SSTRIMM
Traffic Management Manual

Part V
Special Cases

Part V

Special Cases

A number of special situations will confront local traffic management authority as they perform their regular tasks. The most common cases are the following:

- Preventing future traffic congestion arising from land developments
- Temporary closure of a road section or lane due to road works
- Dealing with public transport like buses, jeepneys and tricycles
- Traffic calming
- Special Events
- Pedestrian Districts
- Emergencies

5.1 Transportation / Traffic Impact Analysis

5.1.1 Principle

The management of access to the road system is vital to maintain the overall safety and efficiency of the network. Access should be managed through an encroachment permit process. This permit process requires those desiring access to the public road system to apply for an encroachment permit or a driveway permit. Since access to the city's road system may impact traffic on the thoroughfare, a traffic impact analysis shall be prepared for developments which desire a permit and meet the specific requirements stated below.

Any proposed development in the locality is required by law to secure a zoning and building permit. In the Philippines, as yet no law requires a traffic impact analysis. This section assumes that the city or municipality has enacted an ordinance requiring such an analysis. Even in the absence of an Ordinance, the Building Official has the discretion to require traffic mitigation measures.

A traffic impact analysis is a study that projects, describes, and suggests ways of off-setting the traffic effects of development of new activities within a geographic area. Traffic is broadly defined as circulation of people and goods by all surface transportation modes—cars, public transport vehicles, trucks, pedestrians, and non-motorized traffic—in the vicinity of the proposed development project.

The preparation of a Traffic Impact Analysis follows the general processes of all transportation modeling, which include but are not limited to the following:

- Data Collection
- Trip Generation
- Trip Distribution
- Traffic Assignment
- Level-of-Service Analysis
- Report Preparation and Presentation

A TIA is normally part of an environmental document (Negative Declaration or Environmental Impact Report), although could be required as a separate document for a proposed development. A TIA is an important tool used to determine the transportation impacts of a proposed land development project. It identifies the need for any improvements to a transportation system to reduce congestion, maintain and improve safety, and provide site access and impact mitigation associated with the project.

5.1.2 When Should a TIA be required?

The City Planning Staff should be able to determine the need to prepare a TIA based on an initial assessment of transportation impacts, traffic generation, and parking generation. For traffic generation, the threshold is 100 or more new vehicle trips during the A.M. or P.M. peak hour as generated by the project. For parking generation, the threshold is a parking deficiency of one or more parking spaces generated by the project. Or when a project might impact an already congested or high-accident location, or when specific site access and safety issues are of concern.

An analysis can be prepared for any type of developments such as, residential, commercial, office, industrial or mixed use project. A TIA usually needs to be submitted by a developer before land use zoning changes, subdivision maps, site plans or new driveways are approved. If TIA is not needed, the appropriate office may require a traffic operations analysis to address local transportation issues.

It is a good practice to require applicants for building permits to prepare and submit a Traffic Impact Statement (TIS) under any of the following situations:

- when an existing low-intensity land use (e.g., single detached residential area in R-1 zone) will be converted into commercial use (such as a restaurant, a retail shop, etc.);
- the proposed development will generate 100 or more vehicle trips per hour during the morning or afternoon peak period;
- the site is proximate or within 50 meters of a signalized intersection;
- it will generate on-street parking demands on a major arterial road;
- scale of development is large, such as when the cost of the project exceeds 10% of the annual income of the city or municipality;
- the neighborhood objects to the proposed building on the grounds of potential congestion.

5.1.3 What should be covered in a TIA?

The Local Traffic Management Authority, in coordination with the City/Municipal Engineering Office and the Office of the City/Municipal Planning and Development Coordinator, will determine the scope of work for a TIA. A session with the preparer of the TIA document needs to be held in which the scope of the TIA will be agreed upon. This is usually referred to as a "scoping" session. Upon approval of scope of work, the consultant hired by the project proponent may proceed with the work and prepare a TIA report. During the work, the consultant should discuss any new issue with city / municipal officials and staff.

