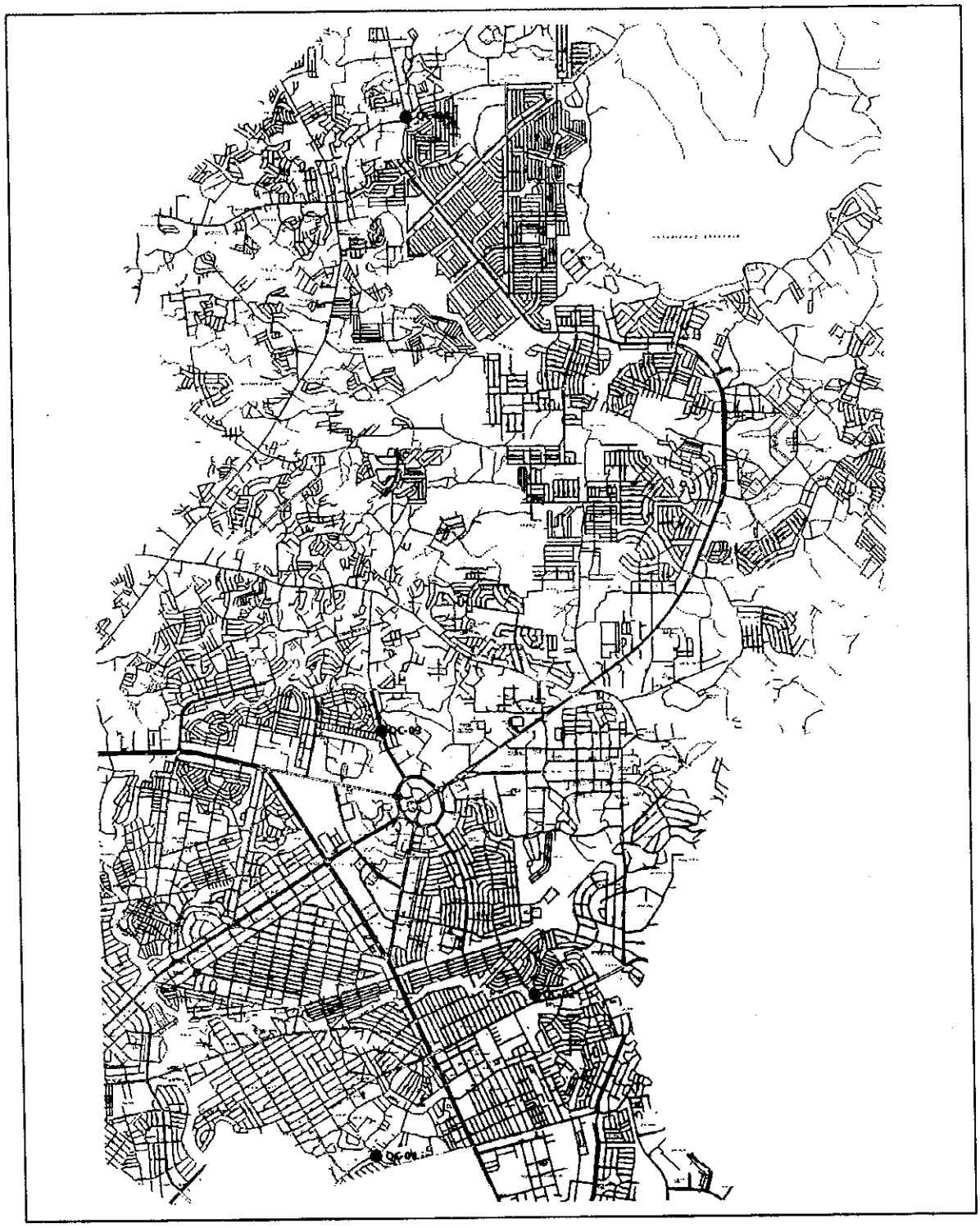
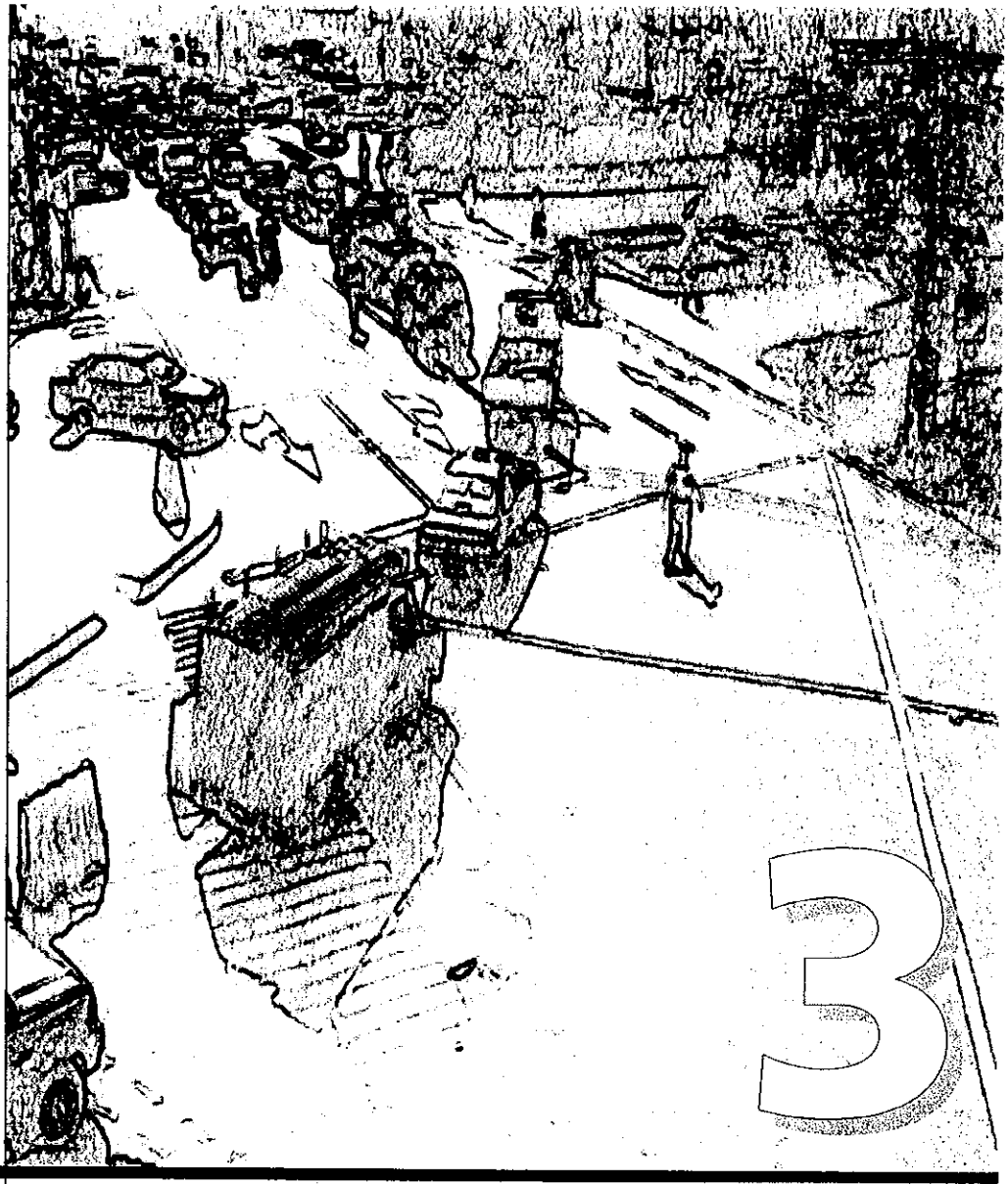


