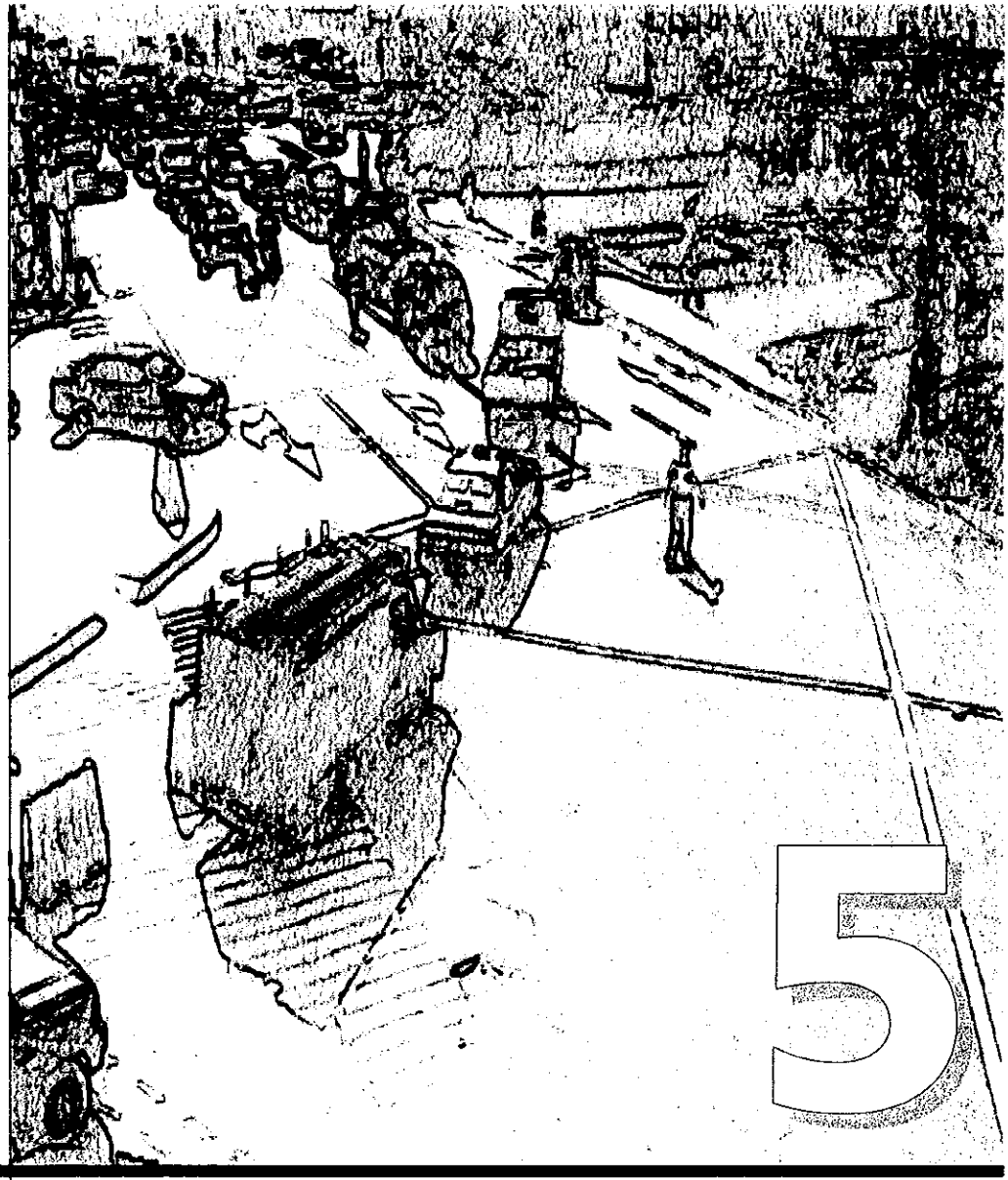

5

Implementation of the Pilot TBPs

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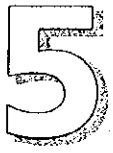


Implementation of the Pilot TBPs

5.1 High Hurdles for Small-Scale Measures

In communicating the selection of pilot projects to the recipient LGUs, it was emphasized that the implementation thereof should follow the normal course for typical projects under LGU ownership, control and supervision. Thus, it was envisaged that several steps had to be undertaken, prior to actual execution of the works, such as:

1. Formal acceptance of the proposed improvement as a pilot project in the context of SSTRIMM;
2. Review and buy-in of the proposed scheme by all departments of the LGUs involved in the traffic management process (e.g. Planning, Engineering, Enforcement, Council);
3. Obtaining the concurrence of national agencies, particularly that of DPWH and MMDA, notwithstanding the fact that the formulation of the scheme had already gone through the inter-agency gauntlets;
4. Public hearings or consultations, if required, with affected sectors in the community;
5. Coordination with the SSTRIMM study team as to the arrangement and schedule for execution;
6. Conduct of any appropriate information and education campaign;

7. Other steps to ensure success of the scheme, such as appropriation of additional funds for extra works not originally anticipated, cleaning of the pavements before markings are painted, enactment of ordinances if required.

While the above hurdles may seem insignificant at the metropolitan or national level, they could generate high emotions at the local level where the ensuing trade-offs often becomes personal. There are 'winners' as well as 'losers' in any traffic situation, and any proposed improvement would alter the numbers in either column. While community views need to be listened to, they tend to be parochial in the use of local roads as has been observed in the course of implementing the five pilot projects.

5.2 The Case of Mandaluyong

5.2.1 Capacity to execute

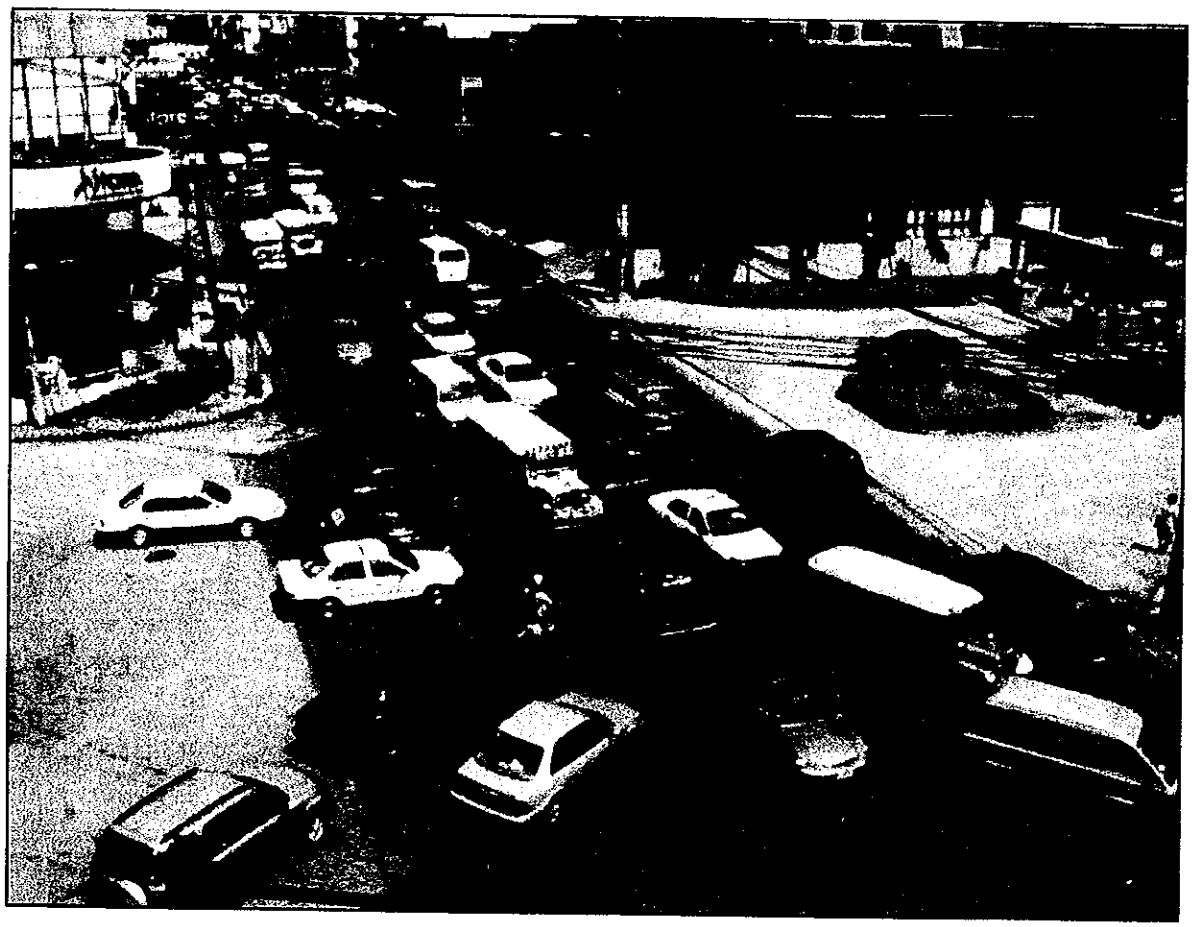
When it comes to traffic management, the City of Mandaluyong is still a 'babe in the woods.' Compared to Marikina, it has a smaller land area, earns 50% more, home to plushier residential subdivisions, and hosts to larger business and commercial establishments. By all yardsticks, traffic management should be at the top of its local agenda.

By its own admission, however, the pilot project of Shaw Boulevard / Wack-wack Rd / Lee St (Figure 5.1) will be its first case of local traffic improvement. Traffic management is still seen under the prism of enforcement – hence, its Traffic Task Force is headed by a Police Officer (organic to PNP, hence, borrowed). In terms of function, this task force is focused on enforcement. It is unclear as to who drives the TM process in Mandaluyong. In the absence of a special body for traffic, Mandaluyong must necessarily rely on lateral collaboration – among its planning, engineering, and public safety departments – for the TM functions to be realized. It has shown the beginnings of inter-departmental coordination, as well as local legislative support and barangay cooperation. It is showing plenty of promise, but its TM process is still inchoate and fragile.

The pilot project, therefore, can be considered a test case on whether it can stand on its own in the future. The problem intersection affects a lot of passing-through traffic – from San Juan, Pasig, Quezon City, and Makati. For this reason, an improvement

should benefit a wider segment of Metro Manila motorists. Most of the users, however, are private cars. Implementation of the scheme could founder on the conflicting demands of local versus metro-wide interests.

Figure 5.1 **The Wack-wack Road - Lee-St - Shaw Blvd TBP**



5.2.2 Implementation blues

The improvement scheme for the Shaw Boulevard / Wack-wack Rd / Lee St TBP is depicted in Figure 5.2. It underwent two public discussions and consultations, where reception was sanguine as to nix the need for a traffic advisory. The expectation was for a very smooth implementation.

In actuality, implementation was bumpy.

Pre-implementation jitters arose – which is normal for first-timers. An influential member of the community sought to overturn the scheme with a one-way option that had been tried (and abandoned)

in the past. Betraying its lack of confidence about the scheme, the officials involved deferred the construction of a permanent 'island' at the northeast corner of Lee Street and Wack-wack Road. Instead, temporary barriers were set up to mimic the function of the island – to be replaced by a more permanent structure only after several weeks of trial.

The actual execution of works went through 4 stages, instead of three:

(i) removal of the existing pavement markings;
(ii) laying down of the new markings;
(iii)setting up of temporary barriers, traffic cones, and interim advisories on the pavement; and,
(iv)construction of the permanent islands and signages.

To minimize traffic disruption, the works was intermittent over a period of 8 weeks (instead of 2) and performed on a staggered basis during off-peak hours and off-peak days.

That a traffic advisory was not needed turned out to be a false expectation. A Primer (Figure 5.3) about the scheme had to be hurriedly written and circulated. Subsequently, local officials felt the need for an information billboard – for which SSTRIMM was asked to craft the proposed contents. The billboard never got installed – a casualty of inter-departmental lethargy.

On the first day of implementation, it was found out that one lane of Lee Street was pre-empted by a nearby high-rise building undergoing construction. Thus, the scheme was suspended until the obstruction got cleared. The delay in clearing what was clearly an illegal encroachment of a roadway revealed further the institutional weakness of Mandaluyong.

Towards the end of October 2001, or nearly 4 months after start of the implementation process, the last remaining item – the construction of the island – was finally made.

Figure 5.2 **The Solution for the Wack-wack Road - Lee-St - Shaw Blvd TBP (MD-01)**

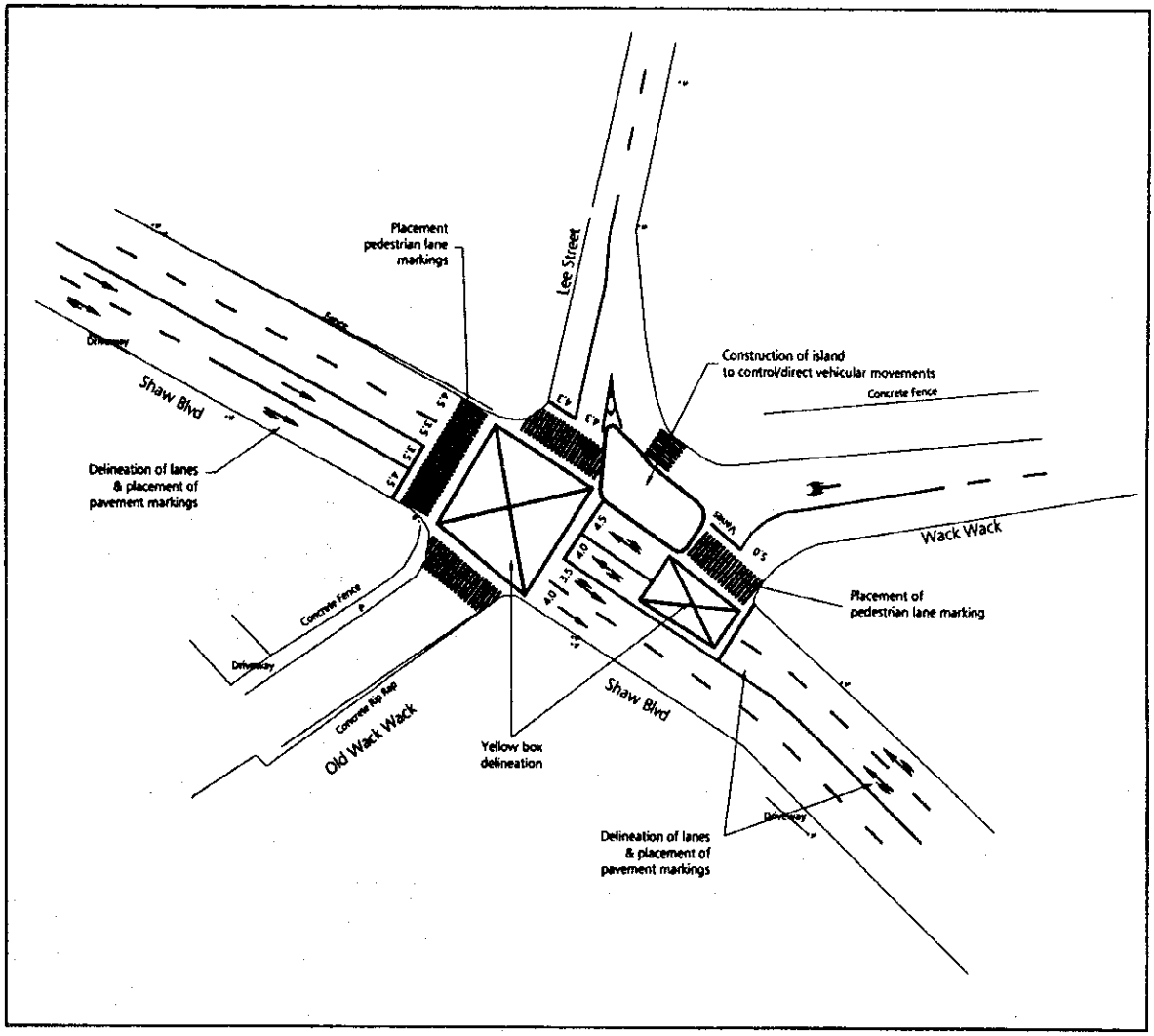


Figure 5.3 **The Primer for the Wack-wack Road - Lee-St - Shaw Blvd Pilot Project**

A Primer on the

Shaw Boulevard
Wack - wack Road
Lee Street
Intersection

in Mandaluyong City

AN EXERCISE IN
LOCAL TRAFFIC MANAGEMENT INITIATIVES

Prepared by

City of Mandaluyong (Traffic Task Force)
Metro Manila Development Authority
(Project SSTR IMM)

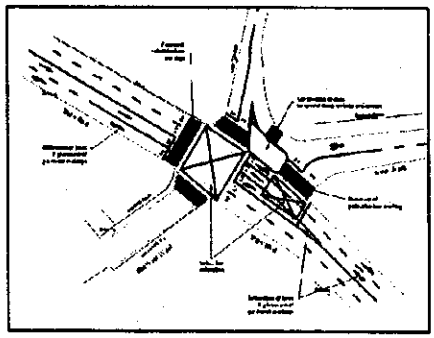
with the assistance of the Japan International Cooperation Agency

THE AUGEAN TASK

Wrestling with the traffic problems of Metro Manila is probably even more difficult than Hercules cleaning up the Augean stable. But it is not impossible. Everybody has to pitch in; a minor alleviation here and there ultimately becomes a deluge. Take the intersection of Shaw Boulevard and Wack-wack with Lee Street in Mandaluyong. The congestion there is not the worse in Metro Manila, but bad enough to warrant priority attention of the City of Mandaluyong.