The TIA covers many aspects of different projects that will affect the transportation network of the City or Municipality, mainly the project surroundings. The various projects can be broadly characterized into the following items:

- Project Alternatives
- Transportation Improvements
- Geometrics and Queuing
- Traffic Safety
- Site Circulation and Parking
- Alternative Transportation Modes (including facilities related to transit, bicycle and pedestrian travel)
- Transportation Demand Management
- Neighborhood Traffic and Parking Management
- Funding
- Others

The level of detail of the traffic study to be required shall be determined by project type and size in accordance with the criteria in Table 5.1-1. The extent of the study area may be enlarged beyond the urban block in which the project is located (200 meters radius), or decreased depending on special conditions as determined by city planning and engineering staff and officials.

Analysis Time Period

The analysis time period shown in the Table below shall include both the morning and afternoon weekday peak hours, except:

- If the proposed project is expected to generate no trips or a very low number of trips during either the morning or evening peak periods, then the requirement to analyze one or both of these periods may be waived by the City Traffic Engineer;

- Where the peak hour traffic in the study area occurs during a different time period than the normal morning or afternoon peak hour travel periods (for example, mid-day), or occurs in a weekend, or if the proposed project has unusual peaking characteristics, these additional peak hours shall also be analyzed.

The peak hour of generator also shall be analyzed where its value exceeds the number of trips generated by the development during the peak hour of the adjacent national road or major arterial road.

Seasonal Adjustments

The traffic volumes for the analysis hours shall be adjusted for the peak season, if appropriate, in cases where seasonal traffic data are available and approved by the DPWH or MMDA regional traffic engineer.

Table 5.1-1 **Criteria for Determining Study Requirements**

Analysis Category	Development Characteristic[d]	Study Horizon [a]	Minimum Study Area [c]
1	Small-scale development, e.g., a single-family residential building	Not required	No TIS required
2	Small development, with traffic generation of 100 to 500 peak hour trips	Opening year	1. Site access driveways 2. Adjacent signalized intersection and/or major un-signalized street intersections
3x	Moderate, single phase 500 – 1,000 peak hour trips	Opening year 5 years after opening	1. Site access driveways 2. All national roads, signalized intersection and/or major un-signalized street intersections within 5,000 meters
3y	Large, single phase > 1,000 peak hour trips	Opening year 5 years after opening[b]; 10 years after opening	1. Site access driveways 2. All national roads, signalized intersection and/or major un-signalized street intersections within 1-km
3z	Moderate or Large, multi-phase	Opening year of each phase; 5 years after opening[b]; 15 years after opening	1. Site access driveways 2. All national roads, signalized intersection and/or major un-signalized street intersections within 1-km

a *Assume full occupancy and build out*

b *Not required if traffic impacts of the project is fully mitigated 10 or 15 years after opening with existing conditions plus 5-year programmed improvements.*

c *An enlarged study area may be required by the City for certain projects, like a shopping mall*

d *The number of trips shall include all trips made to the site, i.e. pass-by and diverted link trips,*

5.1.4 When Should Transportation Impact Analysis be Prepared?

A TIA should start in the earliest planning stages of a project, including at site selection. This would assist in the preparation of a more responsive and cost effective site plan.

In lieu of other locally preferred thresholds, it is suggested that a TIA be conducted whenever a proposed development will generate 100 or more new peak hour vehicle trips to or from the site. A cross sampling of data collected by Institute of Transportation Engineers (ITE) in the United States shows that the following situations or thresholds that commonly trigger a requirement for a traffic impact analysis:

- When a specified amount of development area is being rezoned
- When development contains a specified number of dwelling units or given development area
- At the judgment or discretion of the staff
- When development will occur in a sensitive area
- When financial assessments are required and the extent of impact must be determined.

Developers should have a TIA undertaken in advance of submitting a project to the City Planning and Development Coordinator and the *Sangguniang Panglungsod / Sangguniang Bayan*, communicating with the agency to obtain specific TIA requirements.