Figure 2.1g **Traffic Bottleneck Points in Quezon City**





3

Analysis and Formulation of Solutions

SSTRIMM Final Report
November 2001

3

Analysis and Formulation of Solutions

3.1 Profile of the TBPs

From the 120 identified TBPs, a total of 80 were included for analysis under SSTRIMM. During the analysis phase, however, two of the TBPs were merged into one, such that 79 TBPs remained.

The individual worksheets and descriptions for these 79 TBPs are contained in a separate report. They appear to be a good representation of the usual traffic problems faced by LGUs in Metro Manila. Table 3.1 below summarizes the topology of the traffic problems at the 79 locations.

Table 3.1 **Topology of the Identified TBPs**

Configuration or Topology of the TBPs	Count	%
T-junction or 3-leg intersection	28	35.4
Four-way intersection	38	48.1
Intersection with 5 or more approaches	4	5.1
Mid-block	4	5.1
Others (e.g., urban block, rotonda, unusual configuration)	5	6.3
Total	79	100.0

It can be seen from Table 3.1 that the 79 TBPs represent all types of traffic chokepoints that can conceivably be faced by any LGU in an urban setting.

3.2 Problems Related to the Identified TBPs

At a given intersection or section of a road, it is often difficult to define exactly what the problem is. The results of the problem are observable, such as long queuing of vehicles, congestion caused by vehicle-pedestrian conflicts, blockage and spillover of turning vehicles, etc. One has to observe closely and/or gather enough data before the root of the problem can be identified. In a signalized intersection, it may be due to improper cycle length or inadequate signal timing. In others, it may be lack of capacity of the approaches, uncontrolled loading and unloading of public utility vehicles, etc.

Investigations on the 79 remaining TBPs revealed problems classifiable into three broad categories, namely:

a. Operational

This consists of problems related to improper signal timing – cycle length, green split or phasing. The same can be said of unsignalized intersections manned by traffic enforcers who give too long time that favors some movements over the others.

b. Physical Condition / Geometry

This includes problems brought about by narrow intersection approaches, sharp intersection corners, steep gradient, large intersection areas, bad pavement condition, presence of obstructions (including vendors and road construction works) blocking path of vehicles and pedestrians, lack or misplaced traffic signs and facilities, etc. Under any of these conditions, vehicular movements are hampered.

c. Regulation / Enforcement

This consists of problems engendered by drivers disregard of traffic rules and decorum, compounded by lack of or faulty enforcement.

Examples are parking on No Parking zones, stopping of buses and jeepneys close to the intersection or at No Loading/Unloading zones, left turning movements where such restrictions are imposed, vendors occupying sidewalks or even encroaching on traffic lanes, and ignoring signs and signals, etc.

3.3 Steps in Analyzing a TBP

Data gathering preceded the formulation or design of measures. It would be repetitive and cumbersome, to discuss the various surveys made. Suffice it to say that all 79 TBPs had their respective traffic volumes counted – over a 16- hour period for most of the first tranche of 20 TBPs, and peak-hours only for the second tranche of 60.

There is no single way to go about analyzing traffic bottleneck points since they tend to have their own peculiar combination of characteristics. As a consequence, some methods of analysis will be more appropriate than others, depending on the exact circumstances of the bottleneck point. However, the 79 TBPs in this study were generally subjected to the following steps:

a. Relate the three sets of factors (as discussed in the previous section) to the particular TBP.

This is the act of defining the unique conditions of the TBP, and by doing so answers the basic question, "What is the main cause of the congestion?" This corresponds to the first step in any problem solving situation: define and understand the problem and its causes. While it may at times require some expert knowledge, the causes can usually be discerned given enough time in observing the operational conditions of the TBP.

b. Develop alternative solutions / options.

This is the act of formulating courses of action that will respond to the TBP's situation. The objective of these actions (i.e. what is the desired effect) should be clearly defined in the context of the TBP's conditions. Countermeasures that could relieve the identified problems/causes are generated. After implementation, the outcome can then be compared to these objectives and success be judged.

c. Weigh the options.

This is the act of characterizing the different alternatives in terms of the following issues:

- Potential for operational improvement – This is in terms of the characteristics related to the quality of traffic operation, such as the potential for delay reduction, improvement in safety level, as well as the smoothness of traffic flow. Since options may be singular or broad-spectrum, it is also necessary to understand how its sub-actions relate to the total option and whether or not these sub-actions are independent of each other or contingent (meaning one requires the other in order to succeed).

- Ease of implementation – The ease or ability to implement any action is a key concern that must be weighed before actual implementation. This would include answering questions such as, "How many people will be needed to implement it? What institutional arrangements are necessary to get it done?" An infeasible action will thus be rejected outright and focus can be made on the remaining options.

- Lesser cost – The physical measures will have a cost, as will the enforcement and management aspects of any solution. In addition, other questions will have to be answered, such as "What other resources will be needed? Who will pay? How will funds be sourced?"

d. The weight given to each of the abovementioned issues may vary from situation to situation or among various evaluators. The formulation of solutions to traffic problems often does not require complex mathematical method of weighing these issues.

   However, by defining the set of costs of the solution against the expected benefits, a rational decision can be reached and the proper balance between costs and benefits may be achieved.