THE PROBLEM

Nature abhors a vacuum. Filipino drivers abhor too much road space. That may explain in a nutshell why traffic congestion occurs now and then, especially during rush hours, at the intersection of Shaw Boulevard,Wackwack Road, Lee Street, and Old Wackwack. It is a complicated vehicular junction – with 5 legs and 2 intersections in one place. Each leg allows 3 turning movements each. More than 4,600 vehicles were counted over 1 hour at peak – large but not as crowded as other streets in Metro Manila. In fact, the junction has wide approaches. And therein lies the problem: drivers tend to jump the queue and occupy all available spaces at the approaches, thereby multiplying the points of conflicts. And make life for Traffic Enforcers extremely difficult and frustrating to manage and to untangle.



The basic solution is to reduce the points of conflicts and force drivers to queue – through channelization, pavement markings, proper signage, yellow box rule.

WHO WILL BENEFIT (OR SUFFER)?

Any change from the existing situation produces 'winners' as well as 'losers'. Queue breakers will be losers. Law-abiding drivers will benefit. Left turners from Lee Street to Wack-wack Road (1.3% of peak-hour hour volume), as well as left turners from Wack-wack Road to Old Wack-wack Road (1.2%), will suffer. The dominant traffic flows along Shaw Boulevard and Lee Street will be winners.

WHY NOT PUT IN TRAFFIC SIGNALS?

The DPWH is planning to install the so-called SCAT traffic signals, but it is still 2 to 3 years away. Meantime, what should be done? Small-scale traffic engineering measures should alleviate the congestion now. And sets the stage for the computerized signals of DPWH.

WHY NOT MAKE LEE STREET ONE-WAY?

It was an option considered, but eventually drop. A parallel road would have to become one-way also, in the opposite direction, to accommodate the flow of vehicles displaced at Lee Street. S.Laurel and Ideal Streets can not take up this role. Paired one-way streets work best in a grid-pattern road network. Such a configuration, unfortunately, does not exist in the area.

HOW DID THE PROPOSED SCHEME COME INTO BEING?

It evolved from a study called Small-Scale Traffic Improvement Measures for Metro Manila (SSTRIMM), funded with grant money from the Japan International Cooperation Agency (JICA) and coordinated by the Metro Manila Development Authority. The purpose of SSTRIMM is to assist the 17 local government units (that comprise metropolitan Manila) develop their capability to initiate and solve a number of traffic problems. The Shaw-Wack-wack intersection was identified by the City of Mandaluyong as its top priority traffic problem. As a consequence, it got into the planning scope of SSTRIMM traffic consultants. Traffic counts were made, and a practical scheme formulated. After several reviews, the chosen scheme was discussed extensively with Mandaluyong local officials sometime in May and June 2001. The Barangay gave its thumbs up for the implementation of the scheme.

Consultations have been made. Such a process should become standard operating procedure of LGUs. However, it does not mean a decision by popular vote by the residents of Wack-wack nor 100% satisfaction of those consulted. For practical reasons, the consultation did not include motorists from San Juan, Pasig, Manila, Makati and Quezon City who regularly pass the junction.

WILL THE SCHEME WORK?

There are no guarantees. Traffic management deals with 'unquantifiable' human behavior as well as 'measurable' traffic data. It should work, if experiences with similar chokepoints elsewhere are any gauge.

As a concession to 'doubters', the proposed 'island' at the corner of Lee and Wack-wack (side of the golf country club) will not be built immediately. A temporary barrier will first be set up.

To make sure that we – especially Mandaluyong traffic personnel – learn from the scheme – whether a success or a failure, an evaluation of the traffic delays "before" and "after" will be made. It will attempt to answer: was there really an improvement? An impact evaluation is a pre-condition of JICA. It is intrinsic to a more scientific approach to our urban traffic problems.

Comments may be sent to:

Mandaluyong Traffic Task Force:

MMDA Project SSTRIMM
Orense St. corner EDSA
Guadalupe, Makati
Telefax: 882-0898
e-mail: sstrimm@transportas.com

5.3 The Case of Muntinlupa

5.3.1 Capacity to Implement

Unlike Mandaluyong, the City of Muntinlupa has created a separate Department of Traffic, Environment, and Discipline (TED) – which embraces traffic planning, engineering and enforcement under one roof. It has recognized traffic management as more than enforcement. There are in-house local officials driving the TM process –something conspicuously absent in the case of Mandaluyong. Although less dependent on intra-departmental coordination to get things done, it attempts to bring in other stakeholders – especially its City Council – into the process.

In terms of income, it only has about ¾ that of Mandaluyong but with nearly twice the land area. Its traffic problems are probably less severe, and yet it has a more developed TM status than the former.

Although not yet in the same class as Marikina's traffic management capacity, Muntinlupa is showing signs of getting there. It has implemented a few measures of its own in the past. The pilot project of Montillano St / Montillano Extension / National Highway had been in their local drawing board for about two years already before SSTRIMM. Pedestrian traffic and sidewalk vendors pose a daily challenge to the capability of the local traffic officials.

During a public consultation session on the scheme, the affected sidewalk vendors naturally raised objections. They sought exemptions, if not deferment or modifications. A test of political will. Indicative of strong leadership and confidence about the viability of their plans, Muntinlupa officials did not waver.

The problems arising from this intersection is that it is functioning as a virtual intermodal plaza in the south for the entire National Capital Region. Most of the pedestrian and vehicular traffic are not of local origin. It is a huge on-street sorting and transfer machine for bus, jeepney, tricycles and other modes as well as commuters bound for (or coming from) outside Muntinlupa. An improvement in this area would therefore have ripple effects throughout the provinces of Cavite and Laguna, as well as the neighboring towns of San Pedro, Sta. Rosa, Las Piñas, and Parañaque.

Figure 5.4 **Montillano Road, Muntinlupa**

The proposed improvement entailed substantial civil works – pedestrian barriers to replace the existing makeshift ones, geometric modification of curbs and island, pavement markings – is illustrated on Figure 5.5.

5.3.2 Implementation hiccups

Modification to the original scheme surfaced during the pre-implementation discussions and site inspections. For one, the DPWH was adamant in relocating its recently-installed 'smart traffic signals'. For another, the drainage outfalls would be adversely affected if the sidewalks were to be widened beyond their current dimensions. These were immediately resolved.

When markings on pavements were about to begin, a construction crew under contract with DPWH commenced excavation works on sections of the approaches to the intersection. The road diggings caught the Muntinlupa DTED by surprise; it turned out that its local

engineering department issued a permit without advising the former. Implementation, therefore, had to be postponed. The implementation of the works was finally completed in October 2001, despite threats of lawsuits from a few establishments who see the barriers as limitation to their rights of access.

Figure 5.5 **The Plan for the Proposed Improvements for Montillano Road, Muntinlupa (MT-01)**

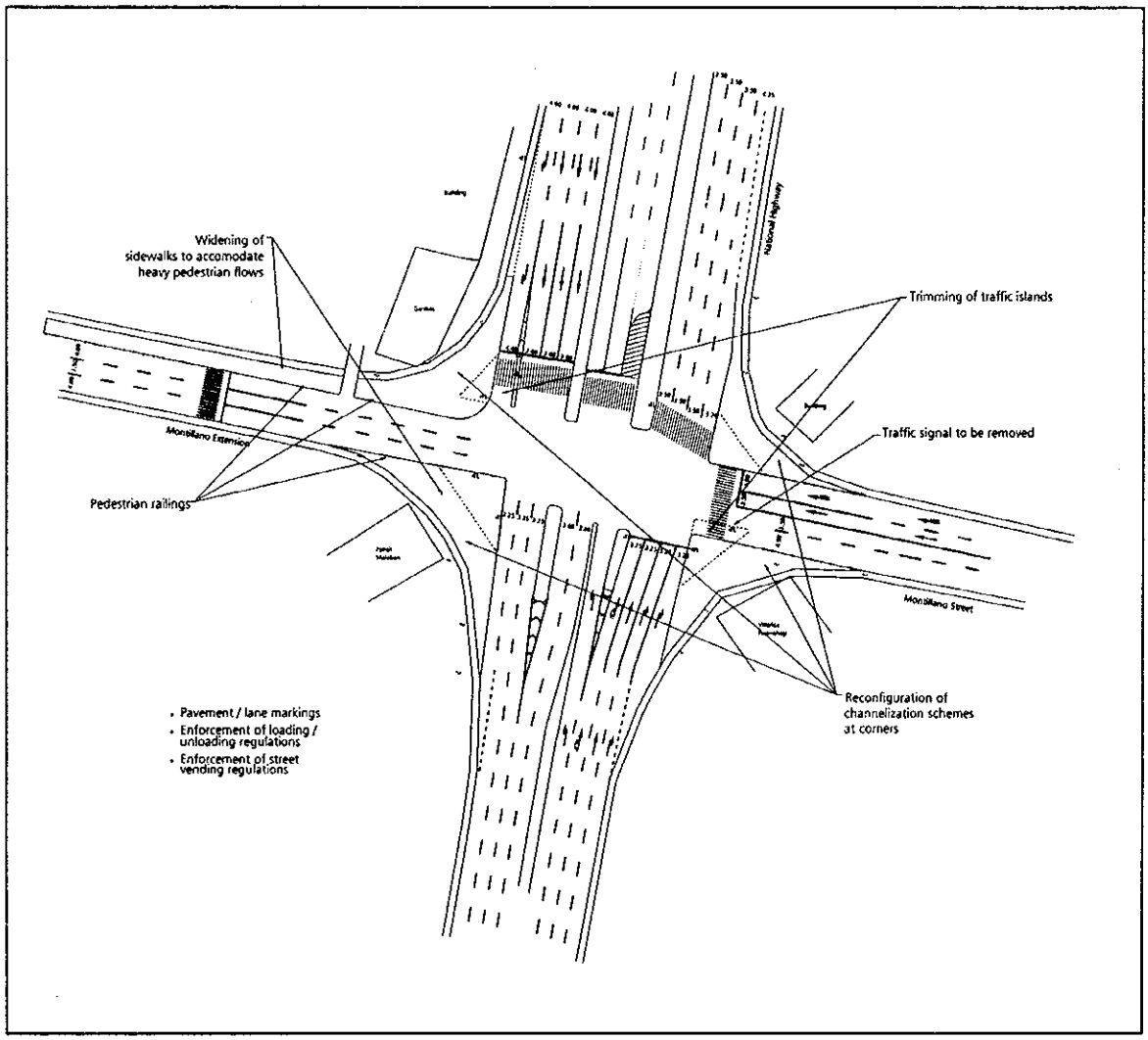
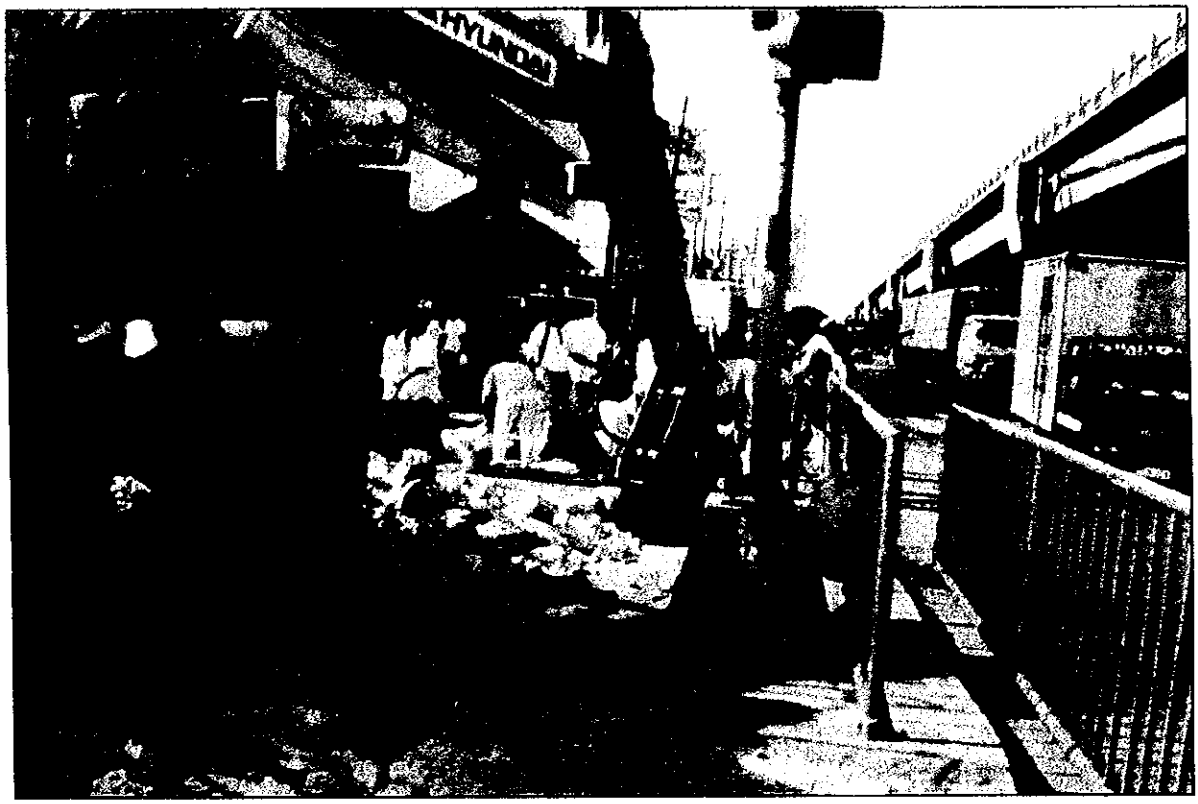


Figure 5.6 shows images of various stages of implementation for the reconfiguration of the traffic island

Figure 5.6 **MT-01: Various Stages of Implementation**



5.4 The Case of Valenzuela

5.4.1 Who is in charge in Valenzuela?

Valenzuela is even less organized than Mandaluyong. Although it appears to have strong planning capability, it revealed weak inter-departmental collaboration in addressing traffic problems.

There is no clear body or official driving the TM process. Like Mandaluyong, traffic problem is primarily seen as an enforcement concern. Ad hoc solutions appear to be the norm.

Income-wise, Valenzuela trails behind Muntinlupa and Mandaluyong. Its TM capability is also several notches lower.

The public consultations on the proposed scheme for Karuhatan / A Pablo / MacArthur Highway revealed a stronger Barangay hand in the TM process. Fortunately for Valenzuela, the various 'hurdles' to implementation (mentioned in Section 5.1) appear to be lower and easily surmountable – compared to the pilot TBPs for Mandaluyong and Muntinlupa.

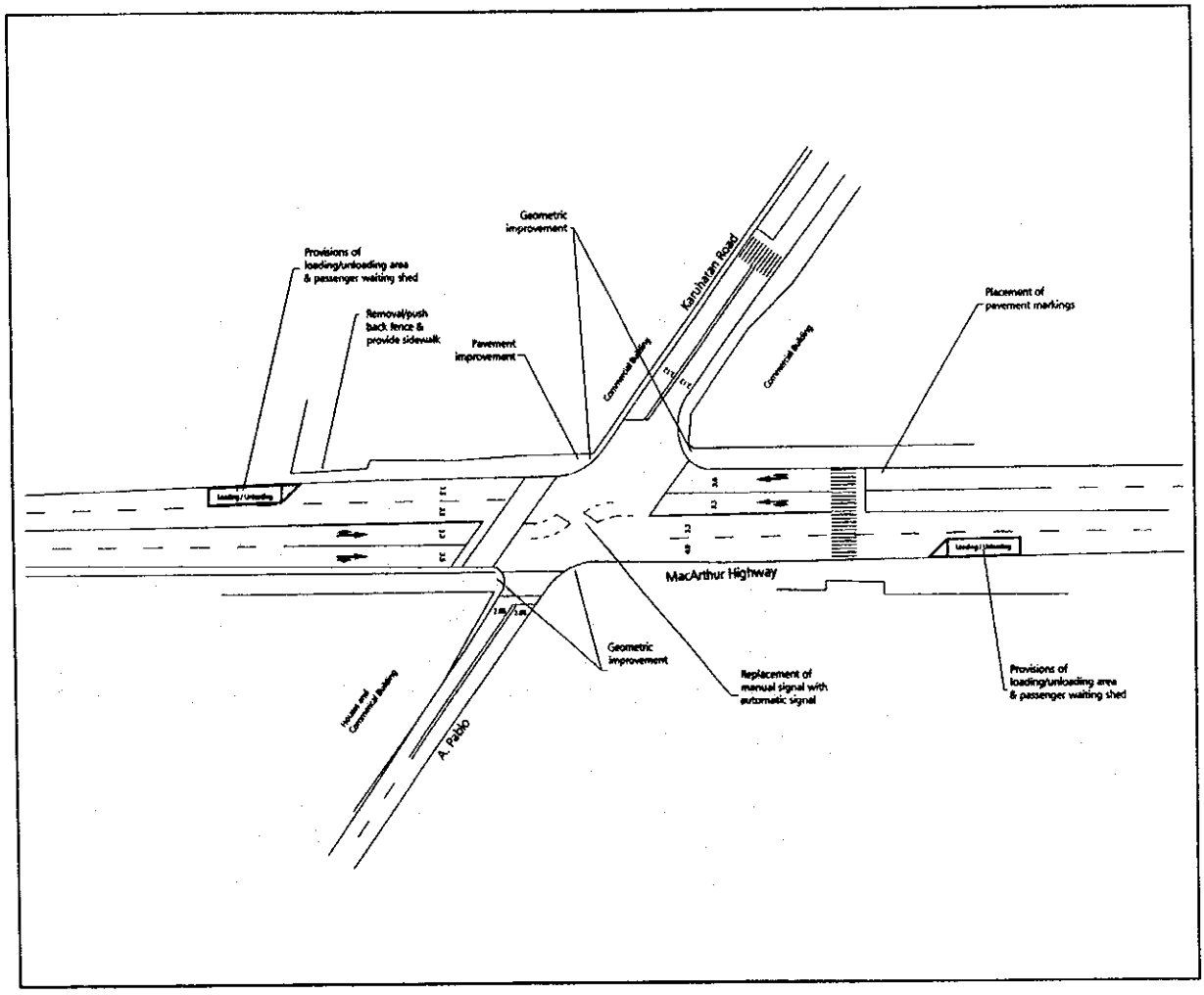
Figure 5.7 shows the proposed scheme for the Valenzuela TBP. MacArthur Highway used to be the northern gateway to Manila until it was replaced by the North Luzon Tollway. However, despite its demotion in status, it continues to attract inter-provincial traffic. Local residents, on the other hand, see the intersection as an access to a medical facility along A Pablo Street. Hence, alleviation of congestion in the area may save lives aside from benefiting many commuters in several towns of Bulacan.