A TIA is typically appropriate for the following local processes:

- Zoning and rezoning application
- Land subdivision application
- Environmental assessment
- Site plan approval
- Special-purpose districts
- Development agreements
- Changes to general and / or specific plans
- Annexations

5.1.5 What Issues does a Transportation Impact Analysis Need to Address?

Once the consultant who will prepare the TIA has been hired by the developer, it is important that a meeting be held involving the City staff, the developer, and the consultant preparing the TIA to determine issues that need to be addressed which would include the following:

- What are the transportation improvements needed to serve the traffic generated by the new development?
- How much will the improvement cost be and who will pay for them?
- Will the new project impact traffic on any existing residential streets and how will those impacts be mitigated?
- Will the new development aggravate any existing safety hazards or create new ones and, if so, how can those hazards be corrected?
- Can the proposed development be served by public transportation and does the design encourage ridesharing?
- Is the design of the development friendly towards bicyclists and pedestrians who need to access the development or who need to pass through or by the development?

- Is the on-site parking sufficient or is there an opportunity to share parking with other adjacent uses?
- How many driveways are needed, what design should each driveway have and is there a long enough throat for each driveway that is clear of parking spaces and other cross aisle traffic?
- If any driveway is proposed to be signalized, is the traffic signal really needed and can on-site circulation handle the traffic that will be queuing to wait for a green light?

5.1.6 Data Collection Requirements

Data for use in the TIA must be current (within a one-year period). Data for main road traffic volumes, local street traffic volumes, intersection traffic volumes, speed surveys, traffic signal timing plans, and traffic collisions may be available from the DPWH-TEC or other agencies. Past transportation impact analyses, approved development traffic plans, transportation improvement project plans, specifications, and estimates can also be made available for review.

If the necessary data are not readily available, then the TIA should include provisions for initial data gathering through surveys. The data shall be collected in accordance with sound traffic survey practices, such as:

Turning Movement Counts
Turning movement counts shall be obtained for all existing cross-street intersections to be analyzed during the morning and afternoon peak periods and the peak hour of the generator.
Available turning movement counts may be extrapolated a maximum of 2 years.

Daily Traffic Volumes
The current and projected daily traffic volumes shall be presented in the TIA report. Available daily traffic count may be obtained from DPWH (or MMDA), and extrapolated a maximum of 2 years.

Traffic volume estimates from other approved developments within the study area which are expected to occur during the study horizon years should be obtained from the local traffic management authority and presented in the TIS report.

Accident Data
Traffic accident data shall be obtained from the Police or the local traffic management authority, for the most current three-year period available.

Roadway and Intersection Geometrics
Roadway geometric information shall be obtained including roadway width, number of lanes, turning lanes, vertical grade, location of nearby driveways, and lane configuration at intersections.

Traffic Control Devices
The location and type of traffic control devices shall be identified.

5.1.7 Trip Generation

In the absence of DPWH-specified standards, trip generation rates from other previous studies may be used for selecting trip generation rates. When no data source is available, primary surveys will have to be conducted for similar uses.

5.1.8 Trip Distribution and Assignment

Projected trips shall be distributed and added to the projected non-site traffic on the road system.

The specific assumptions and data sources used in deriving trip distribution and assignment shall be documented in the TIS.

5.1.9 With and Without the Project

The roadways and intersections within the study area shall be analyzed with and without the proposed development to identify any projected impacts in regard to level of service and safety.

Where the road will operate at arterial level of service C or better without the development, the traffic impact of the development shall be mitigated to arterial level of service D or better.

Where the road will operate below arterial level of service C in the horizon year(s) without the development, the traffic impact of the development shall be mitigated to provide the same level of service at the horizon year(s).

5.1.10 Contents of the Transportation Impact Analysis

The TIS shall be prepared under the supervision or guidance of a registered professional Highway or Traffic Engineer.