3.4 Generic Causes and Recommended Solutions

The problems and contributory factors to congestions in the 79 TBPs are depicted on Figure 3.1. Indiscriminate loading and unloading of jeepneys appeared in 45 of 79 TBPs, while encroachment of sidewalks and roadways occurred in 35 out of 79. Physical conditions and road geometry was also very frequent: 58% of the TBPs suffered from some form of physical inadequacies. Many of the TBPs exhibited more than one congestion-inducing factor.

Table 3.2 is a synthesis of the typical causes of traffic congestion – deduced from the 79 TBPs – and the suggested countermeasures to address these problems. They can therefore provide a template for LGUs in the analysis and formulation of solutions to TBPs.

Figure 3.1 **Most Frequent Congestion Factors**

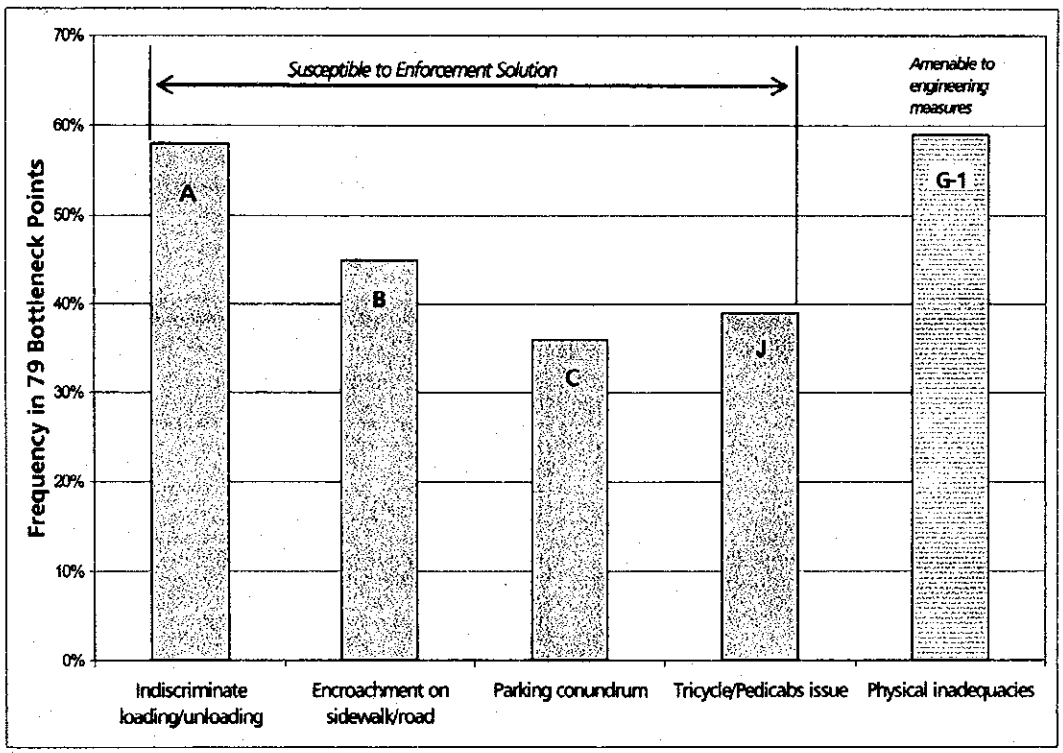


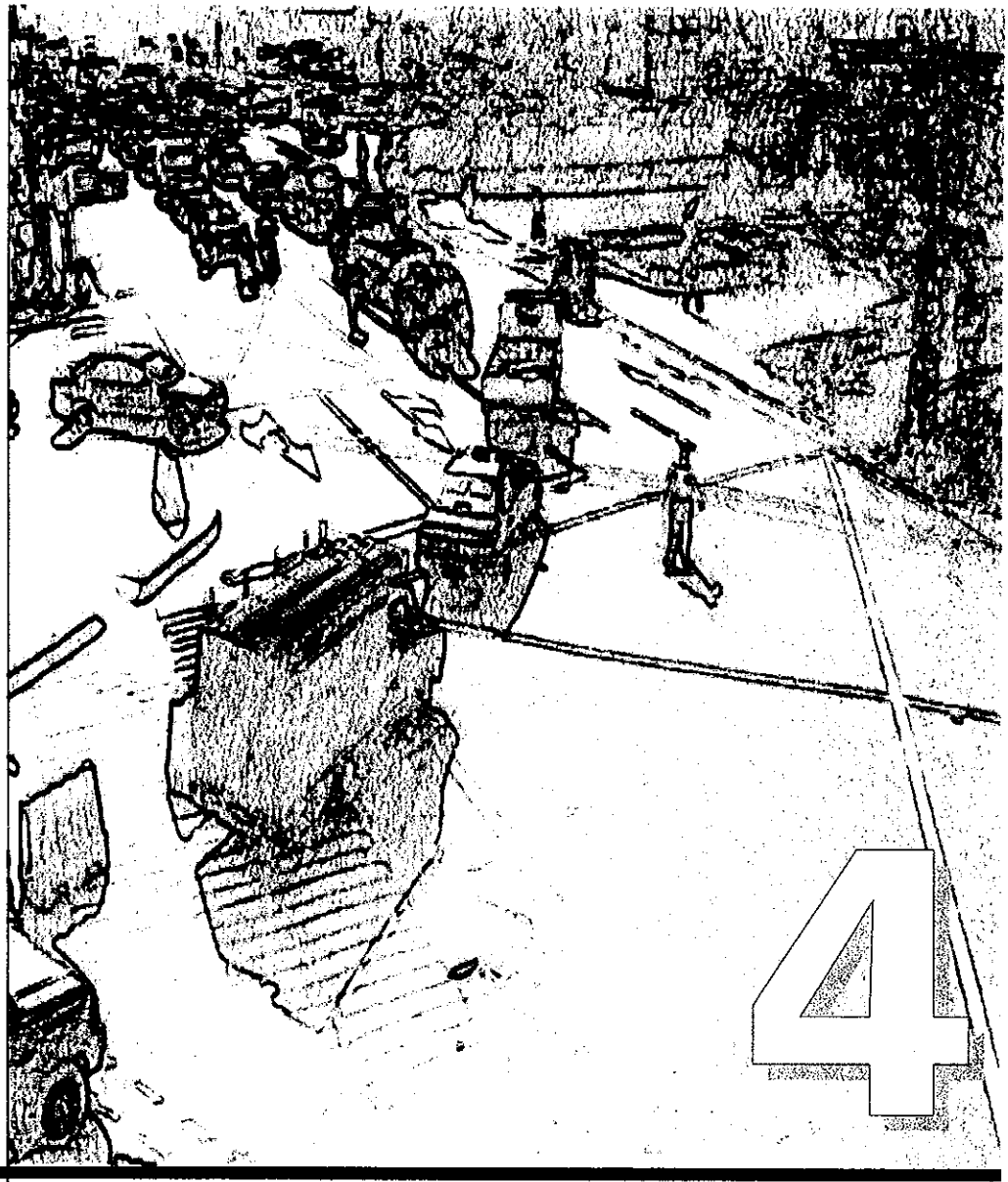
Table 3.2 **Causes of Congestion and Typical Countermeasures**