5.4.2 A minor glitch

Only a leaking pipe caused a minor delay in the execution of works for the Valenzuela TBPs. This has allowed the Study Team to add the installation of an automatic controller and replace the current manual controls of traffic signal lights at the intersection.

There was also a last-minute alteration on the designs of pavement markings to take into account physical limitations found at the site.

Figure 5.7 **Proposed Improvements at Karuhatan / A Pablo / MacArthur Hwy, Valenzuela (VL-01)**



What delayed the completion of works in Valenzuela was the installation of the automatic controller. It was a device similar to the ones acquired and installed by Marikina. The appropriate phasing and signal timings had to be determined, before the controller was set up in November 2001.

Although training had been provided to the Valenzuela staff on the operation of the signal controller, it is doubtful whether they could handle on their own the necessary changes or adjustments in timing in the future.

5.5 The Case of Taguig

5.5.1 Intimations of capability

Compared to Mandaluyong, Muntinlupa and Valenzuela, Taguig has the lowest income. Its traffic problems are not yet on the same scale as the other three. But it has seen fit to create (way back in 1993) a distinct Traffic Management Office responsible for traffic planning, engineering and enforcement. Its understanding of TM is more advanced than Mandaluyong or Valenzuela. Taguig is one of the few LGUs that had enacted a comprehensive local traffic code of its own.

Due to fiscal constraints, however, it has yet to do a traffic improvement scheme of the kind agreed for the 3-way intersection of General Santos Avenue and the East Service Road of South Luzon Tollway. Located at the boundary with Parañaque, the implementation of this pilot project should also resolve cross-border issues in addressing local traffic problems. Congestion relief at the intersection will benefit many residents at nearby villages – mostly in Parañaque – on their way to/from the expressway.

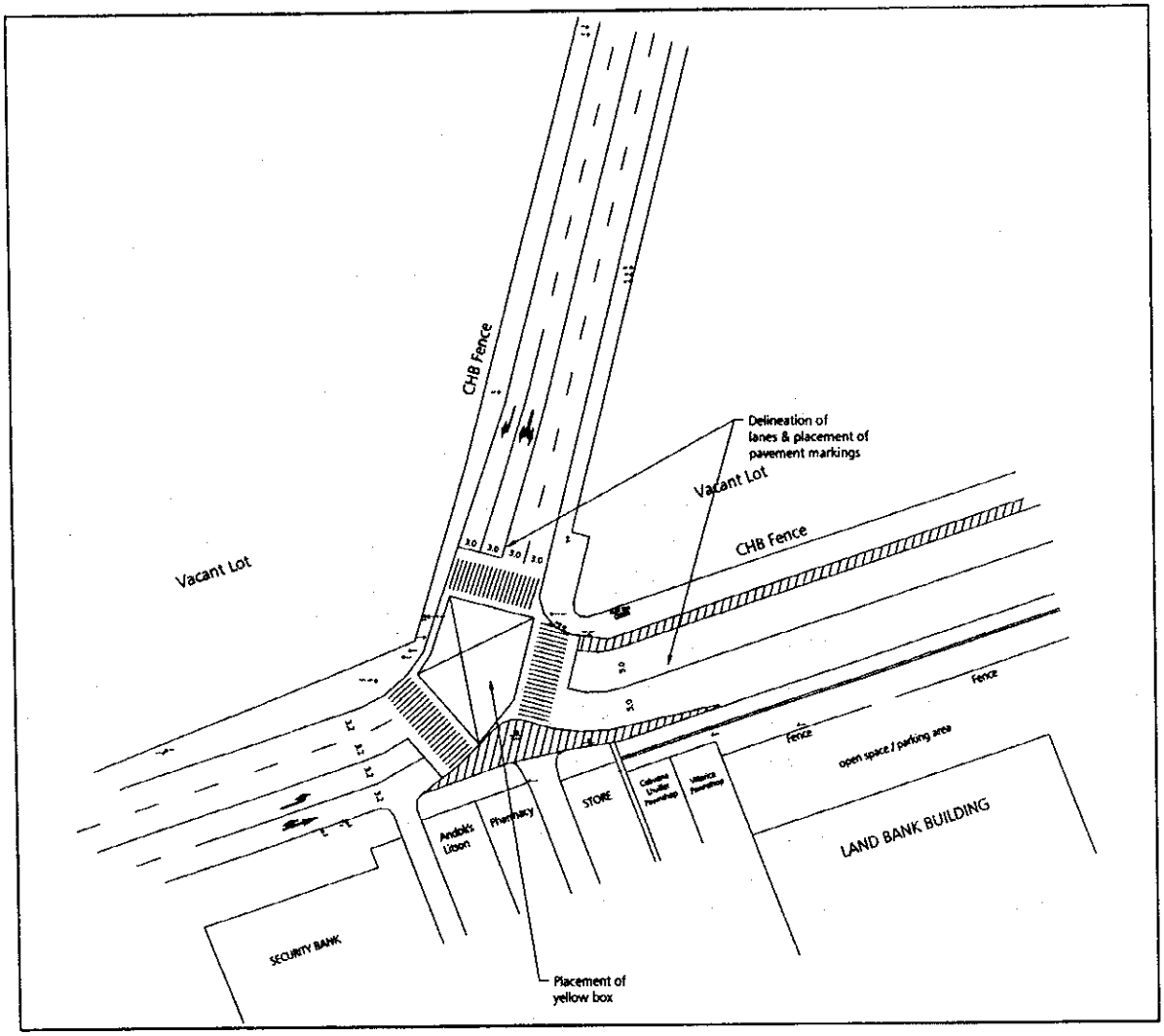
The proposed scheme is shown on Figure 5.8.

5.5.2 Who's minding the store?

At the start, the implementation of the pilot scheme received enthusiastic acceptance. The hurdles to implementation of the scheme were seen to be low, notwithstanding possible grumblings from sidewalk or ambulant vendors who may be adversely affected. The more challenging aspects that could affect project implementation were: (a) the unified treatment of General Santos Avenue on the Taguig and Parañaque sides, (b) the intermittent flooding at the junction due to poor drainage system.

Before the works could proceed, however, all the officers of the Taguig TMO got replaced. Apparently, they were casualties of a change in local administration. The preparatory activities had to be repeated with the new Taguig traffic team. Implementation was postponed, but sans corollary repair works on the local drainage (which was promised by the previous set of officials).

Figure 5.8 **Proposed Improvements at Gen Santos Ave / East Service Road, Taguig (TG-01)**



5.6 The Case of Parañaque

5.6.1 Implementing capacity

In the ensuing deliberations regarding the implementation of the proposed scheme for the Canaynay Avenue /Dr. A Santos Avenue junction, Parañaque's TM capacity was a revelation. It demonstrated a surprising grasp of the problems, conditions, and solution alternatives – not just of the pilot TBP, but also of the others in their list. This level of capability was not apparent from the poor documentations it had submitted before about its TM institutions and traffic ordinances. Initial misgiving about its capability was also fueled by its anemic participation in the three seminar-workshops conducted under SSTRIMM.

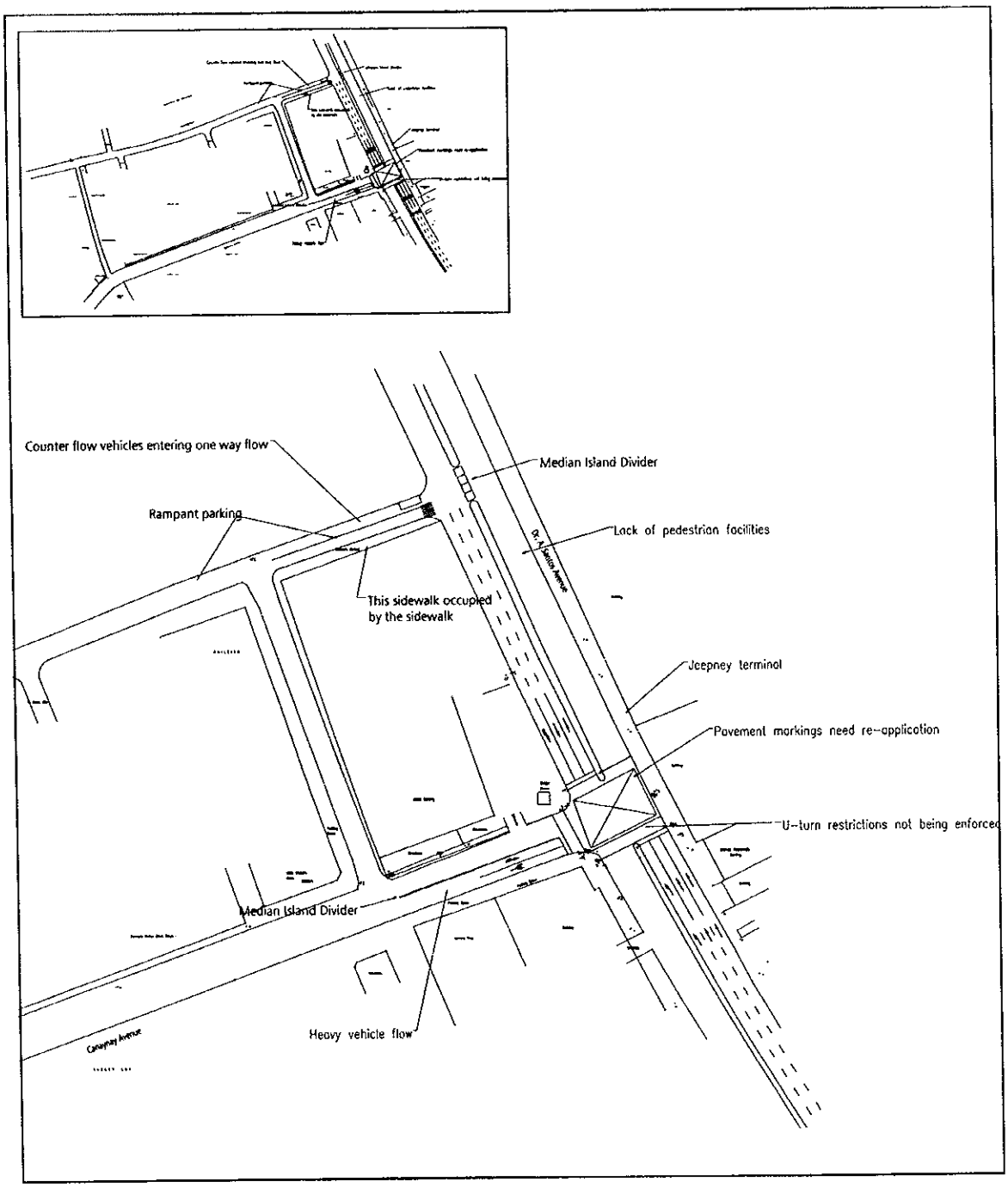
Parañaque does not have a dedicated office tasked with overall responsibilities for TM; thus, it has to involve the other city departments like Planning and Engineering to complete the mission of traffic alleviation. Inter-departmental collaboration appears to be Parañaque's strongest suit. Its City Council and Barangay officials are also actively involved in the TM process. Consensus-building is palpable and a model to other LGUs as it does not abandon technical rigors for the sake of compromise. With city income exceeding the billion peso mark, Parañaque could easily allocate the resources for an effective traffic management.

5.6.2 Twists and turns on the implementation road

The multi-sectoral consultations conducted for the TBP led to a modification of the initial design. The scope of the TBP was expanded to include Evacom and Palanyag roads in a paired one-way scheme. The proposed tricycle and jeepney terminal areas were re-positioned. Also, the location of pedestrian crosswalk had to be moved. Nevertheless, it was quite apparent that the various pre-implementation hurdles had not been lowered, but rather scaled up and surmounted.

Full execution of the improvement scheme was predicated on the passage of a City ordinance declaring the one-way streets, aside from re-paving of Palanyag Street. Unfortunately, none of these conditions had been realized after three months of waiting. To avoid any farther delay, the required civil works under SSTRIMM were executed. Full benefits from the scheme, however, can not be achieved until the missing elements are put in place.

Figure 5.9 **Proposed Improvements at Canaynay Ave / Dr A Santos Ave, Parañaque (PQ-01)**



5.7 The Poor But Enterprising Malabon

The candidate TBP of Malabon (ML-01: P Aquino Ave. – Sanciangco – P Borromeo) ranked in the bottom rung of the evaluation, and hence had no chance of being included for pilot implementation. Fortunately, Malabon became the sixth recipient because of the surplus funds as discussed in Section 4.8.

Malabon's Public Order and Safety Office is responsible for TM in that locality. Despite meager resources, it continues to advocate and lead in alleviating traffic problems. Based on assessment of needs, Malabon received the following traffic management materiel:

a. 100 pieces of reflectorized vests and gloves;
b. 142 pieces of raincoats and rubber boots for use of its enforcement personnel during rainy seasons;
c. 35 units of ready-to-install traffic signages of various types;
d. 10 units of megaphones with corresponding batteries and chargers.

The materiel were formally turned over on 27 August 2001 at the MMDA.

Figure 5.9 **Grant of Traffic Management Equipment to Malabon.**

Malabon Mayor Amado Vicencio formally accepting grant of traffic management equipment from Mr. Hideo Ono, JICA Resident Representative, while MMDA Chairman Benjamin Abalos looks on, together with other MMDA officials.

5.8 General conclusions about the implementation of pilot projects

Based on experiences on the 5 pilot TBPs, it can be concluded that:

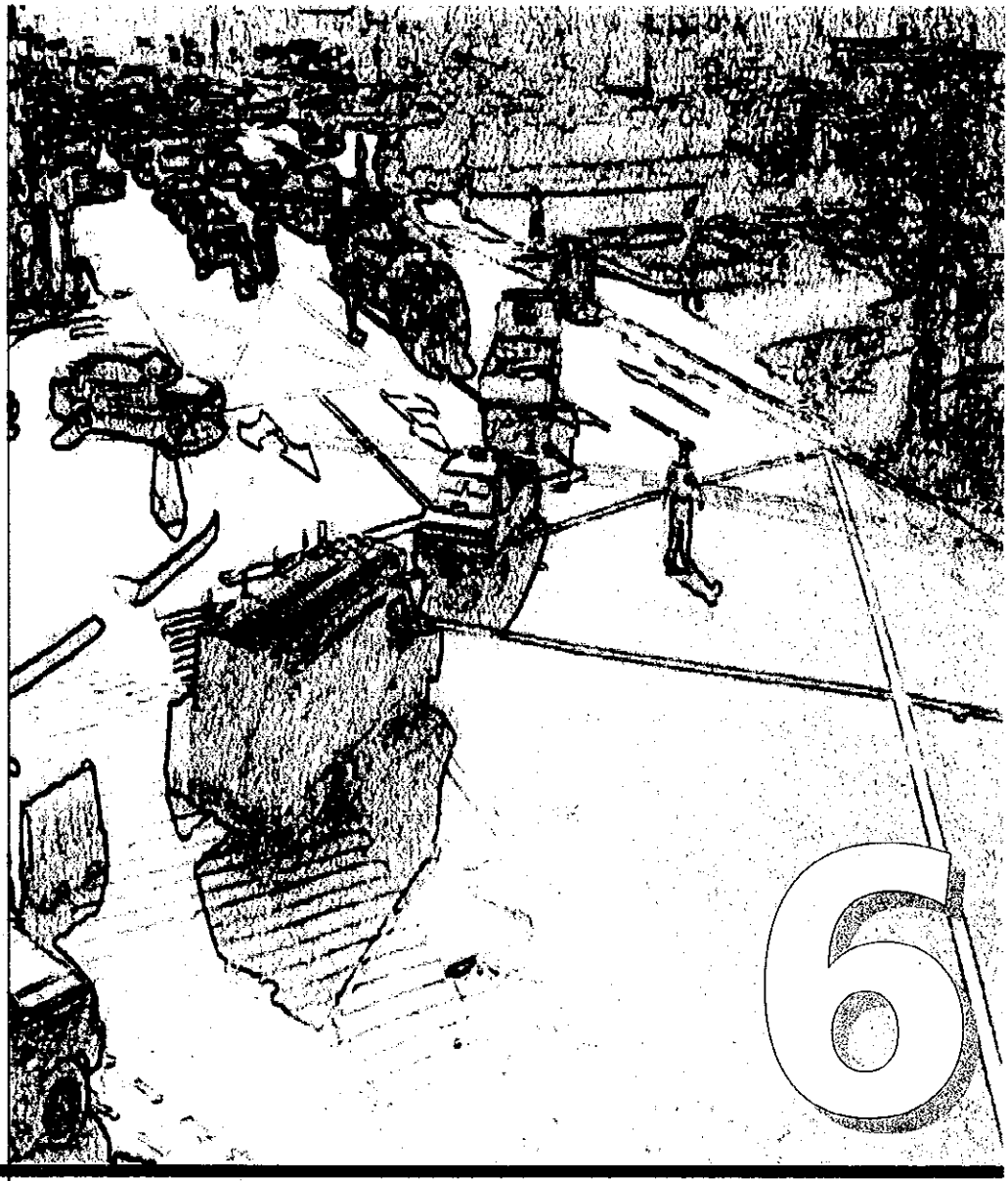
a. Implementation has taken longer than they should have been. Without the external impetus of SSTRIMM, the possibility of snail's pace implementation when the LGUs run on their own respective steam will be greater. External incentives should be made available, perhaps with matching funds from MMDA, to encourage LGUs to implement their own small-scale traffic improvement projects. The slow pace may also be attributed to the organizational readiness of the concerned LGUs. As can be inferred from Table 4.5 and Chapter 7, Mandaluyong, Valenzuela, and Taguig did not have well-established organizations to handle implementation. In the case of Parañaque and Muntinglupa, the delays were caused by factors beyond their control. Table 5.1 shows the schedules of planned and actual implementation of the SSTRIMM pilot projects.

b. If the process has to be speeded up, implementation should not be a hostage to the passage of special ordinances. In short, traffic management ought to be de-politicized. Ordinances should be passed that would permit local traffic authorities to proceed with traffic schemes, even on an experimental basis, without getting it approved by its Sanggunian. This became apparent in the case of Parañaque, where the mere act of converting two parallel streets into paired one-way flows got stuck in the legislative calendar.

c. Decisive leadership matters. This factor was missing in Mandaluyong, but present and palpable in Muntinlupa. Minor decisions could not be made immediately in the former but occur in the latter. In Valenzuela, it was supplied by the Barangay. In Parañaque, it emanates from middle level officials. As exemplified by the case of Taguig, continuity of traffic personnel is also important in nurturing local traffic management capability. All the LGUs in the third tier, i.e., those contented to remain in the shadows of MMDA, have weak or diffused leadership in traffic management.