A TIA that accurately documents the impacts of a new development should contain the following information:

a. A description of the proposed land use (size, type, location, staging) and site plan.
b. Purpose and objectives of the analysis.
c. A description of the site and study area.
d. Determination and identification of the area of influence of the development.
e. Description of existing roadway / transportation conditions including traffic volumes, transit accessibility, accidents, geometrics, transit, bicycle and pedestrian facilities, traffic signals, overall traffic operations and circulation.
f. Identification of traffic congestion, accident areas and other deficiencies of the transportation system in the study area.
g. Anticipated nearby land development (planned or under construction) and associated traffic; and overall traffic growth trends in the area.
h. Anticipated trip generation and daily peak hour traffic volumes of the proposed development at full build and at any interim construction phase.
i. Trip distribution and assignment of site traffic on the transportation system.
j. Projection of existing traffic to a future design year, as determined by the City staff.
k. A future combines traffic volume plan for typical daily and key peak hours of the development and roadway system.
l. Identification of traffic congestion, safety problems and / or other deficiencies of the future transportation system (for vehicle, transit, bicycle and pedestrian travel), with and without the proposed development, including identified transportation improvements being planned by other public or private organizations that are expected to be in operation by the future years under study.
m. An assessment of the change in roadway operating conditions resulting from the development (quantifying the impact of the development).
n. Development and evaluation of potential improvement measures needed to mitigate the impact of the development to the level defined by local or MMDA policies.
o. Recommendations for site access and transportation improvements needed to maintain traffic flow to, from, within, and past the site at an acceptable and safe level of service. Improvements typically include roadway widening, turn lanes, traffic signals, bicycle, pedestrian and transit amenities, safety measures, sight distance, and transportation demand management strategies. Detailed improvements and their costs specifically associated with the development should be identified.
p. On-site issues including number and location of driveways, parking needs / layout, circulation, bicycle and pedestrian facilities, truck access and operations, transit and safety.

q. Coordination efforts with other affected jurisdictions impacted by the development. The TIA report should be presented in a clear and logical sequence. It should lead the reader step-by-step through the various stages of the process and to the resulting conclusions and recommendations.

5.1.11 **Capacity Analysis**

The four basic scenarios of capacity analysis for intersections and arterial roads are:

a. Existing Conditions
b. Background Conditions (Existing + Approved Projects)
c. Project Conditions (Existing + Approved Projects + Project)
d. Expected Growth Conditions (Existing + Approved Projects + Project + Expected Growth)

For the project, the horizon year for capacity analysis will be at full build-out and occupancy. In the case of a multi-phase development, the TIA shall include capacity analysis for each horizon year at each phase. Approved projects are to be included in the background conditions. General Plan Amendments and Master Plan Developments also shall include a horizon year for the General Plan build out year. The capacity analysis shall include programmed transportation improvements at the horizon year.

Typical study hours for capacity analysis of study intersections and study arterials are: A.M. peak hour and P.M. peak hour. In other cases, it may include mid-day peak hour, weekend peak hour, and project peak hour.

The consultant shall use appropriate reference materials such as the "Highway Capacity Manual," or other suitable references for capacity analysis of the transportation system for all scenarios, with exceptions.

Usually, the analysis will be using a computer simulation software to analyze intersection capacity. The report should contain the methodological assumptions used in the simulation model. The capacity analyses shall show the dates of their intersection traffic and street traffic counts. The City should be able to furnish the consultant a standard network for use in the analyses. This network shall contain the default values to be used for the intersection LOS analyses. The consultant shall review left and right turn queues at intersections. They should also review LOS for driveway turn movements.

5.1.12 **Assessing Impacts: Standards of Significance**

The City or Municipality, in coordination with the MMDA, would need to establish guidelines by which the standards of significance for traffic impacts for a project will be measured.

These may include those covering the following:

- If the project traffic will cause the existing intersection or highway roadway levels of service to drop below acceptable levels (below LOS "D");
- If the project traffic will contribute traffic increase along arterials or at intersections currently operating at unacceptable levels;
- If the project design does not have adequate parking or circulation capacity to accommodate traffic increase;
- If traffic increase or roadway design will result in safety concerns; or
- If the project does not include adequate provision for bicycle, pedestrian, or public transport access.

The performance standard of an intersection should be based on LOS "D" during the A.M. and P.M. peak hours. The LOS methodology is based on critical movements. At certain locations, basic LOS standard is LOS "E". LOS is based on evaluation of all intersection movements.