	Most Common Causes	Generic Solutions
A	Indiscriminate or uncontrolled loading and unloading by PU vehicles Deliberate slowing down before the traffic lights to catch the red light and pick-up/unload passengers	Designate specific points for bus/jeepney stops, about 50 meters away from intersection Provide loading/unloading bays off the main road, space permitting, to keep lanes for mainstream traffic free; Impose penalties, and/or fines to erring drivers; Dissuade passengers openly through megaphones, indirectly with use of barriers or additional delays, imposition of fines for jaywalking
B	Encroachment of road space, and/or sidewalk, by vendors for hawking of goods; by private cars for parking; by public utility vehicles for use as terminals and layover areas.	Provide off-road alternative locations for vendors or parkers or transport terminals Conduct periodic, recurring, drives to remove usurpers, tow parked vehicles, and/or demolish structures; Impose penalties/fines on violators; Install bollards or barriers to prevent unwelcome use of sidewalks
C	Parking challenge: high demand for parking arising from nearby activities but no supply of on-street or off-street parking spaces; Indiscriminate parking along busy streets	Ban parking at all times or at certain hours of the day; Penalize or tow illegal parkers; Provide for off-street parking facilities; Require new(or existing) establishments to incorporate adequate scale of parking facilities; Allow parking, but at exorbitant rates
D	Severe road friction arising from vehicles getting in/out of establishments with large frontage along main roads (prevalent in areas with schools, market, many retail shops)	Restrict the length/breadth of ingress/egress for properties and establishments along major thoroughfares; Impose frontage tax; Restrict vehicle access to buildings from main roads, and direct them into service or secondary roads; Install bollards or barriers to restrict movements within tolerable limits
E	Too many conflicts at intersections, due to left-turns, right-turns, through, u-turns movements	Minimize conflicts by banning low-volume turning movements at that intersection and transferring it elsewhere; Channelize the intersection, to limit movements to specific lanes; Improve geometries of road curbs, to speed up turning movements; Examine traffic re-routing options, or introduce paired one-way streets
F	Competing demands of pedestrians and vehicles for the same road space, especially in commercial, educational, and leisure zones.	Provide separation – in time or space - of pedestrians and vehicles, for the safety of life and property; Build pedestrian overpasses or underpasses; Install pedestrian barriers, to preclude overspill from sidewalks to road lanes; Transform the area into pedestrian malls, at specific days/times

continued

Table 3.2 **Causes of Congestion and Typical Countermeasures** (continued)

Most Common Causes		Generic Solutions
G-1	Physical inadequacies such as deteriorated pavement, lack of sidewalks, poor geometry of roads/intersection, etc.	Remedial steps by erecting or constructing the required civil works; Institute geometric improvements, where appropriate;
G-2	Lack markings, signage, traffic control devices, etc.	Provide pavement markings, standardized traffic signage, and the like, to guide motorists and pedestrians;
G-3	Temporary obstruction arising from diggings, road closures, construction, garbage piles, debris, etc.	Fast-track diggings or road works, restrict works at certain times of day, adopt more creative construction methods; Remove obstructions, debris, garbage piles, etc. Impose time-bound road works permits, with penalties for delayed completion Require traffic re-routing plan, mitigation measures, and/or public notification
H-1	Queue propagation, or ripple effect, from adjoining primary intersection;	Synchronize action on this secondary chokepoint with that of the major one;
H-2	Uncoordinated traffic signals, or outdated signal phasing, phasing inappropriate to road configuration	Modify signal phasing or pattern dynamically; Make the two chokepoints behave as one with synchronized signals
J	Inter-mixing of pedicabs and tricycles with other modes	Separate the routes of small transport modes from larger and faster-moving vehicles; Restrict pedicabs/tricycles' sphere of operations; Introduce bicycle or pedicab lanes;
K	Driving pattern, such as cutting corners, jumping the queue, initiating own counterflows, wrong priority in traffic hierarchy	Deploy traffic enforcers at problem intersections; Penalize adverse driving behavior with fines or longer delays; Continuing driver education; Install yellow box, yellow lanes, and appropriate regulatory signs; Introduce physical measures (i.e., civil works) like islands, medians, barriers, etc. whenever feasible.



4

The Selection of the Pilot TBPs

SSTRIMM Final Report
November 2001

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The Selection of the Pilot TBPs

4.1 The Selection of the Pilot TBPs

To select the TBPs that will be implemented on a pilot basis required ranking of the 20 TBPs comprising the first tranche.

The methodology for the ranking and selection of pilot projects is depicted on Figure 4.1. Each of the 20 TBPs was rated against five criteria, as follows:

a. Traffic volume – number of vehicles entering the intersection or road section, during peak hour. The higher the volume, the higher the score.

b. Degree of potential improvement – extent of possible improvement from the existing condition, assuming full implementation of the countermeasures.

c. Environmental and social conditions – qualitative assessment of the environmental and social conditions in terms of existing noise and air pollution. The more polluted the location, the higher the score (notwithstanding the fact that the traffic measures might contribute only a negligible improvement to the situation).

d. Financial capability – refers to the financial status of the LGU where the TBP is located, rather than to the TBP itself. The 17 LGUs

were ranked according to their 1998 incomes; the poorer the LGUs, the higher its rank score on the premise that it deserves priority over its wealthier neighbors.

e. **Institutional receptivity** – rates the state of readiness of the LGUs to implement traffic management measures, their consistency in attending the seminar workshops, the quality of their submissions of identified traffic bottleneck points. This criterion is meant to give higher score to LGUs with high probability of successfully implementing the pilot TBPs.