Table 5.1 **Schedule of Pilot Project Implementation**

TBP	Location	Start of Implementation	Completion of Implementation
MT-01	Montillano / Montillano Ext / National Road	01 Sept 2001	31 Oct 2001
MD-01	Shaw Blvd/ Lee Rd/ Wack-wack Rd	14 July 2001	17 Oct 2001
VL-01	Karuhatan/ A. Pablo/ MacArthur Hwy	06 Sept 2001	31 Oct 2001
TG-01	Gen Santos Ave / East Service Road	08 Sept 2001	13 Sept 2001
PQ-01	Canaynay Avenue/ Dr. A Santos Ave	05 Sept 2001	08 Nov 2001
Malabon	Institutional strengthening: traffic materiel		27 Aug 2001



6

Evaluating Project Impacts

SSTRIMM Final Report
November 2001

6 Evaluating Project Impacts

6.1 The chosen ones

When a traffic improvement project (TIP) has been implemented, the results need to be evaluated after the fact. This is meant to find out whether things have changed for the better or have taken a turn for worse. To illustrate the method, two of the five pilot TBPs were subjected to post evaluations. The chosen ones are: Shaw Blvd / Wack-wack Rd / Lee Street in Mandaluyong, and the Montillano Rd / National Road or Alabang junction in Muntinlupa.

The evaluation entailed a two-stage analysis: a pre-assessment of existing conditions in the study area, and a post-assessment after the traffic improvement measures had been implemented.

6.2 Indicators of traffic impact

There are several yardsticks to measure the impact of a TIP. The most relevant is travel time delay. If the average travel time of all motorists using the problem area has declined, then one can conclude that the intervention is a success.

Level of service (LOS) is another indicator of how the volume of traffic affects driving ease. If motorists must wait an average of 5 seconds or less to get through an intersection, they experience a Level of Service "A"; if they must wait 15.1 to 25 seconds, they

experience Level of Service "C"; and, if they have to wait an average of a minute or longer, the intersection has Level of Service "F." By definition, the identified TBPs in Metro Manila would tend to have LOS "F".

Another impact factor is the level of service for pedestrians – in terms of amount of space on a sidewalk as well as waiting or crossing times at intersections.

One may also attempt to measure the improvements in emission and noise levels at the problem area. When vehicles are moving smoothly rather than idle on the streets most of the time, emission and noise levels tend to be lower. However, local government units rarely have the means to acquire equipment that can measure air and noise pollution levels at specific intersections.

TIPs may also demand varying level of efforts from traffic enforcers. Some may demand more hands on the streets, or more work from existing personnel; others would save on manpower or time. This should not be an objective per se, however, as life may become simpler to enforcers but at the expense of motorists. Nevertheless, it is a side benefit that should not be ignored especially because schemes that demand more from enforcers are not sustainable in the long haul.

The number and severity of traffic accidents in the area is also a good indicator. A traffic scheme that is less accident-prone is definitely better than one that invites more accidents. However, this yardstick is more meaningful over a long time period and requires continuous gathering and analysis of accident data. LGUs have not yet internalized this practice.

For simplicity, only the first indicator was measured. Accordingly, intersection delay surveys were conducted in the two study areas at two different dates. This was supplemented by focused group discussions (involving questionnaires with 80 respondents from Mandaluyong and 140 from Muntinlupa) to assess the impact on non-traffic-related aspects of the TBP.

6.3 The way the TBPs were

Table 6.1 provides the base line (i.e., before the project) information on time delays at the Mandaluyong pilot TBP (MD-01).

Table 6.1 **Observed Delay at the Shaw Blvd - Lee St - Wack-Wack Rd Intersection** (ex ante)

Approach	Ave. Delay Per Approach Vehicle (seconds)	Ave. Delay Per Stopped Vehicle (seconds)	Vehicles Stopped (percent)
Lee Street	25	27	71.3
Shaw Boulevard	8	37	16.3
Wack-Wack Road	25	41	47.3

The preceding table points to Lee St. as having the greatest percentage of vehicles actually having to stop at the intersection. Vehicles approaching the intersection through Lee St. experience the same level of average delay (for all vehicles, including those that have to stop and those that do not) as those on the Wack-Wack approach. The LOS hovers on "D" and does not seem excessive, compared to other choke-points in Metro Manila.

The baseline data at the Montillano Road / Alabang (MT-01) junction is summarized on Table 6.2.

Table 6.2 **Observed Delay at the Montillano St./Montillano Ext / National Highway Intersection** (ex ante)

Approach	Ave. Delay Per Approach Vehicle (seconds)	Ave. Delay Per Stopped Vehicle (seconds)	Vehicles Stopped (percent)
Montillano St. to Montillano Ext	21	36	43.7
Natl Hwy northbound	20	35	45.1
Natl Hwy southbound	26	41	49.6

It can be seen that the average delays in the Muntinlupa pilot TBP range from 20 to 26 seconds (when all vehicles are considered), or 35 to 41 seconds (when the volume of vehicles that do not stop is excluded). In both cases, the delays do not seem excessive. At the same time, it was observed that the percentage of stopped vehicles did not exceed 50% in any instance.

6.4 The altered states of the two pilot projects

6.4.1 Time delays at the Mandaluyong intersection

Surveys similar to what were alluded to in Section 6.3 were conducted a few weeks – sometime in early November 2001 – after the full implementation of the TIP was in place. Due to time constraints, these surveys may not have been as exhaustive as needed to completely measure the new conditions. However, the following results give us an indication of the changes in the traffic conditions at the intersection.

Table 6.3 **Comparison of Average Delay Per Approach Vehicle Shaw Blvd ./ Lee St / Wack-wack Rd**

Approach	Average Delay per Approach Vehicle (seconds)		Difference	Percent Change
	Before	After		
Lee Street	25	38	13	-52%
Shaw Boulevard	8	10	2	-25%
Wack-Wack Road	25	34	9	-36%

Consistent with Table 6.3, the average delays experienced by vehicles that actually had to stop also went up during the post-assessment period (see Table 6.4). By definition, the average delay per stopped vehicle would be larger than the average delay per approach vehicles (which includes both vehicles that were stopped and those that were not).

Table 6.4 **Comparison of Average Delay Per Stopped Vehicle Shaw Blvd ./ Lee St / Wack-wack Rd**

Approach	Average Delay per Stopped Vehicle (seconds)		Difference	Percent Change
	Before	After		
Lee Street	27	56	29	-107%
Shaw Boulevard	37	38	1	-3%
Wack-Wack Road	41	60	19	-46%

If Tables 6.3 and 6.4 would be interpreted literally, then vehicles passing by the intersection are worse off now than before. On this criterion, the TIP can be declared as a failure.

However, because of the contrary findings from interviews regarding other impacts, SSTRIMM examined other data that might explain the possible causes of traffic degradation at the Mandaluyong intersection. Volume count data (see Table 6.5) indicates that the changes were accompanied by significant increases in traffic volumes during the post-assessment period. The increases, percentage-wise, were proportionately higher than the increases in time delays. Speed-volume curves would suggest geometric effects rather than straight-line; thus, it would appear that the measures had been effective in dealing with the higher traffic volume. That is to say, the time delays would have been higher under the new traffic volumes had the TIP not been implemented.

Why the volume increases? Some traffic rerouting might had transpired near the intersection not known by the study team. It is difficult, however, to infer that the increase in volume corresponds to an actual increase in the capacity of the intersection due to the pilot TIP.

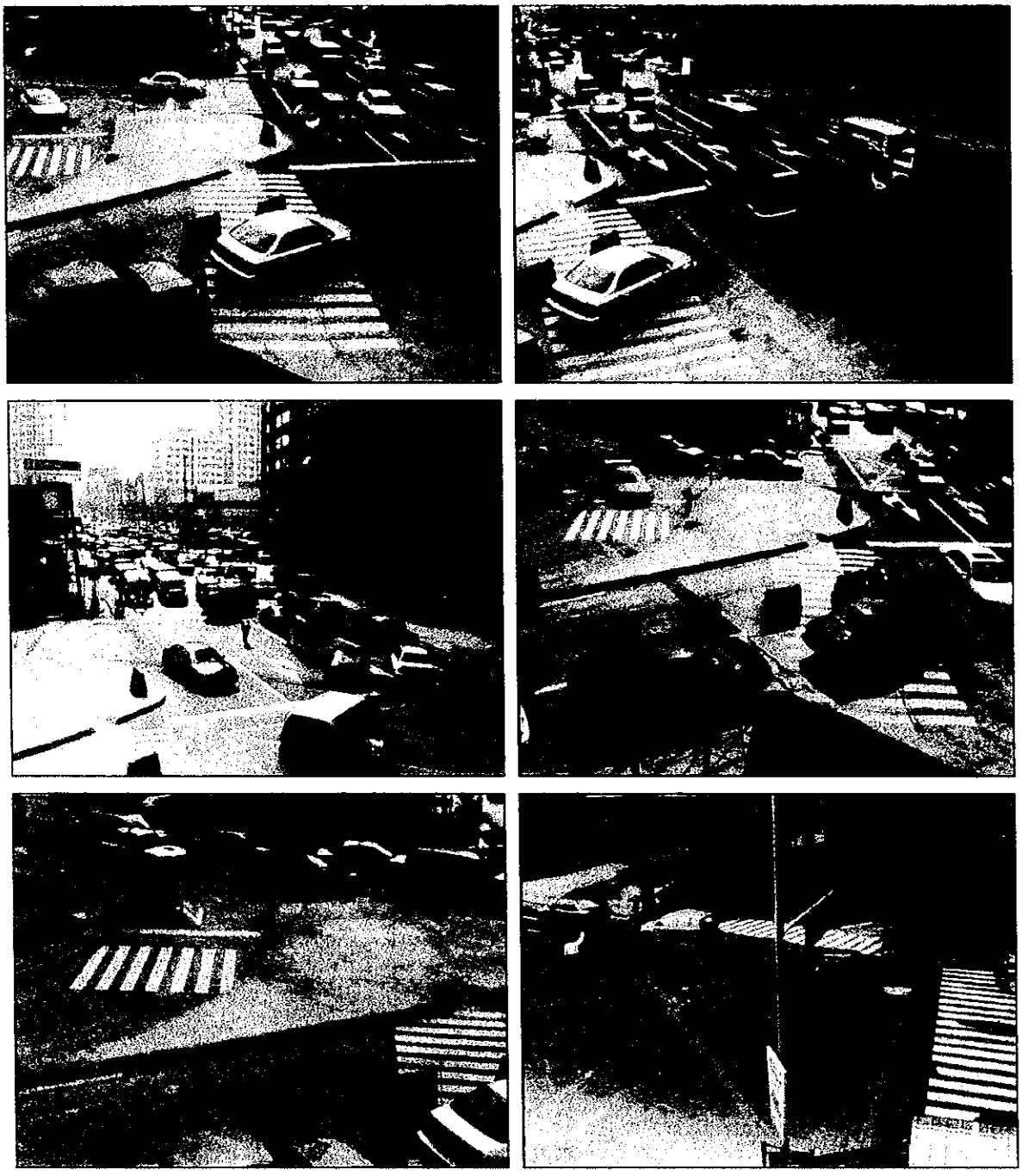
Table 6.5 **Comparison of Total Traffic Volumes at the Intersection of Shaw Blvd / Lee St / Wack-wack Rd**

Approach	Number of Vehicles		Difference	Percent Change
	Before	After		
Lee Street	331	617	286	86%
Shaw Boulevard	1,550	2,373	823	53%
Wack-Wack Road	118	175	57	48%

Another factor that might explain the seeming contradiction is the reduction in the number and level of efforts by traffic enforcers. Before the TIP was implemented, the wide-open intersection required more hands during peak hours but worked quite well – despite the disorderly crossings – during non-peak hours. It was possible for the time delays to increase, even if there were no volume increases, because the motorists now have to queue or behave properly.

Lastly, it can be inferred from the interview results that the probability of occurrence of a gridlock has been reduced after the TIP was implemented. Figure 6.1 shows a picture of the MD-01 intersection after the measures have been implemented.

Figure 6.1 **Images of the Shaw Blvd / Lee St / Wack-wack Rd / Old Wack-wack Rd intersection in Mandaluyong (MD-01) after the SSTRIMM Pilot Project was implemented**



6.4.2 Time delays at the Muntinlupa intersection

Similarly, the average time delays per approach vehicle and average time delays per stopped vehicle were measured during the post assessment period for the Muntinlupa TIP.

The comparative results are shown on Tables 6.6 and 6.7. Unlike the Mandaluyong case, the data for Muntinlupa are more positive. Although the scheme was more directed at pedestrians, the impact on the vehicular flows has not been insignificant.

Table 6.6 **Comparison of Average Delay Per Approach Vehicle Montillano St / Montillano Ext / National Hwy**

Approach	Average Delay per Approach Vehicle (seconds)		Difference	Percent Change
	Before	After		
Montillano St. + Ext	21	18	-3	+14%
National Rd – North	20	15	-5	+25%
National Rd – South	26	27	1	- 4%

Table 6.7 **Comparison of Average Delay Per Stopped Vehicle Montillano St / Montillano Ext / National Hwy**

Approach	Average Delay per Stopped Vehicle (seconds)		Difference	Percent Change
	Before	After		
Montillano St. + Ext	36	29	-7	+19%
National Rd – North	35	41	6	-17%
National Rd – South	41	42	1	-2%

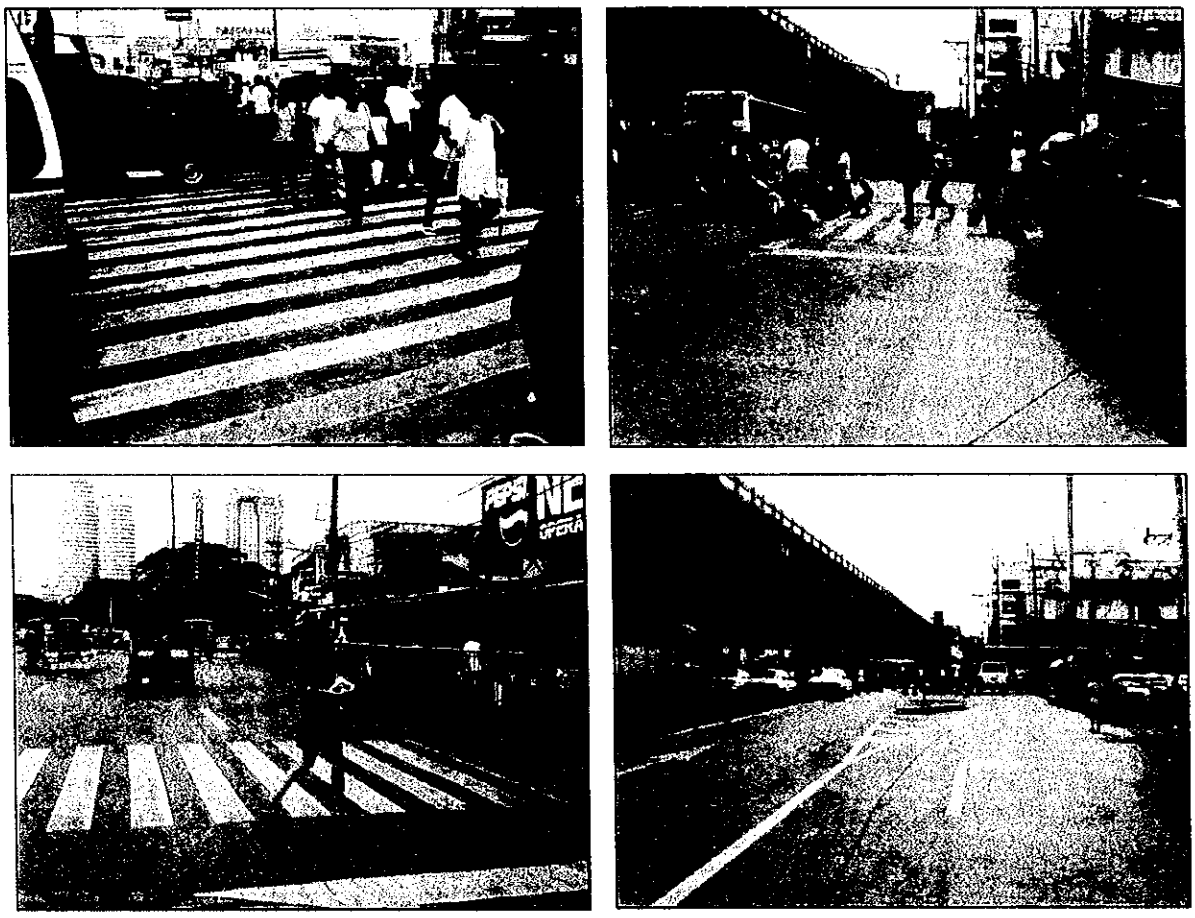
Based on Tables 6.6 and 6.7, vehicles passing by the intersection are now moderately better off than before – with dramatic gains on the Montillano Street and Montillano Extension approaches. Those on the National Road south approach are slightly worse off.