Other guidelines may include the following:

- When addition of project traffic under project conditions scenario causes an intersection's LOS under background conditions scenario to deteriorate from acceptable level to LOS "E" or LOS "F", or
- If an intersection under background conditions scenario already operates at LOS "E" or LOS "F", and under project conditions scenarios, critical movement delay increases by 4 seconds or more.
- Project traffic increases the critical VCR value by 0.01 or more.

5. 1.13 Traffic Control Devices, Parking Control Devices, and Roadway Design Features

The consultant shall determine the need for new traffic control devices, parking control devices, and roadway design features (also take traffic calming measures, see Section 5.4) based on the City's and MMDA's traffic engineering policies and procedures. The installation of traffic control devices and parking control devices and construction of roadway design features shall conform to engineering standards and traffic engineering rules and regulations.

5.1.14 Mitigation Measures

For every significant impact, the TIA must identify and discuss mitigation measures that will be addressed by the proposed development. The TIA may identify a mitigation measure or develop a range of mitigation measures for each impact to improve the

performance of the transportation system. Mitigation measures shall be specific and feasible actions that will actually improve adverse transportation conditions. The mitigation measures shall improve conditions or correct capacity deficiencies to acceptable levels of service (performance standard). An effective mitigation measure shall adequately avoid, minimize, rectify, reduce over time, or compensate an impact. It shall be consistent with local plans and policies. If the mitigation measures do not reduce impacts to less than significant, an environmental impact report may be required.

There may be impacts that arise due to "background" growth or development, and not due to the project. The project may not be required to mitigate these impacts not related to the project; however the project proponents may choose to mitigate impacts on their own accord.

In addition, mitigation measures shall address vehicular queues, progression quality, and other factors that affect traffic conditions that are not part of the capacity analyses. They shall consider traffic operations at intersections and driveways.

For mitigation measures, the TIA must discuss improvements and programs (objectives and specifics), funding, implementation responsibilities, and implementation schedule. A monitoring program by the City shall ensure project compliance with mitigation measures.

5.1.15 **TIA Report**

For consistency, the TIA report shall follow a format to be established by the City. The TIA report must also meet the following requirements:

a. Transportation System Management (TSM) concepts must be fully explored and discussed. A generalized statement offered as a solution to a specific problem is not acceptable. The solutions offered must be backed by data to confirm practicability of successful implementation.
b. All computerized analysis output sheets and supporting raw-count data, both ADT, turning movement, and intersection-delay data should be submitted with draft reports for review. All assumptions used in the calculations must be referred to the appropriate table, chart or page in approved publication (e.g. V/C ratios, operating speeds, etc.). Calculations must be comprehensive and clear.
c. All maps and graphics involving improvements must be drawn to scale with roadway geometrics appropriately dimensioned (e.g. road width, lane width, etc.). Intersection geometrics must include bus and jeepney (and FX) stops, parking areas, pedestrian crossings, driveway restrictions, etc.
d. For employee-intensive uses, such as office buildings, trip rates may be reduced to account for the effects of ride sharing. The text of the report must fully justify the use of any ride sharing percentage adjustments. Normally, ride sharing reductions will not be applied to such uses as hotels, restaurants, retail, financial, or medical related uses.

e. Daily-trip rates may be reduced for those land uses potentially served by public transportation. The use of any public transport percentage adjustments must be justified in the text of the report. Normally, transit reductions would only apply to employee-intensive uses and residential uses. Uses not expected to have public transport reductions would include hotels, restaurants, retail and financial uses.
f. After the daily-trip adjustment factors have been applied to produce daily trips, the peak-hour trips are to be calculated. Where fully justified, peak hour percentages may be adjusted by up to 25% to account for flex time, staggered work hours and other measures that result in the use of non-traditional peak-hour periods. Peak hours are usually from 7.00 AM to 9.00 AM and 5.00 PM to 7.00 PM for weekdays, 12.00 PM to 2.00 PM for midday and weekend peak period is between 12.00 PM. to 2.00 PM. The use of any flex time, staggered work hours, etc., must be justified in the text of the report. Enforcement of such measures must be guaranteed over the long term and be fully documented in the report. The use of peak hour adjustment factors does not eliminate any traffic. It merely assumes less peaking in a single hour and a spreading of peaking tendencies. Peak-hour adjustment factors are typically only applied to employee intensive projects, which are candidates for improvements through TSM measures.
g. Where build-out intersection configurations are different from those currently existing, they must be based on approved construction projects as certified by the City or Municipality.
h. Passerby factors are to be used to reduce the estimated additional total daily traffic to streets serving a proposed development. They are not to be applied directly to reduce trip generation and turning-movement volumes at driveways serving the proposed development.