4.2 Criterion of Traffic Volume

This was defined as the vehicular and passenger volumes passing through the particular TBPs. The information base included vehicular traffic counts, composition of public transport vehicles, and passenger and/or pedestrian counts. The decision rule is to give priority, hence higher scores, to those TBPs with larger passenger throughput and bigger vehicular counts.

Table 4.1 shows the summary of information given to the seminar-workshop participants pertaining to the first selection criterion: traffic volume. The information given to the participants also included peak hour traffic volumes (in equivalent passenger car units) along the national roads and along the local roads in the identified TBPs.

4.3 Criterion of Degree of Improvement

The question to be answered by this criterion is: "To what extent will the problem be lessened once the improvement scheme is put in place?" It requires some judgment about the efficacy of the proposal as well as value judgment on how far it will alter existing conditions.

Combined with the traffic volume criterion, these two factors provide a measure of the economic benefits of the proposed countermeasures. Also, their combined weights comprised 70% in value.

Table 4.2 contained detailed information to guide the evaluation process.

Figure 4.1 **Methodology for Ranking of (and Selection of Pilot) Traffic Bottleneck Points**

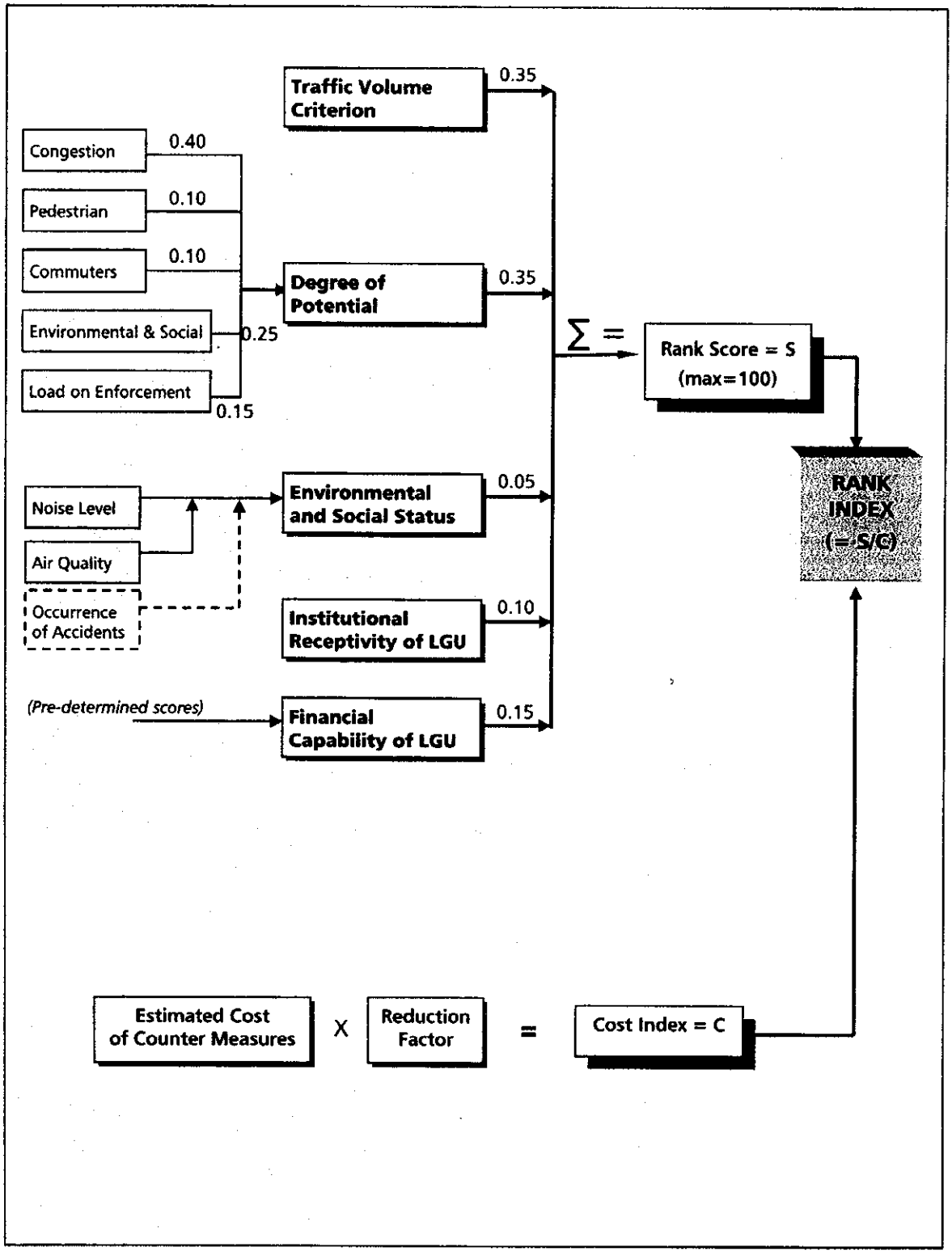

Table 4.1 **Guide in Evaluating the TBPs against Criterion 1: Traffic Volume**

TBP Code	Location	Peak Hour Traffic Flows (PCUs)			Share of Local Road Traffic	Estimated Peak Hour Passenger Flows
		Total	National Road	Local Road		
CC-01	A Mabini / JP Rizal	1,553	0	1,553	100%	8,600
LP-01	Marcos Alvarez / Alabang-Zapote Road	3,410	2,393	1,017	30%	14,000
MK-01	Nicanor Garcia / Jupiter	3,027	0	3,027	100%	7,400
ML-01	P Aquino Ave / Sanciangco /P Borromeo	1,641	0	1,641	100%	5,700
MD-01	Shaw Blvd / Lee St / Wack-wack / Old Wack-wack	4,619	3,106	1,513	33%	21,000
MD-02	Shaw Blvd / Sheridan St / San Miguel Ave	4,953	1,987	2,966	60%	20,800
MN-01	Legarda / Bustillos	2,413	1,698	715	30%	10,500
MR-01	BG Molina / G del Pilar	1,349	0	1,349	100%	2,700
MT-01	Montillano / Montillano Ext / National Road	3,980	2,304	1,676	42%	15,200
MT-02	Muntinlupa City Hall / MCM Hospital / Bruger	2,384	1,865	519	22%	8,900
NV-01	M Naval/Tangos /F Pascual /L Santos /Gov Pascual	621	0	621	100%	2,600
PQ-01	Canaynay Avenue / Dr A Santos Ave	4,473	2,772	1,701	38%	16,000
PY-01	Burgos St / Libertad St	2,563	1,380	1,183	46%	12,400
PG-01	Plaza Rizal / Plaza Col Flores	2,532	0	2,532	100%	8,500
PT-01	B Morcilla / P Herrera	1,408	0	1,408	100%	6,200
QC-01	Boni Serrano St / Benitez St / Valentina St	2,450	1,165	1,285	52%	4,800
QC-02	Anonas St / Molave St	2,431	1,592	839	35%	9,800
SJ-01	Wilson St / P Guevarra St	2,964	0	2,964	100%	6,600
TG-01	Gen Santos Ave / East Service Rd	1,931	1,204	727	38%	4,600
VL-01	Karuhatan / A Pablo / MacArthur Hwy	3,205	2,594	611	19%	14,600