When viewed against the volume increases shown on Table 6.8, the above improvements can be deemed as significant. Despite the increases in traffic volumes, reductions in delays at the intersection had been achieved.

Table 6.8 **Comparison of Total Traffic Volumes at the Intersection Montillano St / Montillano Ext / National Hwy**

Approach	Number of Vehicles		Difference	Percent Change
	Before	After		
Montillano St. to Montillano Ext	231	682	451	+195%
Natl Hwy northbound	1,646	2,478	832	+51%
Natl Hwy southbound	807	1,890	1083	+134%

Figure 6.2 **Images of the Montillano St / Montillano Ext / National Hwy Junction in Alabang, Muntinlupa (MT-01) after the SSTRIMM Pilot Project was implemented**



6.5 Other impacts

6.5.1 Surveys of another kind

Aside from the volume and time delay surveys before the improvement schemes were developed, pre-implementation surveys were conducted in Mandaluyong between 29 June and 03 July 2001, and in Muntinlupa between 09 and 14 July 2001, to gauge a number of factors other than purely traffic indicators. The respondents included the private motorists who live nearby and from the establishments around the problem area. The public motorists included the drivers of buses, jeepneys, taxis and tricycles. They were chosen at random from among those present in the vicinity. In the case of jeepney drivers, they were taken from those waiting for their turn at the station. In Muntinglupa, vendors were also taken as respondents through systematic random sampling.

A second set of survey, using the same instrument and with the same items was conducted between 05 and 10 November 2001, about two weeks after the measures were implemented.

Table 6.9 **Respondents to the Pre-and Post Surveys**

Respondents	Mandaluyong		Muntinlupa	
	Before	After	Before	After
1. Private Motorists	29	14	30	25
2. Public Motorists	20	16	30	28
3. Commuters/Pedestrians	30	29	50	47
4. Traffic Enforcers	3	5	10	10
5. Vendors	-	-	20	20
Total	82	64	140	130

Due to some limitation brought about by the delays in the implementation of the traffic measures, the number of respondents taken in the 'after' survey was less than those the 'before' condition. Thus, to level off the difference in the number of respondents, the percentages to the total number of responses was used as the basis for comparing the pre- and post assessment data.

In addition to the surveys, focus group discussions were conducted with the LGU officials concerned with traffic enforcement. These were held on 18 September 2001 in Mandaluyong and 21 September 2001 in Muntinglupa.

6.5.2 Evaluation Results for Mandaluyong

The positive findings regarding the Mandaluyong TIP were as follows:

a) Improved loading and unloading practice among the public motorists and pedestrians.

It was seen by the respondents that illegal loading and unloading was reduced by 50% – using the traffic violations as the measurement. Prior to implementation, 44% cited this as the most frequent violation prior compared to 21% after the fact. This positive outcome can be attributed to better traffic signage and traffic enforcement in the area.

b) The pedestrian problem diminished.

Prior to the project implementation, 14% of the responses cited difficulty for pedestrians to cross. After the TIP, no one mentioned this condition. One possible explanation for this was the improved markings as well as the intermediate refuge afforded by the island.

c) Less demanding to field traffic enforcers

The channelization was meant to reduce the degrees of freedom of motorists in crossing the intersection anywhere they please. Hence, it should simplify things for enforcers. A few weeks after implementation, the traffic enforcers assigned to the intersection reported getting favorable "thumbs up" signs from motorists, and greater ease in controlling vehicles. It was also noted that whereas before, 36% would like to have more traffic enforcers to prevent accidents in the area, only 6 % mentioned it afterward. This change may also be attributed to the better handling by traffic enforcers as a result of instruction and attention.

The implementation of the "Yellow Box" Rule was well accepted too. Only two public motorists rated it negatively. The rest believed that the yellow box rule had minimized the traffic, made the intersection open and prevented collision.

The evaluation will not be complete if the negative aspects will not be recognized. There were two, viz.:

a) Construction of the island had elicited the most strident opinions and been the most divisive factor.

The implementation of the island had been delayed precisely because of the wariness of some residents about it. Respondents perceived the island at the intersection of the Lee St / Wack-wack Rd / Shaw Blvd junction as a new source of traffic. Before its construction, 73% of the respondents approved the construction of the island compared with 62% afterwards. While some people said that the island had helped in easing the traffic, others said that it had constricted the street. This is not surprising, because the island was meant to force motorists to queue. Reducing the size of the island might ease the objection; but its removal would bring back the old set up.

b) Logic of the TIP appears not to have sunk into the head of Mandaluyong traffic officials, nor bolstered their confidence in planning and implementing traffic schemes.

Despite the hand-holding and numerous discussions before and during the implementation, local traffic officials showed uncertainties and indecisiveness. It had taken several days before the lane obstruction caused by a nearby building construction could be cleared – which effectively delayed implementation by two weeks. Movable barriers and markers to simulate the intended flows as an experimental measure had been installed off and on, rather than executed consistently to accustom motorists about the full scheme. Information billboards that were supposed to be set up by the LGU failed to materialize. By the end of SSTRIMM, the alternative option of instituting a one-way flow on Lee Street is being revived – despite full knowledge that the same had failed in the past and that it would simply transfer (and induce a bigger) problem at two nearby intersections.

6.5.3 Results for Muntinlupa

The positive impacts of the pilot TIP in Muntinlupa were as follows:

a) Improvement in the loading and unloading practices of public transport.

Before the improvement scheme was implemented, respondents saw it as the number one cause of traffic in the area (28 %); only 5% perceived it as such during the post assessment survey. A corroborative finding is the attribution to aggressive driver

behavior in competing for passengers as the cause of traffic accidents: 45 % before versus nil response in the post survey.

Under the present set-up, the buses were no longer allowed to line up in the main highway. Instead, terminal or a loading and unloading zone was designated in front of the Metropolis mall.

b) Reduction in cases of illegal parking.

Very much related to the first is the assessment that illegal parking had been reduced from 19% before to 6 % after the project implementation. This can be attributed to the designation of terminals and parking spaces, as well as heightened enforcement occasioned by the pilot project.

c) Easier crossings of streets for pedestrians.

It is interesting to note how the pedestrians were affected by the small measures implemented, particularly the railings. While the problems of jaywalking and lack of discipline remain before and after the project implementation, only 3% raised the difficulty of crossing after implementation (compared to 7 % before). Corollarily, only 23% (versus 39% before) raised the pedestrian overpass solution after. The result may seem counter-intuitive, since the TIP limited pedestrian crossings to the designated lanes.

While the installation of pedestrian railings was the most visible aspect of the TIP, respondents' opinion about its effectiveness was somewhat mixed - with the nays as many as the ayes.

d) Better cooperation among the three groups of enforcers in the area.

The enforcers assigned at the intersection come from MMDA, PNP, and the city. Before the TIP was implemented, division of work among the three groups was ambiguous. The local traffic officials used the pilot TIP as an opportunity for coordinated efforts.

What were the negative undertones from the Muntinlupa pilot TIP?

As expected, the relocation of the sidewalk vendors did not elicit unanimous reaction. Many saw it as contributory to the easing of congestion in the area, but a significant number also felt uneasiness about vendors losing their source of incomes.

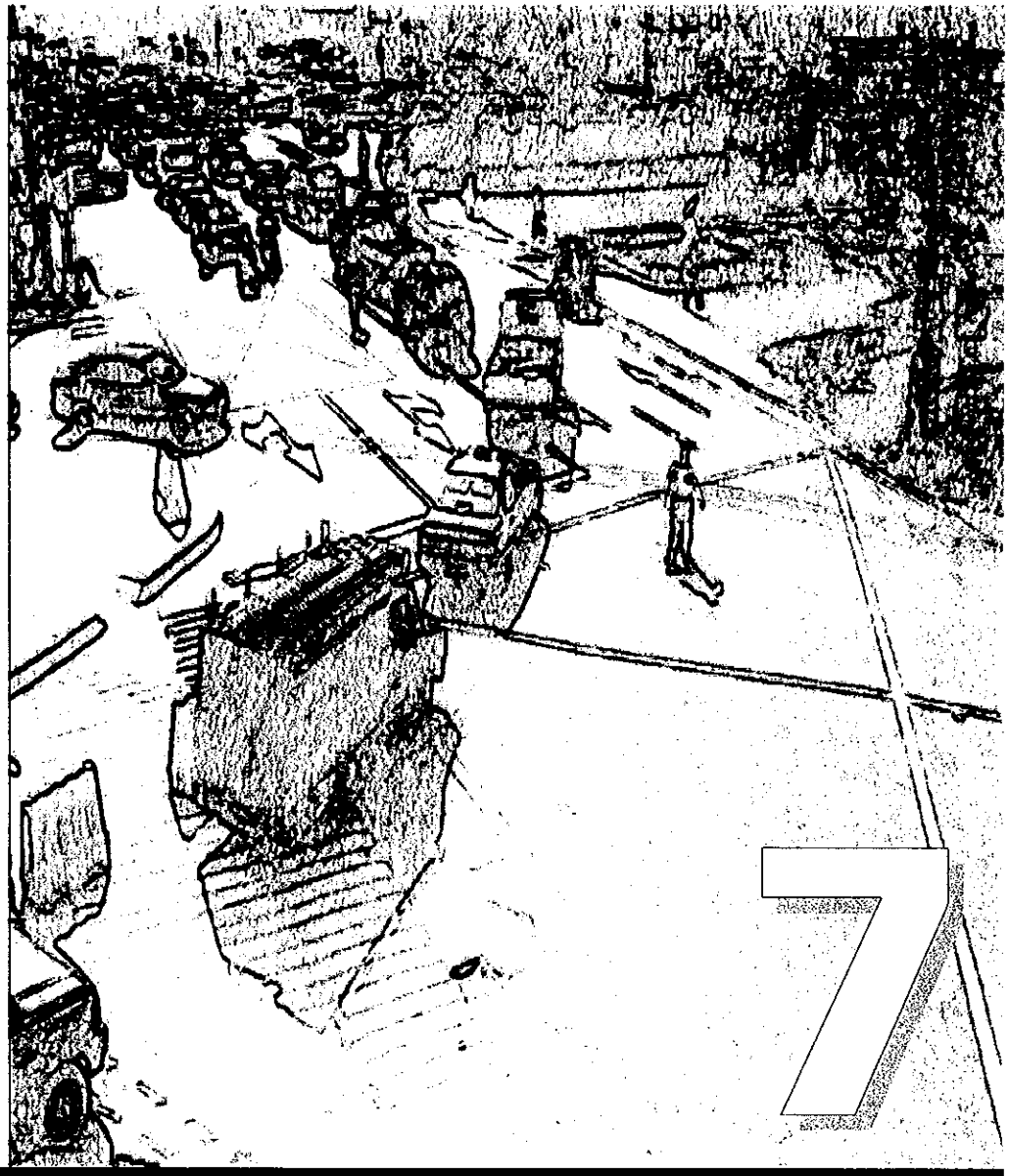
Some of the business establishments also reacted strongly against the erection of railings – viewing them as an infringement of their right of access to their properties.

6.5.4 Air and noise pollution

It may also be worthwhile to consider the environmental impact of traffic improvements in terms of reduction of air and noise pollution. The theory is that less idling time and higher speeds correlate with lower emissions and quieter conditions.

There are two fundamental ways in obtaining 'before' and 'after' data: (i) direct sampling using measuring instruments at strategic points in the area; (ii) estimations using mathematical models that predict the values based on some dependent but measurable variables.

The factor conditions of LGUs, however, would preclude direct sampling. In other words, even if these measurements are made under SSTRIMM, the same cannot be replicated by the LGUs without resorting to instruments that are not readily available to them. A second-best option is to rely on mathematical models to assess the environmental conditions at the two pilot sites. An empirical model for 18-hour noise level is available. Similarly, levels of solid particulate matter (SPM) and carbon monoxide (CO) can be estimated. However, both the noise and air prediction models are dependent on such input variables as traffic volumes, travel speed, and vehicle compositions, among others. Hence, the environmental impacts would turn out to be auto-correlated with the findings already discussed in Section 6.4. Accordingly, and in order not to complicate matters for LGUs, the study team decided to ignore these indicators.



7

Local Institutions for Traffic Management

SSTRIMM Final Report
November 2001

7

Local Institutions for Traffic Management

7.1 Who will implement?

The project terms of reference contemplated that only two pilot projects would be implemented. Accordingly, only the organizational structure for the two recipient LGUs would then be examined preparatory to implementation. In fact, the concentration of SSTRIMM was on the identification and generation of solutions for about 80 traffic bottleneck points.

However, during the early stages of the study, it was determined that all the 17 LGUs be included in the analysis because of the following realities:

- Traffic management capability is a function not only of trained personnel, but also of the institutions in which they operate.
- The 17 LGUs are not equal nor have the same factor conditions;
- As a follow up to the "Metro Manila Traffic Administration Capability Survey" conducted in 1999 on the 17 local government units' perception of their traffic problems and traffic management capabilities.
- An understanding of existing organizations, capabilities and limitations is crucial to the follow-on tasks, after SSTRIMM, of implementing the countermeasures to the remaining 74 or so traffic bottleneck points.

7.2 Local Traffic Organizations

Table 7.1 compares the traffic management structure of the 17 LGUs in terms of division of responsibilities for traffic engineering, traffic enforcement, and existence of any local traffic management efforts.

The LGUs can be categorized into three models or organizational patterns:

Model 1 – Traffic management is split among several departments or units, usually a Department of Public Order and an Engineering Department. Caloocan, Malabon, Marikina, Navotas, Parañaque, Quezon City, and San Juan belong to this category. A portion of Makati – those outside the Ayala business district – is under a similar set up.

Model 2 – A dedicated and separate office is organized to focus on traffic, generally encompassing traffic engineering and enforcement. Makati, Muntinlupa, Manila and Pasay can be considered under this group. However, none is fully integrated or organized for the full range of traffic management functions. Public transport concerns, including tricycle supervision, have been excluded under a separate unit in all of the four LGUs. Pasay's organization is patterned after that of Manila but omitted traffic engineering. Manila has the oldest institution, but appears to have concentrated on parking probably in deference to MMDA. In form, Taguig can be classified under this category; in substance, however, it operates more like Model 3 because the police enforcers in the municipality are more enduring than its casual TMO officers.

Model 3 – Mainly an adjunct of traffic enforcement and/or the Police, with some features of Model 2. The LGUs belonging to this category are: Las Piñas, Mandaluyong, Pasig, Pateros, and Valenzuela.