5.1.16 **Report format**

Typical TIA report contents could be as follows:

Chapter 1. Introduction

A. Land Use, Site and Study Area Boundaries, which defines influence area, and area of significant traffic impact.

Include a brief description of and a map displaying the size of the land parcel, the general terrain features, and the location within the jurisdiction and region. In addition, identify the roadways that afford access to the site and are included in the study area. The exact limits of the study area should be based on engineering judgment and an understanding of the existing traffic conditions in the site vicinity. In all instances, however, the study area limits will be discussed with the applicant

and his traffic engineer and will be determined by the competent Transport or Traffic authority of the City or Municipality. The definition of the study area should result, subsequent to the initial staff review of a developer's rezoning application or preliminary site plan, at which time a traffic impact analysis will be required. This section should also include pertinent figures and diagrams.

B. Existing and Proposed Site Uses

Identify the existing and proposed uses of the site in terms of the various zoning categories. In addition, identify the number and the type of residential units, and type and amount of commercial, industrial, or office uses in accordance with accepted trip generation categories. If the project is being completed in phases, describe the total project and the phases. The study should include an analysis for each phase of the proposed development

C. Existing and Proposed Nearby Uses

Include a complete description of the existing land uses in the vicinity of the site, as well as their current zoning. Also state the proposed developments of adjacent land using the city's comprehensive land use and development plan and any other pertinent planning documents. This is especially important where large tracts of undeveloped land are in the vicinity of the site and are within a prescribed study area.

D. Existing and Proposed Roadways and Intersections

Describe and provide diagrams of the existing roadways and intersections (including road geometrics, lane usage, traffic control, and intersection condition diagrams) within the study area as well as improvements contemplated by the city and MMDA. This includes the nature of the improvement project, its extent, the implementation schedule, and the agency or funding source responsible.

Chapter 2. Analysis of Existing Conditions

A. Daily and Peak Hour(s) Traffic Volumes

Present diagrams depicting daily and peak hour traffic volumes for roadways within the study area. Present turning movement volumes and vehicle volumes for the main road for the peak hour conditions (a.m., p.m., lunch, and site-generated). Present only main road volumes to reflect daily traffic volumes. Also present the source and/or the method of computation for all traffic volumes. The City should make available to the applicant at no cost, existing traffic counts and other information it may possess that is relevant to the particular TIA analysis area.

B. **Capacity Analyses at Critical Points**

Utilizing techniques in various reference materials such as the Highway Capacity Manual, etc., assess the relative balance between roadway volumes and capacity. Analyze existing conditions (roadway geometrics and traffic signal control) for all peak hours.

C. **Level of Service at Critical Points**

Based on the results obtained in the previous section, determine and present levels of service (A through F). Include a description of typical operating conditions at each level of service.

Chapter 3. Analysis of Future Conditions without Development

Describe the anticipated traffic volumes in the future and the ability of the roadway network to accommodate this traffic without the proposed zoning or subdivision request. The future year(s) for which projections are made and associated growth factors will be specified by the City Planning and Development Office and will depend on the timing of the proposed development.

A. **Future Daily and Peak Hour(s) Traffic Volumes**

Indicate clearly the method and assumptions used to forecast future traffic volumes so that the city staff can replicate these calculations.

B. **Capacity Analyses at Critical Locations**

Describe the ability of the existing roadway system to accommodate future traffic (without site development) for all peak hours. (If roadway improvements or modifications are committed for implementation by the developer, present the capacity analysis for these conditions.)