Table 4.2 **Guide in Evaluating the TBPs against Criterion 2: Degree of Potential Improvement**

TBP	Impact on Congestion	Impact on Pedestrian Movements	Impact on Commuters' Convenience	Environmental and Social Impact	Required Enforcement Efforts
CC-01	Moderate improvement in vehicular flows; due to market activities at one end	Medium impact; crosswalks are more clearly marked	Slightly longer walking distance for jeepney passengers	Moderate reduction of air pollution and noise due to reduced congestion	No change from present deployment; but may need more focus or consistency
LP-01	Medium; signal timing could improve traffic flows	Low; no new pedestrian facilities may be accommodated within ROW	Medium impact; additional waiting shed to provide convenience	Low; no drastic change in current environmental set-up	No change from present deployment.
MK-01	Signal synchronization with Buendia to improve Jupiter congestion	Low impact, pedestrian facilities already adequate	Low impact, little public transport component, except for tricycles	Low impact	No change; signalized intersection in need only of occasional intervention by enforcers
ML-01	Moderate improvement in overall capacity	Medium; clearing of obstacles to pedestrian movements	No effect	Low impact	No change; same enforcement level
MD-01	High impact, proposal will help reduce traffic flow conflicts and accidents	High impact; facilities to ease pedestrian flows and provide safer crossings	Low impact, commuter drop-off not too significant	High impact; potential for accidents greatly reduced	Scheme should lessen burden on enforcers, to the extent of manning reduction
MD-02	Medium impact, congestion mainly caused by narrow exit lane	Low impact, low pedestrian volume	Low impact, low commuter traffic drop-off in this area	Low	No change in present deployment of enforcers
MN-01	Medium impact, chaotic pedicab traffic cause of congestion	Medium, main impact to patrons of wet market	Medium; improper commuter loading/unloading also a cause of congestion	Medium; will cause more inconvenience to wet market patrons	Requires more intensive enforcement; particularly to ensure compliance of pedicabs
MR-01	Medium impact; expects to improve travel speed and provide orderly flow	Medium impact; pedestrian movements will be regulated	Medium Impact; loading/unloading points will be properly located	Medium Impact; improved noise and pollution level	No change in present deployment of enforcers
MT-01	Medium; congestion mainly caused by heavy pedestrian volume	High; wider sidewalks to facilitate pedestrian movements	Medium; commuter drop off to be located some distance away from present location	Medium, market vendors not to be allowed to take over additional sidewalk space	More enforcers needed to keep sidewalks free from vendors
MT-02	Medium; lane markings to facilitate flows and enforcement	Medium; crossings already marked, but underutilized	Low; designation of drop-off will require slightly longer walks for commuters	Low impact	Same as present number of enforcers presently deployed
NV-01	Low; faster flow along M Naval St will be for naught because of constricted capacity at F Pascual.	Low; no space available for pedestrian facilities	Low; no drop-off space can be accommodated	Low impact	May require re-deployment of existing enforcers - to focus on the turning point at F Pascual
PQ-01	Medium; signal timing could improve traffic flows	Low; pedestrian traffic not conflicting with vehicular flows	Medium; jeepney loading/unloading encroaching on intersection to be controlled	Negligible change	No major change in current enforcement requirements

continued

Table 4.2 **Guide for Degree of Potential Improvement** (continued)

TBP	Impact on Congestion	Impact on Pedestrian Movements	Impact on Commuters' Convenience	Environmental and Social Impact	Required Enforcement Efforts
PY-01	Low; congestion mainly caused by temporary construction works	High; pedestrian flows mainly hampered by improperly located signs	Medium; drop-off areas to be located further away from junction (cause of congestion)	Medium; some change in physical environment	No change in current number of enforcers, but entail more consistency or intensity
PG-01	High; expects to provide orderly flow and reduce vehicular and pedestrian conflicts	High; more orderly flow of pedestrians	Loading and unloading points will be relocated; still shorter walk needed	High; improved noise and air pollution at impacted areas - church; park; museum; commercial areas	Scheme likely to reduce demands on enforcers, to the extent of reduction in number
PT-01	Medium; congestion mainly caused by jeepneys waiting for passengers	Low; sidewalks occupied by vendors and by extensions of commercial establishments	Medium, particularly for tricycle patrons; enforcement of one way scheme to alter their current routes	Medium; noise levels from tricycle operations can be reduced	Requires more intensive enforcement of loading/unloading restrictions
QC-01	Medium, and only at peak; channelization to facilitate vehicle movements	Low; pedestrian volumes are low	Low; not a major commuter drop-off / loading area	Low	No change. Scheme designed to lessen likelihood of enforcer's time.
QC-02	Medium; congestion caused by PUJs propensity to counterflow on turning left to Molave.	Medium; designation of pedestrian crosswalks to reduce conflict at other sections of Anonas	Slightly longer walking distance for jeepney passengers going to Aurora	Moderate reduction of air pollution and noise due to reduced congestion	Slight; more enforcers are initially needed to educate motorists
SJ-01	High; reduction of vehicular flow conflict expected to speed up flow	Low; there are presently few pedestrians	Low; there are no public transport routes passing through the intersection	Moderate reduction of air pollution and noise due to reduced congestion	No change from current practices
TG-01	Medium; congestion mainly an offshoot of SLEx junction congestion, and spill-over of pedestrians	Medium; need to clear sidewalks for vendors to facilitate pedestrian flows	Medium; commuter facilities to improve convenience	High; need for more controls on vendors' activities so as not to hamper pedestrian flows	No change from current deployment
VL-01	High; reduction of vehicular flow conflicts expected to speed up flow	High; clear designation of pedestrian crossing to reduce conflicts with vehicles	Slightly longer walking distance for jeepney passengers going to Aurora	Moderate reduction of air pollution and noise due to reduced congestion	No change in number, but better method and consistency are required.