Table 7.1 **Comparison of Traffic Management Systems in Metro Manila**

Name of LGU	Unit Responsible for Traffic Management	Responsibility for Traffic Engineering	Traffic Enforcers Other than Police/MMDA	Existence of a TM Program?
Caloocan	Department of Public Safety & Traffic Management (DPSTM), reports to the City Mayor	Separate; part of City Engineer's Office	Yes, under DPSTM. Traffic auxiliaries hired as 'casuals'	Not indicated. Can be interpreted as existing, due to special accounts
Las Piñas	Traffic Enforcement Unit, probably under the PNP and/or the Traffic Regulatory Council	Separate; part of Engineering Office	Unclear from documents submitted	Not indicated. Can be interpreted as NONE
Makati	Makati Parking Authority (MAPA) for CBD; Department of Public Safety Assistance (MAPSA) for other areas of city	Included in MAPSA as Traffic Eng'g & Planning Office; not specified in MAPA	Yes. Both MAPA & MAPSA have own enforcers, aside from MMDA	YES, with forward plans & budget
Malabon	auxiliary function of Public Order and Safety Office, which reports to the Mayor	Indicated as a unit of Traffic Management Section	Unclear from documents submitted	Not indicated. Can be interpreted as NONE
Mandaluyong	Traffic Task Force with 2 main functions: traffic enforcement & tricycle regulation	Separate; part of Engineering Office	Yes. Size not indicated in submitted documents	Not indicated. Can be interpreted as NONE
Manila	Manila Traffic and Parking Bureau, with 292 personnel, created in 1993	Included in MTPB, with 20 personnel	Yes. Listed 107 personnel engaged in direct enforcement	Not indicated. Can be interpreted as NONE
Marikina	Traffic Management Section under the Office of Public Security & Safety (OPSS)	Separate, a Traffic Engineering section under City Engineer's Office	Yes. Size not indicated in submitted documents	YES, with forward plans & budget
Muntinlupa	Department of Traffic, Environment & Discipline (DTED)	Included as a unit under DTED	Yes. Size not indicated in submitted documents	Not indicated. Can be interpreted as NONE
Navotas	1 of 2 responsibilities of the Public Order and Safety Office (POSO), focused on enforcement. An ordinance alluded to a Traffic Management Office	Separate, probably under Engineering Office	Yes. Size not indicated in submitted documents	Not indicated. Can be interpreted as NONE
Parañaque	Traffic Bureau under the Office of the Mayor, creation inserted in an ordinance on towing.	Separate, part of the city Engineering Department	Unclear from documents submitted; most likely, no.	Not indicated. Can be interpreted as NONE
Pasay	Traffic and Parking Bureau	Separate, probably under Engineering Office	Unclear from documents submitted	Not indicated. Can be interpreted as NONE
Pasig	Pasig City Traffic Management Office	Separate, probably under Engineering Office	Yes. Size not indicated in submitted documents	Not indicated. Can be interpreted as NONE
Pateros	Pateros Traffic Enforcement Unit (ordinance alluded to a Pateros Metropolitan Traffic Command	Separate, probably under Engineering Office	Yes; 4 traffic enforcers under PNP supervision	Not indicated. Can be interpreted as NONE
Quezon City	1 of 4 responsibilities of the Public Order and Safety Department under the Secretary to the Mayor.	Separate, part of the city Engineering Office. POSD also has a traffic eng'g section	Yes. Size not indicated in submitted documents	Not indicated. Can be interpreted as NONE
San Juan	PNP San Juan Traffic Division and San Juan-BOC Traffic Task Force	Separate, probably under Engineering Office	Unclear from documents submitted	Not indicated. Can be interpreted as NONE
Taguig	Traffic Management Office under the Office of the Mayor	Planning & Traffic Engineering is a section under TMO	Yes. Size not indicated in submitted documents	Not indicated. Can be interpreted as NONE
Valenzuela	Valenzuela Traffic Unit under the direct supervision of the Northern Police District	Separate, probably under Engineering Office	Yes. Size not indicated in submitted documents	Not indicated. Can be interpreted as NONE

7.3 Out of the apron string of MMDA

Among the 17 LGUs, three can be singled out in staking out their own capacity for traffic management without relying solely on MMDA. Because of Republic Act No. 7924 (the MMDA Charter), it is understandable for the other 14 LGUs to place traffic management in their backburners. Not so for Marikina, Makati, and Muntinlupa.

An autonomous traffic management process is evident in the cities of Marikina, Makati (at least, for MAPA covering the business district), and Muntinlupa. The three LGUs differ in organizational models and financial capabilities: Marikina splits its traffic management activities across several units and has the lowest income among the three LGUs. Makati is the wealthiest, but its traffic management outside MAPA is not exemplary. Perhaps a reflection of their autonomy as well as traffic maturity, Marikina and Muntinlupa opted out of or do not apply the Vehicle Volume Reduction Program of MMDA. Neither is any worse off than the rest of the metropolis for doing so. The single variable that could explain the phenomenon in these three LGUs is leadership – either by the Mayor or his deputies.

The objectives of SSTRIMM would have been fully realized if all the 17 LGUs in Metro Manila are like Marikina, Makati, and Muntinlupa. They already exemplify what SSTRIMM seeks to achieve.

Ingredients (similar to what the three LGUs have) can be discerned in Malabon, Mandaluyong, and Parañaque. The attendees to SSTRIMM seminar workshops revealed sustained participation of a wide cross-section (planning, engineering, enforcement) of LGU staff. The beginnings of locally-devised traffic improvement programs are already evident among them. Of the three, Mandaluyong exhibits the most fragility. If the experience in the implementation of the pilot project is any gauge, Mandaluyong is likely to remain dependent on MMDA longer than Malabon or Parañaque.

The other 11 LGUs have to decide whether they will carve their own role in traffic management in accordance with the Local Government Code or remain in the shadows of MMDA. If they pursue the more independent path – a decision that their Mayors and Councilors has to make – SSTRIMM has already provided them the necessary ingredients, such as:

- Initial training for its core staff;

- Traffic management manual for guidance and reference;
- Ready-to-implement program (set of traffic bottleneck points with complete solutions);

7.4 Traffic and traffic-related ordinances

Another indicator of the state of institutional readiness and maturity for traffic management of the LGUs is the quality and range of their traffic and traffic-related ordinances.

Table 7.2 summarizes the topics covered by the various ordinances enacted by the 17 LGUs in Metro Manila. Parking (and no-parking) topics top the list, followed closely by towing and impounding of stalled vehicles. Third on the most frequent list are rules concerning public transport like buses, jeepneys and tricycles.

Strangely, only 6 of 17 revealed any ordinance on the regulation of tricycles and/or pedicabs. The 6 includes Caloocan, Malabon, Manila, Marikina, Muntinlupa, and Navotas. Under the Local Government Code, the franchising for this mode of transport has been devolved from the LTFRB to the LGUs. Expectedly, all the 17 LGUs should have shown ordinances on this subject. It is possible that more of them have, but that copies of the ordinances had simply not been furnished to SSTRIMM. For example, a number of traffic ordinances in Quezon City alluded to locally-issued franchises but the corresponding general ordinance was not submitted.

Over and above the individual pieces of ordinances is the glaring fact that there is a wide disparity in coverage, treatment, and quality across the 17 LGUs. Without commonly understood rules of conduct on the roadways of Metro Manila, enforcement is almost certain to fail.

It can be discerned also from all the ordinances that every traffic scheme – big or small – requires the intervention of the local Sanggunian or Council. It does not bode well for local traffic officials. The length of time may discourage implementation if not generation of new measures. The Council's calendar is usually crowded with far more hot issues than traffic congestion in one intersection. Instead of decisions based on technical and economic merits, the process tends to become political, i.e., a subject of horse-trading.

In lieu of special ordinances for every topic of current concerns to the LGUs, a comprehensive traffic code can be enacted. Caloocan, Malabon, Mandaluyong, Marikina, Pasay, Pasig, Quezon City and Taguig had attempted to consolidate or codify their traffic rules. Navotas also has a similar ordinance, although the topics are not as wide-ranging as one would expect from a code. The more outstanding one is that of Caloocan. The codes of Mandaluyong and Quezon City are also good starting points. For uniformity, the codes to be enacted by each of the 17 LGUs should be the same, or as close as possible. It will necessarily differ on the specific streets designated for parking, one-way, or turning movements. It will also differ on parking rates. But the norms of discipline required from drivers and pedestrians, as well as the requirements for vehicles, should be the same across all the 17 LGUs.

Table 7.2 **Comparative Scope of Local Ordinances in Metro Manila**

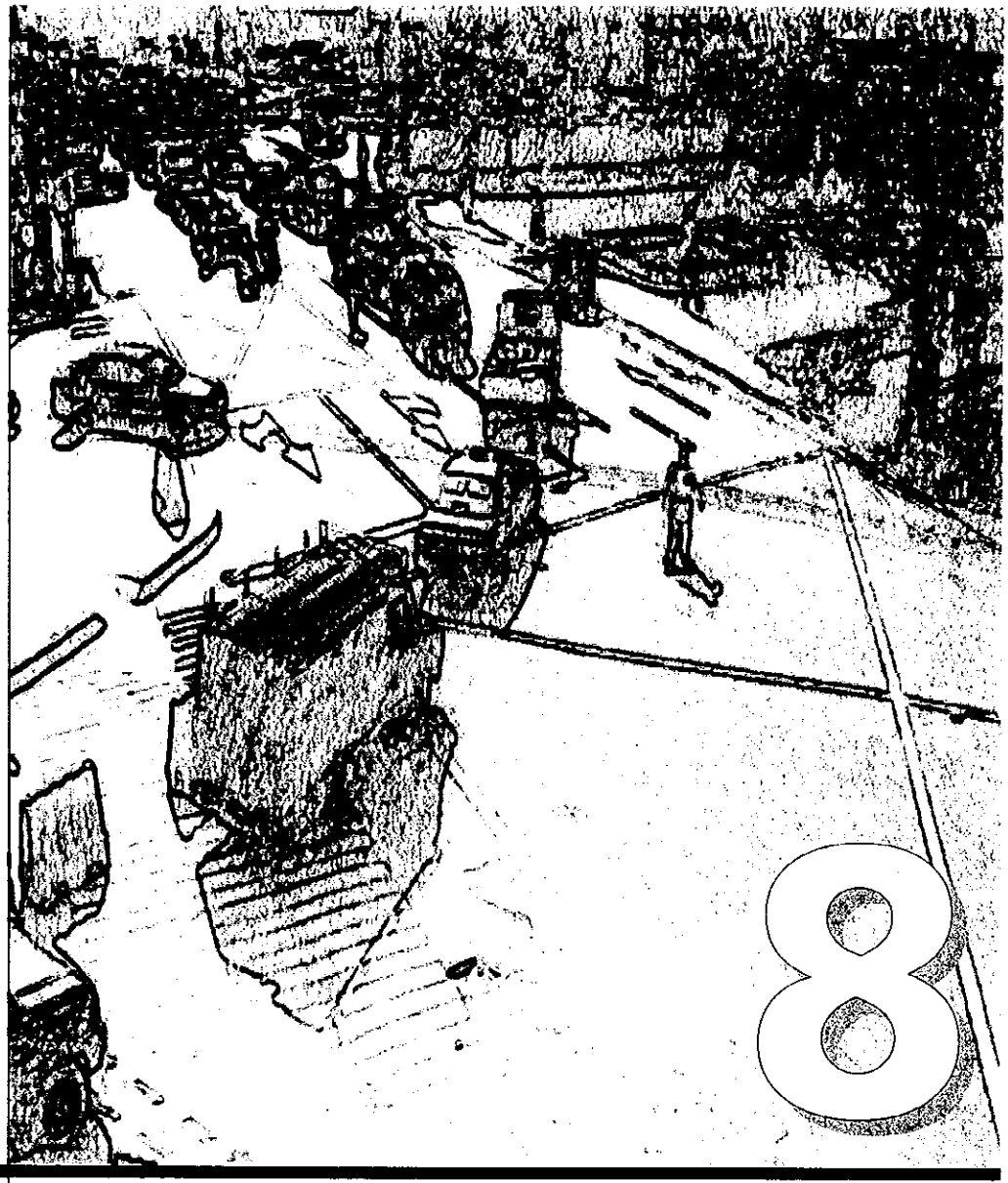
Legal Support for Traffic Management in Metro Manila LGUs	Caloocan	Las Piñas	Makati	Malabon	Mandaluyong	Manila	Marikina	Muntinlupa	Navotas	Parañaque	Pasay	Pasig	Pateros	Quezon City	San Juan	Taguig	Valenzuela
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
TYPE OF ORDINANCES																	
- Designation of parking/no-parking zones	○	●	●	○	○		●	●	●	●	○	●	●	●	●	●	●
- Towing and impounding of vehicles	○		●	○	●	○	○		○	●	○	●	○	●		●	
- Rules on PUJ, PUB, Tricycle	○	●	○	○			●	●	○	○		○			○	○	
- Transport and/or traffic code	●			●	●		●		○		●	●		●		●	
- Designation of one-way streets		●	●	○				○	○				●	●	●	○	
- Designation of loading/unloading zones	○		●	○	○	●	●				○					○	
- Pedestrians, jaywalking, etc.	○			○				●	○	●		●				○	
- Prohibition re sidewalks	○		●			○						●		●	●		
- Regulation of PU terminals	○	●		○		○								○		○	
- Truck ban, truck routes	○	●	●									○		●	○		
- Franchising of tricycles	○			○										○			
- Opening of private/subdivision roads								●		●		●		●			
- Special fund for traffic improvements	○		●											●		○	
- Procedures on TCTs/TVRs	●				○		○										○
- Road diggings & excavations												●					●
- Bicycles, roller skates, blades, boards	○			●													
- Prohibition on provincial PUV						●											
- Miscellaneous topics (e.g., sale of gadgets, signages, seatbelts, drivers,)												○	○	●	●		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

7.5 Weakest aspects of LGUs

From the workshops and interactions with the different LGUs on the formulation of measures (for the second tranche of TBPs), it became apparent that the weakest element in their arsenal is traffic engineering. While most could formulate soft (i.e., those involving non-physical measures) solutions – very few could muster enough bases to evolve engineering measures like geometric improvements, channelization, and the like.

Another fundamental weakness is the propensity to jump to proposed scheme or measure without first analyzing the data. Many found it easy to suggest solutions or schemes, but few could cite specific data or figures underlying their schemes. This tendency may be due to familiarity with the TBPs. However, in many instances, the relative scale of the classified volumes could not be explained. An aversion to figures may also explain the experience of the Study Team in conducting surveys: none of the LGUs cared to participate directly in the field surveys.

A third weakness is the virtual paucity of road engineering data. While many could produce sketches of the TBPs, rare is the LGU that could produce scaled-drawings with the physical dimensions indicated.



8

Towards Stronger Local Traffic Management

SSTRIMM Final Report

November 2001

8

Towards Stronger Local Traffic Management

8.1 Implementing TIPs

Seventy-six (76) traffic chokepoints with proposed improvements eventually came out of the SSTRIMM exercises – five (5) of which had been implemented with funding from JICA. There are two main issues in the implementation of the remaining 71 Traffic Improvement Projects (TIPs): (i) funding, (ii) organization.

In terms of funding, there are three alternatives for the LGUs:

a. Rely on their own internal resources.

This is what Marikina and Makati have demonstrated. The argument is compelling that if the two LGUs can do it, the other 15 LGUs can also do it. It is estimated that the 71 TIPs would require P20 million to implement, which is less than 1/10 percent of the aggregate revenues of the 17 LGUs. Nearly one half of the amount is accounted for by Makati, whose P6 billion annual revenues could easily pay for their own TIPs. Cost of the 16 TIPs in Makati represents only 0.18% of its annual income. Marikina claimed that it spent about P12 million for its own traffic projects, which would indicate a ratio of approximately 2% of income. Using the Marikina experience as the upper limit, it suggests that only Malabon would have difficulty implementing its own TIPs. Looking at Table 8.1

below, it can be surmised that Malabon and Pateros would be the only two LGUs that would have difficulties in funding their own local TIPs. Malabon deserves special mention also because it had identified more TBPs than the other 16 relative to its size. That Makati tops the number is understandable, but for Malabon to rank second on this score means only one thing – its traffic management people are keeping a sharper eye on their local problems than the bigger LGUs like Quezon City and Manila.

Table 8.1 **Cost of TIP Relative to Incomes of LGUs**

Name of LGU	No. of TIPs	Cost (₱)	1998 Revenue	Cost-to-Revenue (%)
Caloocan	3	676,450	1,159,708,458	0.058
Las Piñas	4	1,315,000	787,026,119	0.167
Makati	16	10,333,330	5,780,139,163	0.179
Malabon	9	1,652,520	266,993,392	0.619
Mandaluyong	4	1,092,480	981,601,782	0.111
Manila	3	473,578	3,106,579,980	0.015
Marikina	3	1,128,170	610,094,895	0.185
Muntinglupa	3	684,900	716,706,106	0.096
Navotas	1	42,823	168,726,401	0.025
Parañaque	4	388,740	1,017,190,676	0.038
Pasay	2	644,860	939,163,852	0.069
Pasig	3	1,106,720	1,859,853,517	0.060
Pateros	2	218,280	56,566,582	0.386
Quezon City	4	765,651	3,997,728,181	0.019
San Juan	2	253,200	389,588,219	0.065
Taguig	3	239,190	390,144,585	0.061
Valenzuela	5	886,830	595,118,408	0.150

b. Get funding support from MMDA in full or part.