4.4 Environmental and Social Conditions

It was determined early on that any impact of the traffic improvement measures on the environment would be minimal because the action would be 'small-scale' and the air and noise pollution from other sources tend to dominate and drown out the traffic-related sources. Furthermore, because the whole approach must be replicable in the future by the LGUs, it was decided that complex mathematical models be eschewed.

Nevertheless, information (see Table 4.3) was generated to guide the evaluation. The decision rule was to give higher priority to TBPs that are more polluted. In effect, the possible change in the quality of the environment as a result of the countermeasures had been excluded under this criterion, but considered in Criterion 2.

Table 4.3 **Environmental Conditions in the TBPs**

Traffic Bottleneck Point		Air Quality		Noise Level
		CO ppm, 8-hr	SPM $\mu g/cm^3$, 24-hr	Sound L_{10} dB(A), 18-hr
	Standard →	9.00	230.00	max allowable 70.00
CC-01	A Mabini / JP Rizal	4.67	342.88	76.56
LP-01	Marcos Alvarez / Alabang-Zapote Road	8.31	411.17	77.46
MK-01	Nicanor Garcia / Jupiter	1.80	50.66	75.68
ML-01	P Aquino Ave / Sanciangco / P Borromeo	4.16	196.51	78.86
MD-01	Shaw Blvd / Lee Rd / Wack-wack / Old Wack-wack	8.53	346.47	77.12
MD-02	Shaw Blvd / Sheridan St / San Miguel Ave	4.93	163.01	77.10
MN-01	Legarda / Bustillos	5.53	282.55	75.75
MR-01	BG Molina / G del Pilar	3.12	139.82	76.33
MT-01	Montillano / Montillano Ext / National Road	9.11	438.52	80.08
MT-02	Muntinlupa City Hall / MCM Hospital / Bruger Subd	8.62	404.49	78.31
NV-01	M Naval/Tangos Mkt/F Pascual/L Santos/Gov A Pascual	1.26	77.25	69.10
PQ-01	Canaynay Avenue / Dr A Santos Ave	10.80	339.07	78.50
PY-01	Burgos St / Libertad St	3.63	101.44	80.59
PG-01	Plaza Rizal / Plaza Col Flores	6.67	329.57	80.83
PT-01	B Morcilla / P Herrera	7.15	197.88	77.94
QC-01	Boni Serrano St / Benitez St / Valentina St	5.88	68.19	73.67
QC-02	Anonas St / Molave St	5.87	212.18	78.79
SJ-01	Wilson St / P Guevarra St	5.62	15.90	74.21
TG-01	Gen Santos Ave / East Service Rd	4.60	217.42	74.70
VL-01	Karuhatan / A Pablo / MacArthur Hwy	3.06	177.65	78.31

Note: CO= Carbon Monoxide; SPM = suspended particulate matter

4.5 Financial Capability

This factor was pre-determined, in that the scores assigned to the TBPs were automatically calculated based on the relative incomes of the LGUs. Latest revenue figures available were for the year 1998. Based on Table 4.4, Pateros got the highest score of 10 (because it had the lowest income) while Makati got the lowest score of 1 since it recorded the highest income.

Table 4.4 **Comparative Incomes of the 17 LGUs**

LGU	Total Income CY 1998	Rank by Income	Area	Income per Hectare	Rank by Income per area
Caloocan	1,159,708,458	8.27	55.80	20,783,306	9.26
Las Piñas	787,026,119	8.85	41.50	18,964,485	9.35
Makati	5,780,139,163	1.00	29.90	193,315,691	1.00
Malabon	266,993,392	9.67	23.40	11,409,974	9.71
Mandaluyong	981,601,782	8.55	26.00	37,753,915	8.45
Manila	3,106,579,980	5.20	38.30	81,111,749	6.37
Marikina	610,094,895	9.13	38.90	15,683,673	9.51
Muntinlupa	716,706,106	8.96	46.70	15,347,026	9.53
Navotas	168,726,401	9.82	2.60	64,894,770	7.15
Parañaque	1,017,190,676	8.49	38.30	26,558,503	8.99
Pasay	939,163,852	8.61	13.90	67,565,745	7.02
Pasig	1,859,853,517	7.16	13.00	143,065,655	3.41
Pateros	56,566,582	10.00	10.40	5,439,094	10.00
Quezon City	3,997,728,181	3.80	166.20	24,053,720	9.11
San Juan	389,588,219	9.48	10.40	37,460,406	8.47
Taguig	390,144,585	9.48	33.70	11,576,991	9.71
Valenzuela	595,118,408	9.15	47.00	12,662,094	9.65
Highest	*5,780,139,163*	*Makati*		*193,315,691*	*Makati*
Lowest	*56,566,582*	*Pateros*		*5,439,094*	*Pateros*

4.6 Institutional Readiness

Chapter 7 of this report presents the institutional study done under SSTRIMM. From that study component, Table 4.5 was prepared to establish the administrative likelihood that the pilot projects can be implemented successfully.

Makati and Marikina stood out among the 17 LGUs. With contrasting resources and organizational framework, they nevertheless demonstrated independent traffic management initiatives. Both have track records of implementing traffic improvement projects before SSTRIMM.

Table 4.5 **Comparative Capability of the 17 LGUs**

LGU	Existence of a Traffic Program?	Is formal TM process apparent?	Breadth & scope of Ordinances	Seminar Attendance	Qualifying TBPs
Caloocan	Not indicated. Can be interpreted as existing, due to special accounts	With chart. Functional & job descriptions stipulated in Traffic Code	Comprehensive traffic code, other ordinances covering a wide range of 12 topics	73.3%	35.71%
Las Piñas	Not indicated. Can be interpreted as NONE	With chart; no functional nor job descriptions	Limited range, touching on 5 topics.	44.4%	50.00%
Makati	YES, with forward plans & budget	With Chart, functional & job descriptions	Good coverage, touching on 8 topics	64.8%	71.43%
Malabon	Not indicated. Can be interpreted as NONE	With chart and functional descriptions only	Comprehensive traffic code; other ordinances on 8 topics	66.7%	88.89%
Mandaluyong	Not indicated. Can be interpreted as NONE	With Chart, functional & job descriptions	With a traffic code; other ordinances on 4 topics	75.0%	80.00%
Manila	Not indicated. Can be interpreted as NONE	No chart nor job descriptions;, but can be inferred from Ordinance	Ordinances touching on 7 topics.	61.5%	0.00%
Marikina	YES, with forward plans & budget	With Chart, functional & job descriptions	Comprehensive traffic code; other ordinances on 6 topics	47.6%	42.86%
Muntinlupa	Not indicated. Can be interpreted as NONE	With Chart, functional & job descriptions	Ordinances on 6 topics	83.3%	100.00 %
Navotas	Not indicated. Can be interpreted as NONE	With Chart, functional & job descriptions	Limited scope of traffic code; other ordinances on 6 topics	38.1%	33.33%
Parañaque	Not indicated. Can be interpreted as NONE	No chart, no functional nor job descriptions	Limited array of ordinances touching on 5 topics	53.3%	100.00 %
Pasay	Not indicated. Can be interpreted as NONE	No chart; limited functional & job descriptions	A traffic code plus separate ordinances on 3 other concerns	53.3%	25.00%
Pasig	Not indicated. Can be interpreted as NONE	With Chart and functional description. No job descriptions	A traffic code, plus separate ordinances on 10 other concerns	46.7%	100.00 %
Pateros	Not indicated. Can be interpreted as NONE	No chart, no functional nor job descriptions	Limited scope of ordinances on 4 topics	44.4%	100.00 %
Quezon City	Not indicated. Can be interpreted as NONE	With Chart & functional descriptions	10 topics, including a comprehensive traffic code	63.6%	80.00%
San Juan	Not indicated. Can be interpreted as NONE	No chart, no functional nor job descriptions	6 topics w/limited breadth	33.3%	50.00%
Taguig	Not indicated. Can be interpreted as NONE	With Chart, functional & job descriptions	9 topics, mostly encompassed in Traffic Code	77.8%	100.00 %
Valenzuela	Not indicated. Can be interpreted as NONE	Chart only. No functional & job description.	2 topics: illegal parking, excavations	55.6%	100.00 %

The fifth column of Table 4.5 rates the consistency of attendance of LGU staff to the seminar workshops. At that time of rating, only three sessions had been counted.

The last column, on the other hand, evaluates the quality of identified TBPs in relation to the guidelines. A lower percentage meant poorer understanding of what constitute small-scale and local traffic problems.

4.7 Results of Evaluation

The weighted scores of the ranking of the 20 priority TBPs from both the LGUs and the Study Team are shown on Table 4.6.

Table 4.6 **Final Results of the Evaluation for Pilot TBPs**

TBP Code	Name of Traffic Bottleneck Points	LGU Rating	Study Team Rating	Combined Scores	Rank	
					Score	R-Index
MT-01	Montillano / Montillano Ext / National Road	74.3	77.3	75.5	1	14
MD-01	Shaw Blvd / Lee Rd / Wack-wack Road	65.2	86.0	73.5	2	13
MD-02	Shaw Blvd / Sheridan St / San Miguel Ave	58.1	80.3	67.0	3	15
VL-01	Karuhatan/ A. Pablo/ MacArthur Hwy	59.0	73.1	64.7	4	2
PQ-01	Canaynay Avenue / Dr A Santos Ave	57.8	73.3	64.0	5	12
PG-01	Plaza Rizal / Plaza Col Flores	57.2	72.0	63.2	6	16
MT-02	Muntinlupa City Hall / MCM Hospital	59.6	63.5	61.2	7	4
LP-01	Marcos Alvarez / Alabang-Zapote Road	54.1	69.3	60.1	8	19
PY-01	Burgos St / Libertad St	53.0	64.2	57.5	9	20
SJ-01	Wilson St / P Guevarra St	51.6	65.0	57.0	10	8
TG-01	Gen Santos Ave / East Service Road	53.2	60.7	56.2	11	1
CC-01	A Mabini / JP Rizal	52.2	61.4	55.9	12	9
PT-01	B Morcilla / P Herrera	51.3	61.4	55.3	13	7
MR-01	BG Molina / G del Pilar	51.1	61.3	55.2	14	18
ML-01	P Aquino Ave / Sanciangco / P Borromeo	51.6	59.4	54.7	15	6
MN-01	Legarda / Bustillos	47.7	56.8	51.3	16	17
NV-01	M Naval/ Tangos Mkt / F Pascual /	51.9	47.0	49.9	17	5
QC-02	Anonas St / Molave St	44.4	56.8	49.4	18	10
MK-01	N Garcia / Jupiter	42.3	54.4	47.1	19	11
QC-01	Boni Serrano St / Benitez St / Valentina St	41.0	52.0	45.4	20	3

The ranking of the 20 TBPs based on scores submitted by the LGUs as well as those from the Study Team is shown on Column 6 (score) of Table 4.6. It does not consider the cost of the countermeasures. The last (7th) column would be the ranking based on rank-index, computed by dividing scores with the cost index. The latter is a rough measure of benefit-cost ratio, while the former is simply the magnitude of benefits.

4.8 Selecting the Pilot TBPs

The top four (4) ranking TBPs based on value score alone plus the first ranking TBP based on rank-index were recommended for pilot implementation. Five were recommended, instead of only two, because the budget of P3.0 million could accommodate all the five as shown on Table 4.7.

Table 4.7 **Allocating the Available Funds**

TBP	Location	Cost* (in Pesos)	Cumulative Cost
MT-01	Montillano / Montillano Ext / National Road	1,658,766	1,658,766
MD-01	Shaw Blvd/ Lee Rd/ Wack-wack Rd	365,982	2,024,748
VL-01	Karuhatan/ A. Pablo/ MacArthur Hwy	142,391	2,167,139
TG-01	Gen Santos Ave / East Service Road	244,417	2,411,556
PQ-01	Canaynay Avenue/ Dr. A Santos Ave	233,161	2,644,717
Malabon	Institutional strengthening: traffic materiel	Residual amount	3,000,000

The cost estimates were only preliminary, but sufficient for budgeting purposes. The sixth item, institutional strengthening – was added to maximize the use of available grant money from JICA. Being a residual value, it shall be disbursed only once the final cost of the five pilot TBPs are fixed via contracts to suppliers and/or construction firms experienced in similar traffic engineering works.

In May 2001, the Steering Committee of SSTRIMM approved the '5+1 implementation program' described in Table 4.7 above. Malabon was chosen as the recipient of the institutional strengthening item for the following reasons:

- it is one of the 12 LGUs not benefiting from the 5 pilot TBPs;
- it ranks second to the lowest in income among the 17 LGUs;
- it ranked highest on institutional receptivity.