It is unclear whether the MMDA has the budget for such an undertaking, but it could re-allocate a portion of its annual appropriations for a metro-wide program of TIPs. The number and list of TIPs shown in Table 8.1 would only be an initial program; certainly other LGUs could generate as much, if not more, candidate projects or traffic problem areas than Makati and Malabon. Nevertheless, a fund of P20 million should be a good starting point. MMDA could well afford this amount, considering the magnitude of

traffic improvement measures that it executed during the course of SSTRIMM alone.

c. **Get loans or raise taxes.**

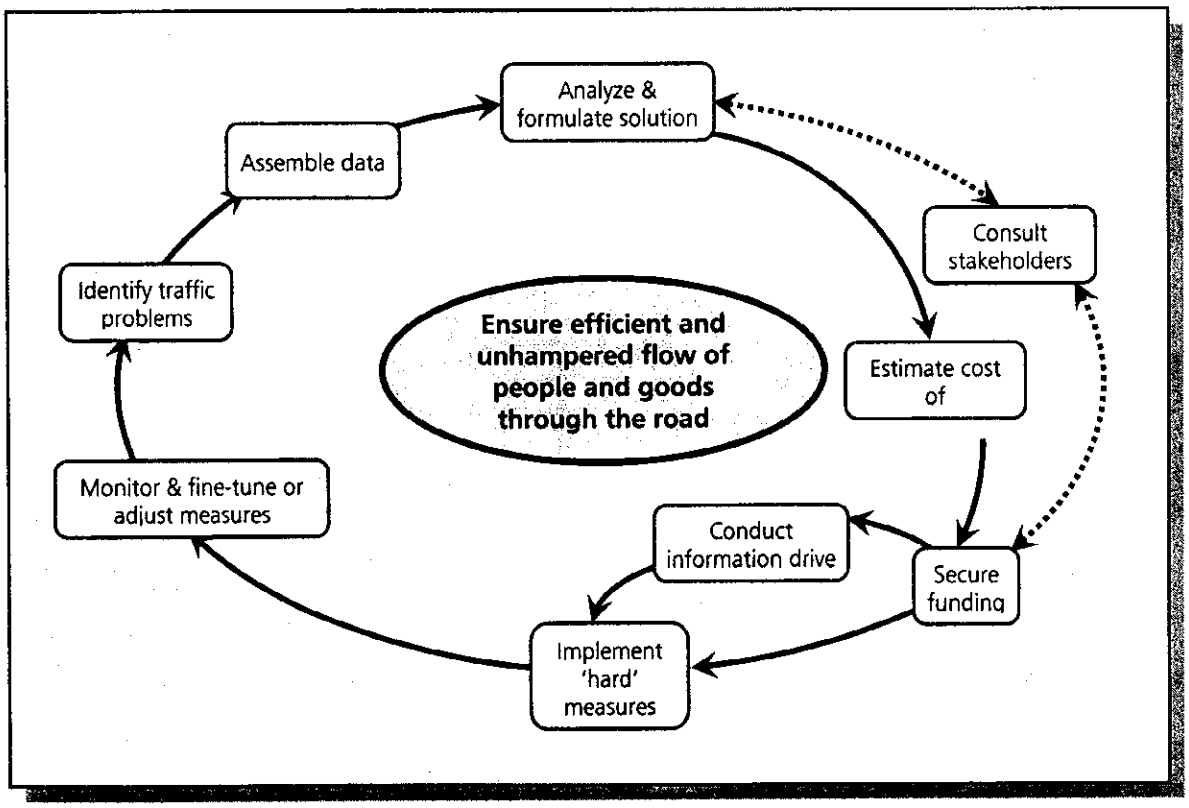
This option may be unattractive to most of the 17 LGUs. Besides, it is also not advisable for LGUs with inchoate traffic organization.

Of the three alternative method of financing, it is recommended that MMDA create a matching grant – say 50% of the TIP cost – to jumpstart a metro-wide program and to initiate the LGUs towards a bigger role in traffic management.

8.2 Organization of TM Activities

As discussed in Chapter 7, the 17 LGUs of Metro Manila have different organizational models. What is critical, however, is local leadership – a 'Traffic Champion' high enough in the local government hierarchy who could drive the traffic management process shown in Figure 8.1.

Figure 8.1 **Basic Traffic Management Process**

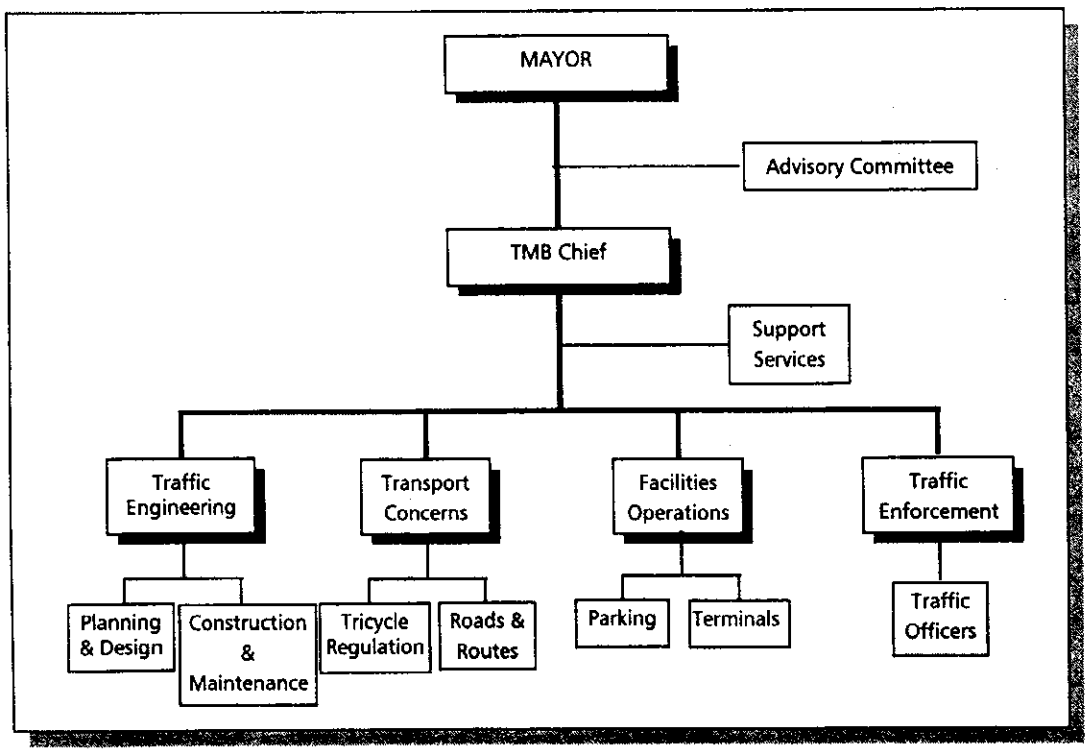


A more efficient model is to integrate or unify all the activities comprising the TM process in one roof, i.e., one Department or Traffic Management Bureau (TMB).

A TMB reporting directly to the City/Municipal Mayor is most appropriate in Metro Manila. The bureau shall be responsible for the planning, design, implementation, and maintenance of transportation and traffic schemes within the city/municipality territorial boundary – especially over local roads. It shall, however, defer to MMDA when it comes to national roads. Proposed structure is shown in Figure 8.2, and assumes fulfillment 'under one roof' of the TM processes of Figure 8.1.

The TMB is a departure from the traditional concept whereby traffic management is an adjunct to enforcement by the Police. In the Philippines, the provision of public transport services is left to private operators, although local governments cannot shirk away from this concern. Ensuring a smooth flow of traffic over the road network in its jurisdiction is the principal focus of LGUs. Corollary to this mission is managing the circulation of public transport, including their interface with passengers. Apart from what the national agencies are doing, the city/municipality may also operate transport-related enterprises such as parking facilities, transport terminals, and towing services.

Figure 8.2 **Internal Structure of a Model Transport and Traffic Management Bureau**



The TMB will be headed by a Chief, whose position is equivalent to that of a department head of the city/municipality and covers five sections, namely: Traffic Engineering, Transport Concerns, Traffic Enforcement, Facilities Operations, and Support Services.

Because of the number of affected sectors that could not be subsumed under the TMB, an Advisory Committee (or Local Traffic Council) is proposed to be constituted. The Committee's primary function is to provide advice and policy directions to the TMB to ensure a holistic approach to problem-solving and cooperation in the implementation of transportation and traffic schemes. The recommended members are the following:

Chairman	:	Mayor
Vice-chairman	:	City Administrator
Members	:	City Engineer
		Planning & Development Coordinator
		PNP Chief in the City (or Traffic District Command)
		City Legal Officer
		Representative of LTFRB
		Representative of LTO
		3 Private Sector Representatives

The following are the powers and functions of each of the Sections of TMB.

a) Traffic Engineering Section

- Identify traffic bottleneck points and establish their priorities;
- Formulate traffic engineering schemes, starting with the priority list;
- Secure agreement on proposed traffic schemes;
- Install and maintain traffic signs, road markings and other traffic control devices;
- Recommend ordinances in support of traffic management schemes;
- Review major property development proposals as to their traffic impact;
- Identify private roads that should be opened to improve overall circulation, and initiate moves for the full or partial integration into the road network;
- Collect traffic data and statistics such as vehicular counts, road layouts and dimensions, etc.

- Review and approve request for road diggings, road constructions, temporary closures, parades, and conduct of extra-ordinary events that would reduce road capacity.

b) Transport Concerns

- Provide professional inputs into the preparation and updating of Comprehensive Land Use Plan (CLUP), particularly the long-term road network plan of the city;
- Update and analyze the public transport routes and services covering tricycles, buses, and jeepneys;
- Provide the technical and staff support to the Sangguniang Panlungsod in regulating the operation of tricycles, pedicabs and other public conveyances within the administrative jurisdiction of the city/municipality;
- Coordinate with public transport operators in the provision or operation of facilities like terminals and waiting areas;
- Appear in the hearings of the LTFRB to ensure that the issuance of franchise is consistent with the plans of the city/municipality;
- Evaluate requests (coursed through the City Planning Department) for variances from the zoning ordinance that are likely to have a significant traffic impact;
- Formulate and advocate programs that will promote/encourage trips by public transport and higher-capacity modes.

c) Traffic Enforcement Section

- Assign personnel to direct or control traffic at intersections and other locations requiring such intervention;
- Execute the enforcement component of any traffic scheme devised or conceived by the traffic engineering section and approved by the Advisory Committee;
- Enforce applicable traffic rules and regulations;
- Coordinate with MMDA and PNP traffic enforcers to harmonize personnel deployment and field operations;
- Initiate the towing or removal of vehicles obstructing traffic;
- Suggest changes in any traffic scheme, including provision of traffic signals;
- Formulate and implement a local traffic education and road safety program.

d) Facilities Operations Operate a towing unit, by itself or with private entities;

- Establish, operate, maintain and/or administer terminals, parking facilities, bicycle paths, including collection of user fees and charges;
- Initiate or administer pedestrian-only zones or streets temporarily or permanently withdrawn from vehicular use, including time allocation for use of roads other than for vehicles.

e) Support Services Section

- Provide administrative services to all the sections of TMB;
- Provide management information services, including the collection of accident data, updating and maintenance of TMB records, inventory of roads and traffic control devices;
- Handle the paper work and documentation attendant to enforcement, such as the processing of traffic citation tickets and TVRs in behalf of MMDA and LTO;
- Conduct public information campaigns in support of any activities of the TMB;
- Provide other administration and logistics support to the various technical sections.

8.3 Avoiding Sub-optimization

The biggest danger of every LGU acting autonomously on traffic is sub-optimization – where a solution for one chokepoint is 'solved' by transferring the problem elsewhere or into another LGU. Corollarily, a problem could not be solved fully because the other parts fall under another municipality. This has been observed in a number of bottleneck points investigated by SSTRIMM.

Analogously, attacking one chokepoint in isolation from its adjoining areas may disregard the network or ripple effects. Congestion in one intersection eventually ripples into another down and up the roads. This parochial view and piecemeal attention, however, is not endemic to LGUs; it has been observed also under the current set-up of metro-wide management of traffic.

If and when the 17 LGUs in Metro Manila assume greater control of traffic management within their respective jurisdictions, the role of MMDA may have to change in accordance with the foregoing principle. MMDA will have to pay more attention to overlapping problems among LGUs and to solutions that cut across several localities. That would be going back to its basic mission in traffic - which is to "set the policies concerning traffic in Metro Manila, and shall coordinate and regulate the implementation of all programs and projects concerning traffic management, specifically pertaining to enforcement, engineering, and education."

Illustrative of the overlapping concern is the Ortigas Commercial Center or business district. The area straddles three cities and a municipality: Pasig, Quezon City, Mandaluyong and San Juan. A quasi-government organization (the Makati Parking Authority model) appears to be suitable for the areas adjoining the three primary roads of EDSA, Ortigas Avenue, and Shaw Boulevard. MMDA could initiate the formation of an Ortigas Traffic authority among the four LGUs and the major property developers therein.

8.4 Establishing a Traffic Fund

The funding requirements will depend on the size of the TM organization and the extent of traffic improvement projects that it will undertake for the city/municipality. The expenditure side will consist of the operating expenses (to cover personnel and supplies) and the capital expenses (to cover signage, geometric improvements, pavement markings, and the like).

The usual source of funding is the general fund of the city/municipality, which would mean enactment of an appropriation – annually - by the Sangguniang Panlungsod (City Council).

It is preferable, however, to earmark certain transport and traffic-related collections and fees to a special fund that can cover the operating and capital expenditures of the TMB. The possible sources are:

- parking fees or charges;
- penalties/fines for traffic violations;
- tricycle license fees;
- frontage tax on properties along major thoroughfares;
- tax on private roads not otherwise opened to the public;

- charges for land conversion – from low to high-intensity use, as when a residential property is converted into commercial.

Makati has a special fund, but only for MAPA and not MAPSA. Its main source of income is parking fee within the Business District. Caloocan, Quezon City, and Taguig also mentioned a special account for traffic.

Aside from parking charges, Caloocan also earmarks fees from tricycle regulations and traffic fines. On the other hand, Quezon City mentioned some parking fines accruing into a peace and order fund of the barangay and fifty (50%) of traffic fines being placed in trust under the Police and Traffic Enforcement Incentive Program. The traffic code of Taguig created a Traffic Management Office with powers to collect fines that are supposed to accrue into a special account in the general fund.

No attempt was made in the course of SSTRIMM to examine in detail the procedures, inflows and outflows, experiences, and amounts of these special funds. Suffice it to say, however, that their sources are not as varied and their utilization are unclear. To provide continuity and divorce somehow the activities of the local traffic organizations from politics, a Special Traffic Fund should go a long way towards strengthening the capability for implementation of TIPs.

8.5 Adopting a Comprehensive Traffic Code

Apart from reconfiguring its organization and lining up funding, a third element that could enhance local traffic management capability is the enactment of a comprehensive ordinance on traffic. The MMDA has attempted to draft a traffic code in the past, but for one reason or another, it never got adopted. Currently, there is some legal uncertainty about the powers of MMDA to enact such a code, but none on LGUs.

A model Draft Traffic Code was therefore drafted under SSTRIMM to fill up the gap, define a minimum set of rules, and harmonize them across the 17 LGUs. The Draft Traffic Code is appended in this volume of the Final Report. It is a synthesis of the best features of existing ordinances, national and international rules and regulations

on traffic management, wit special attention to the peculiar nature of Metro Manila.

The salient features of the proposed Draft Traffic Code are as follows:

a) It supplements and expands Republic Act 4136 as amended, otherwise known as the "Land Transportation and Traffic Code." Among its new provisions are those on:

- Traffic signals;
- General driving rules, involving rotundas, bicycles lanes, clearways, etc.;
- Incorporating rules pertaining to traffic schemes adopted in Metro Manila such as "Bus Only" lanes and box intersections;
- Designation of one-way streets;
- Designation of parking zones and specifying parking fees;
- Operation of non-motorized vehicles.

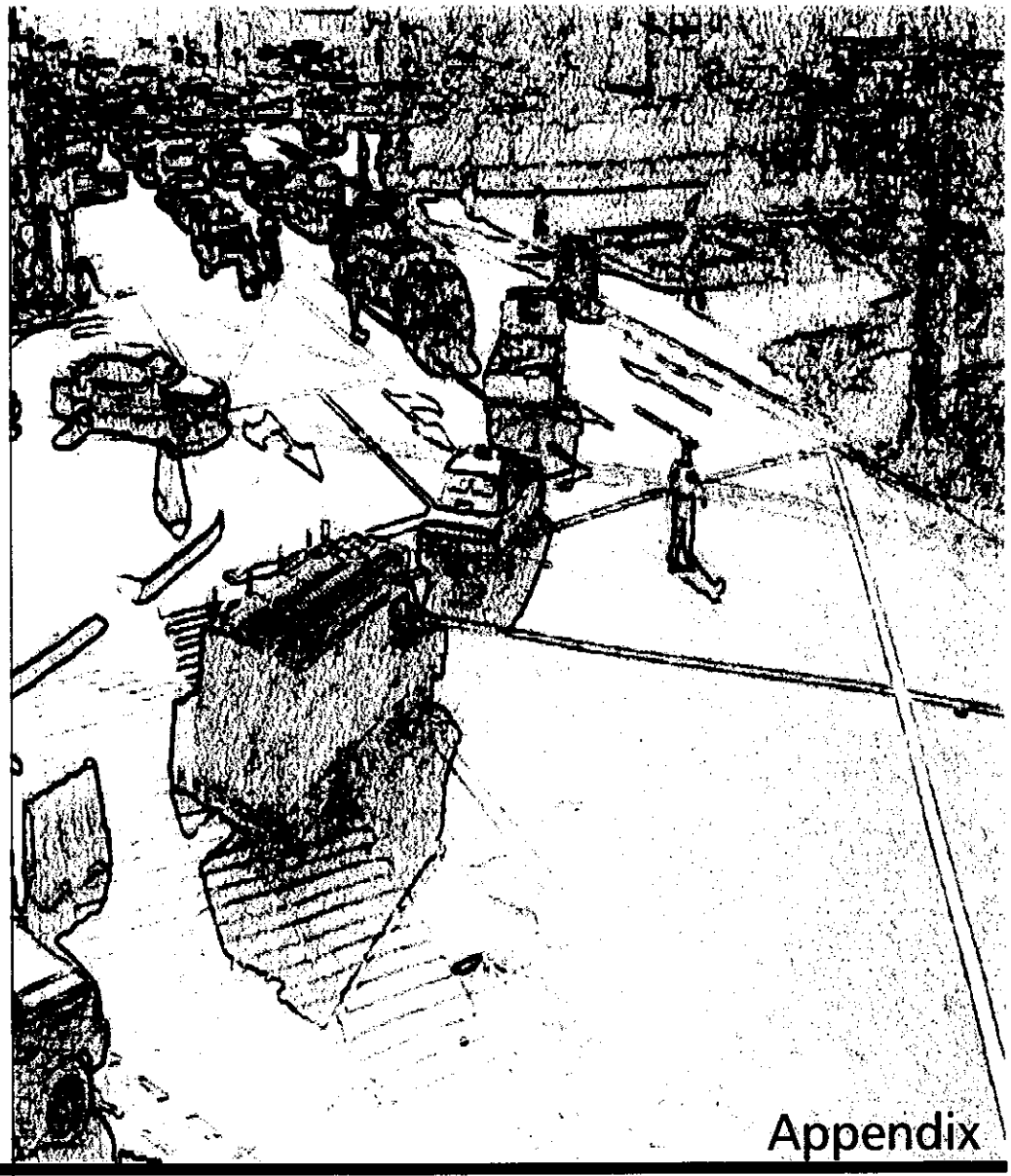
b) It enumerates pedestrian rights and obligations.

c) It provides a balance treatment on the conflicting needs of exclusive villages to fence off their roads from public use and the traffic imperatives of linking them into the urban network;

d) It reverses the principle of 'ordinance first before execution' into 'pilot implementation becoming permanent unless overturn through a Sanggunian resolution later'. This will facilitate the adoption of new traffic schemes – which are generally technical in nature - and declog the calendar of the local council. However, it stipulates a rigorous technical process of analyses and consultation before implementation.

e) It recognizes the peculiarity of Metro Manila in the entire country, by allowing for traffic enforcers other than the Police to be employed by the LGU, and for the issuance of traffic citation tickets apart from the LTO-issued TOPs.

f) It enshrines the policy that the urban road space is a scarce resource whose usage must be allocated judiciously through sound traffic management, and that maximizing passenger throughput on the roads is the objective rather than moving motor vehicles per se.



Appendix

Draft Traffic Code

Draft Traffic Code for Metro Manila LGUs

Contents

TRAFFIC CODE
OF
[Name of LGU]

Republic of the Philippines
CITY OF [Name of LGU]
SANGGUNIANG PANLUNGSOD
ORDINANCE NO. [_____]

ARTICLE I – GENERAL PROVISIONS

Section 1. Title –

This Ordinance shall be known and cited as the Traffic Management Code of the City of [Name of LGU], Metro Manila.

Section 2. Scope and Application –

This Ordinance provides for the traffic rules and regulations on all roads or highways in the City, whether national or local in classification; pedestrian rules and regulations; vehicle stops and public transport terminals; the use of sidewalks and alleys; road use by all motor vehicles including motorized tricycles and pedicabs, bicycles, horse-drawn rigs, pushcarts and other forms of conveyances, whether public or private; day-parking zones and night-parking zones; and in general, such other rules and regulations hereinafter promulgated in furtherance of an optimum utilization of the road network in the City of [Name of LGU]. Where the context applies, the rules shall also apply to public places.

Section 3. Declaration of Policy –

It is hereby declared the policy of the City of [Name of LGU] that:

(a) the flow of people and goods through the road network shall be as efficient, safe, unhampered and orderly as possible for the economic and social vitality and viability of the city;

(b) urban road space is a scarce commodity, the competing use of which must be allocated for the greatest good and the greatest number through judicious, fair, participatory and informed traffic management system;

(c) traffic problems and issues must be resolved in a rational manner, guided by facts and shaped through consultation, collaboration, and coordination with the surrounding Municipalities and Cities, with the Metropolitan Manila Development Authority, as well as national agencies like the Department of Public Works and Highways and the Department of Transportation and Communications;

(d) the public has the right to be informed *a priori*, and to participate in the formulation, of any measures that may affect their community and traveling habits.

Section 4. Exemptions for Emergency Vehicles –

The driver of any emergency vehicle may, when it is expedient and safe to do so:

(a) on sounding a siren, bell or repeater horn, proceed past a traffic control signal displaying a red or amber circle or a red or amber arrow or proceed contrary to the direction or instruction of any traffic control devices;

(b) on sounding a siren, bell or repeater horn, drive in any direction or any part of a road or overtake or pass on either side of another vehicle;

(c) stop, leave waiting or park the vehicle at any place at any time; or

(d) exceed the speed limits prescribed in Section 30 of Article VII of this Code.

ARTICLE II – DEFINITIONS

Section 5. Definition of Terms –

When used in this Code, the terms

1. **Abandoned vehicle** - any vehicle left unattended for more than twenty-four (24) hours on a public highway.
2. **Authorized maintenance vehicle** - any vehicle of the city government used in street lighting, traffic signal, highway construction and highway repair and maintenance works.
3. **Authorized tow vehicle** - any vehicle specially constructed for towing vehicles, other than trucks and farm or road tractors, which is designated as an authorized tow vehicle by the City.
4. **Acceleration lane** - a speed change lane used for increasing speed and merging with fast moving vehicles.
5. **Bicycle** - any two-wheeled vehicle designed to be propelled solely by human power.
6. **Bicycle path or lane** - a way established for the exclusive use of bicycle, including tricycles propelled by human power, but excluding push carts and animal drawn vehicles.
7. **Built-up area** - a type of street normally characterized by relatively low speeds, wide ranges of traffic volumes, narrower lanes, frequent intersections and driveways, significant pedestrian traffic, and prevalence of businesses and houses.

8. **Center** - in relation to a thoroughfare, means a line or series of lines, marks or other indications placed at the middle of the thoroughfare or, in the absence of any such line, lines, marks, or other indications, the middle of the main traveled portion of the thoroughfare.
9. **Channelized intersection** - an intersection provided with islands meant to guide and limit vehicle movements.
10. **Clearway** - a length of carriageway generally defined by signs, along which vehicles may not stop or be left standing at times of the day as provided on the signs.
11. **Deceleration Lane** - a speed change lane used for decreasing speed, preparatory to stopping or exiting a fast lane.
12. **Divided road** - a highway or road with separated carriageways for traffic traveling in opposite directions.
13. **Driver** - is any person having control of the directional and motive power of a vehicle.
14. **Emergency vehicle** means a motor vehicle:
    a. conveying member of the police force on urgent police duty,
    b. of a fire brigade traveling to or on duty at any place in consequence of a fire or an alarm of fire,
    c. being an ambulance or any other vehicle, answering an urgent call or conveying to a hospital any injured or sick person urgently requiring treatment,
    d. being used to obtained or convey blood or other supplies, drugs or equipment for a person urgently requiring treatment which may or may not carry a siren, bell or repeator horn for use as a warning instrument, or
    e. duly authorized as an emergency vehicle for purposes of this Code by the appropriate authority.
15. **Footway** - that portion of road set aside for pedestrian use only.
16. **High beam** - means a beam of light projected from vehicle headlights such that the main bright portion of the beam thereof rises above the horizontal plane passing through the lamp centers parallel to the road level upon which the vehicle stands.
17. **Horn** - includes any or every device for signaling by sound.
18. **Intersection** - the place at which two or more roads cross.
19. **Laned thoroughfare** - means a thoroughfare divided into two or more marked lanes for vehicular traffic.
20. **Low beam** - means a beam of light projected from vehicle headlights such that none of the main bright portion of the beams thereof rises above a horizontal

plane passing through the lamp centers parallel to the road level upon which the vehicle stands.

21. **Marked Cross-walk** - means a portion of a thoroughfare between two parallel lines marked across the thoroughfare, intended for use of pedestrian.
22. **Merging** - the converging of separate streams of traffic into a single stream.
23. **Motor vehicle** - means any conveyance designed to be self-propelled, and includes any vehicle designed to be propelled by electric power obtained from overhead wires but not operated upon rails.
24. **No parking area** - means a portion of a thoroughfare between two consecutive "No Parking" signs and with arrows pointing generally towards each other or other appropriate signs.
25. **One-Way thoroughfare** - means a thoroughfare on which vehicles are permitted to travel in one direction only, as indicated by appropriate signs or signals.
26. **Overtake** - to pass or attempt to overtake or pass a slower-moving vehicle traveling in the same direction.
27. **Parked** - a vehicle is said to be parked if it is stationary for the period during which the vehicle is not limited to the time needed to pick up or set down persons or goods.
28. **Parking area** - means a portion of the thoroughfare where parking is permitted as indicated by appropriate notices or parking signs.
29. **Pedestrian** - any person on foot or in a perambulator.
30. **Public Place** - any place where the public have access, upon payment or otherwise.
31. **Road** - sometimes called street or highway, means that part of the land surface designed or used for the passage of vehicles, whether motorized or not, inclusive of sidewalks and shoulders forming part of the right-of-way.
32. **Road marking** - any traffic control device laid out or painted on the surface of the road or carriageway used to regulate traffic or to warn or guide road users, used either alone or in conjunction with other signs or signals to emphasize or clarify their meaning.
33. **Roundabout** - an intersection where all traffic travels in one direction around a central or circular island.
34. **Separation line** - a line marked on the pavement of a thoroughfare to separate traffic traveling in opposite directions.
35. **Standing** - a vehicle is said to be standing if it is stationary for the time needed to pick up or set down persons or to load or unload goods.
36. **Stop line** - a line marked across the thoroughfare near a traffic control signal, stop sign, children's crossing or intersection.

37. **Thoroughfare** - means that portion of a road improved, designed or used for vehicular travel exclusive of the shoulder and footway.

38. **Traffic Control Signal** - means any device using a word or words, a symbol or symbols, a colored light or lights or any combination thereof operated mechanically, electrically, manually or otherwise by means of which traffic may be controlled or regulated.

39. **Traffic Island** - a defined area within the roadway, usually at an intersection and set off above ground level, from which traffic is intended to be excluded and which is used for control of vehicular movements and as pedestrian refuge.

40. **Traffic management authority** – refers to the city's organization or office designated and authorized to perform traffic engineering, planning, education, and/or enforcement activities.

41. **Trailer** – a vehicle not otherwise self-propelled, usually attached to the rear of a motor vehicle.

42. **Two-way Thoroughfare** - means any thoroughfare where traffic is permitted in opposite directions.

43. **U-turn** - means a movement which causes a vehicle facing or traveling in one direction to face or travel in the opposite, or substantially the opposite direction.

44. **Vehicle** - means any conveyance or other device propelled or drawn by any means and includes a bicycle and, where the context permits, includes an animal driven or ridden, but does not include a train.

45. **Waiting** - means a vehicle permitted to remain stationary with the motor running.

ARTICLE III – ERECTION AND OPERATION OF TRAFFIC CONTROL ITEMS

Section 6. Erection and Interference with Traffic Control Items –

(a) No person shall, except when duly authorized by the proper authority, erect, establish or display on any road or in the view of any person on any road, or interfere with, alter or take down, any traffic-control sign or item;

(b) No person shall erect, establish, place, maintain, or display on any road or in the view of any person on any road anything which purports to be or is an imitation of or similar to any traffic control sign or item, or which interfere with the effectiveness of or prevents an approaching driver from clearly distinguishing the whole or part of any traffic control item, or distracts his attention from any traffic control sign or item;

Section 7. Limits on Operation of Signs –

Any sign associated with a "No Parking Area", "No Waiting Area", or "Parking Area" or any sign of a kind referred to in Section 10 shall be limited in its operation and effect in respect of days, periods of the day, classes of vehicles or circumstances to the extent (if any) shown on the sign.

Section 8. All Traffic Control Signs or Items to be Operative –

(a) Where any traffic-control sign or item of a kind referred to in this article exists on road, it shall be effective and operative as a traffic-control item duly established for the purpose under this Code.

(b) Any traffic-control or item which substantially conforms to the requirements of these sections with respect to dimensions, shape, color, position, direction, angle or any other features of traffic-control signs or items of any kind shall be deemed to be traffic-control sign or item of that kind.

Section 9. Display of Dazzling Lights, etc. –

No person shall establish, place or maintain any light of such kind or so placed as to prevent a driver from clearly distinguishing the road ahead of him, nor shall any person maintain or use any light which the proper authority has declared by notice in writing to that person to be a danger to traffic.

ARTICLE IV – OBEDIENCE TO TRAFFIC-CONTROL SIGNALS AND SIGNS

Section 10. Obedience to Traffic Control Signals –

(1) Every person shall at all times observe and comply with the instructions of any traffic control signal applicable to him.

(2) The display by a traffic control signal of

(a) (i) a green circle is an instruction that a driver facing the traffic control signal may, subject to the provisions of this Article, proceed straight ahead turn left or turn right unless a sign at such place prohibits either such turn. Vehicles turning right or left shall give way to any opposing traffic and/or pedestrians.

(ii) a green signal and walking man symbol is an instruction that a pedestrian facing the traffic control signal may proceed across the thoroughfare;

(b) an amber circle alone is an instruction that

(i) a driver facing the traffic control signal shall not proceed beyond the stop line, or in the absence of a stop line, the traffic control signal itself, unless his vehicle is so close to the stop line or traffic control signal when the color amber first appears that he cannot safely stop his vehicle before passing the stop line or traffic control signal;

(ii) a pedestrian facing the traffic control signal shall not obstruct vehicles entering or approaching the intersection;

(c) a red circle alone is an instruction that

(i) a driver facing the traffic control signal shall not proceed straight ahead or turn left beyond the stop line, or in the absence of a stop line, shall not proceed straight ahead or turn left beyond the traffic control signal itself;

(ii) a pedestrian facing the traffic control signal shall not obstruct vehicles entering or approaching the intersection;

(d) a red square and standing man signal is an instruction that a pedestrian facing the traffic control signal shall not enter upon the thoroughfare;

(e) a green arrow is an instruction that a driver facing the traffic control signal may proceed in the direction indicated by the arrow;

(f) an amber arrow is an instruction that a driver facing the traffic control signal shall not for the purpose of proceeding in the direction indicated by the amber arrow proceed beyond the stop line or, in the absence of a stop line, shall not enter the intersection at or near which the traffic control signal is erected unless his vehicle is so close to the stop line or the intersection when the amber arrow first appears that he cannot safely stop his vehicle before passing the atop line or entering the intersection;

(g) a red arrow is an instruction that a driver facing the traffic control signal shall not for the purpose of proceeding in the direction indicated by the red arrow proceed beyond the stop line or, in the absence of a stop line, shall not enter the intersection at or near, which the traffic-control signal is erected;

Section 11: Obedience to Signs –

Traffic signs installed on or along the road shall be obeyed by motorists at all times. For-purposes of this Article,

(1) A driver shall not cause his vehicle to turn at any intersection contrary to the instruction to turn at any intersection, contrary to the instruction on any "No Turns", "No Left Turn", "No Right Turn" or "no U-Turn" signs erected to face an approaching driver at or near the intersection.

(2) Where "One Way" sign is erected to face a driver entering a thoroughfare to face an approaching driver, the driver shall not proceed on that thoroughfare beyond the sign.

(3) Where a "No Entry" sign is erected over or adjacent to a thoroughfare to face an approaching driver, the driver shall not proceed on that thoroughfare beyond the sign.

(4) Where "No Overtaking or Passing" sign is erected to face an approaching driver, the driver shall not overtake or pass a vehicle traveling the same direction.

(5) (a) Where a "No Overtaking on Bridge" sign in erected near a bridge to face an approaching driver, the driver shall not overtake a vehicle on the bridge;

(b) A driver shall not drive a vehicle and its load, including trailer attached to it, when it exceeds the weight indicated on the bridge load limit sign facing the driver.

(6) (a) Where a " Keep Right" sign is erected to face an approaching driver, the driver shall pass to the right of the sign;

(b) Where a "Keep Left" sign is erected to face an approaching driver, the driver shall pass to the left of the sign.

(7) Where a "Stop" sign is erected to face a driver who is approaching or has entered an intersection, the driver shall;

(a) Stop his vehicle before reaching and as near as practicable to the stop line associated with the sign or, in the absence of a stop line, at the point nearest the first intersecting thoroughfare where he has a clear view of traffic approaching the intersection; and

(b) On reaching and after passing such sign give way to any vehicle which is entering or within or leaving the intersection, except where that vehicle:

(i) is facing, on has passed a "STOP" sign or "Give Way" sign erected at the intersection, and

(ii) is about to turn, or is turning at the intersection.

(8) (a) Where a "Give Way" (or "Yield") sign is erected to face a driver who is approaching or has entered an intersection, the driver shall on reaching or after passing such sign give way to any vehicle which is entering or within or leaving the intersection road, except where that vehicle:

(i) is facing, on has passed a "STOP" sign or "Give Way" sign erected at the intersection, and

(ii) is about to turn, or is turning at the intersection;

(b) Where a "give Way" sign is erected to face a driver approaching a bridge, the driver shall not pass the sign while any vehicle traveling in the opposite direction is between the sign and far end of the bridge.

(9) Where a "No U Turn" sign is erected adjacent to a thoroughfare to face an approaching driver, the driver, shall not make a U-turn while he is between the sign and the far side of the first intersection beyond the sign, nor shall a driver who enters the thoroughfare between the sign and the intersection and travels towards the intersection make a U turn before he has passed the intersection.