C. **Levels of Service at Critical Points**

Based on the results obtained in the previous section, determine the levels of service (A through F).

Chapter 4. Trip Generation

Present and diagram the amount of traffic generated by the site for daily and three peak hour conditions (a.m., noon, p.m.) In addition, those trips that result from "passerby trips" must be calculated.

Chapter 5. Trip Distribution

Present and diagram the direction of approach for site-generated traffic for the appropriate time periods. The basic method and assumptions used must be clearly stated so that the city staff can replicate these results.

Chapter 6. Traffic Assignment

Describe the utilization of study area roadways by site-generated traffic. Combine the proposed traffic volumes with the anticipated traffic volumes from chapter 3 to describe and diagram main road and turning movement volumes for future conditions with the site developed as proposed. Clearly state the basic method and assumptions used.

Chapter 7. Analysis of Future Conditions with Development

A. Future Daily and Peak Hour(s) Traffic Volumes

Present and diagram mainline and turning movement volumes for the road network in the study area, as well as driveways and internal circulation roadways for the 24-hour and peak hour periods.

B. Capacity Analysis at Critical Points

Perform a capacity analysis for all peak hours for future conditions with the site developed.

C. Levels of Service at Critical Points

As a result of the capacity analysis, compute and describe the level of service on the study area roadway system.

Chapter 8. Recommended Improvement

In the event the analysis indicates that unsatisfactory levels of service will occur on study area roadways, describe the improvement proposed to remedy deficiencies. The proposals would identify committed projects by the city and state that were described in Chapter 1 and reflected in the analysis contained in Chapters 2 and 3.

A. Proposed Recommended Improvements

Clearly describe and diagram the location, nature, and extent of proposed improvements to ensure sufficient safety and roadway capacity. This section should make clear recommendations of installation responsibility for said improvements.

Accompanying these recommendations should be a suggested time schedule for implementation of the improvements.

B. Capacity Analysis at Critical Points

Describe the anticipated results of making these improvements.

C. Levels of Service at Critical Points

As a result of the revised capacity analysis presented in the previous section, present the levels of service for the roadway system with improvements.

Chapter 9. Conclusion

The last chapter of the report should be a clear, concise description of the study findings. This concluding chapter should serve as an executive summary.

5.2 Mitigating the Impact of Road Works

5.2.1 Continuing Development of the City

The city or municipality is in a continuous flux. There will always be road diggings and road constructions causing temporary dislocations in the existing traffic pattern. For example, telecommunication companies dig the roads to lay down telephone cables. Water utility companies dig the streets to put in new pipes or repair old ones. These indicate progress – a community on the move. However, while these activities are harbingers of future conveniences, they may also pose traffic obstructions in the short-term. They have to be managed properly to minimize their negative impacts on traffic.

5.2.2 Special Budget

No road diggings or street closures or road constriction should be allowed to happen without prior approval of local traffic management authority. This will provide information about the potential disruptions to traffic; and therefore, permit early planning on how to mitigate the road works.

Past practices entailed prior approval from either the Building Official or the City Engineer's Office. It is good practice to involve the local traffic management authority. This procedure can be imposed – either by Ordinance or by internal arrangement between the two local departments.

The application for temporary road occupancy – whether accompanied with diggings or not – should require the following basic information:

- Name and location of street
- Length of the street to be occupied at any given time
- Period of occupancy, i.e., start and end of road works
- Time of day when road works will be active
- Description of proposed works
- Traffic mitigation plan during the period of occupancy
- Commitment to restore ex ante conditions

Only when a satisfactory traffic mitigation plan is submitted shall the road works be allowed to commence.

5.2.3 How to minimize adverse impacts on traffic

The local traffic management authority as well as the Party undertaking the road works should exercise creativity in minimizing traffic dislocation. Without realizing it, road users pay for such road works in terms of time lost and the higher vehicle operating costs. On

the other hand, the Party undertaking the road works gets a 'free ride' in the sense that it does not compensate the road users for such losses. Fairness and equity demands that the former spend such amount as may be necessary to minimize the losses to the latter.

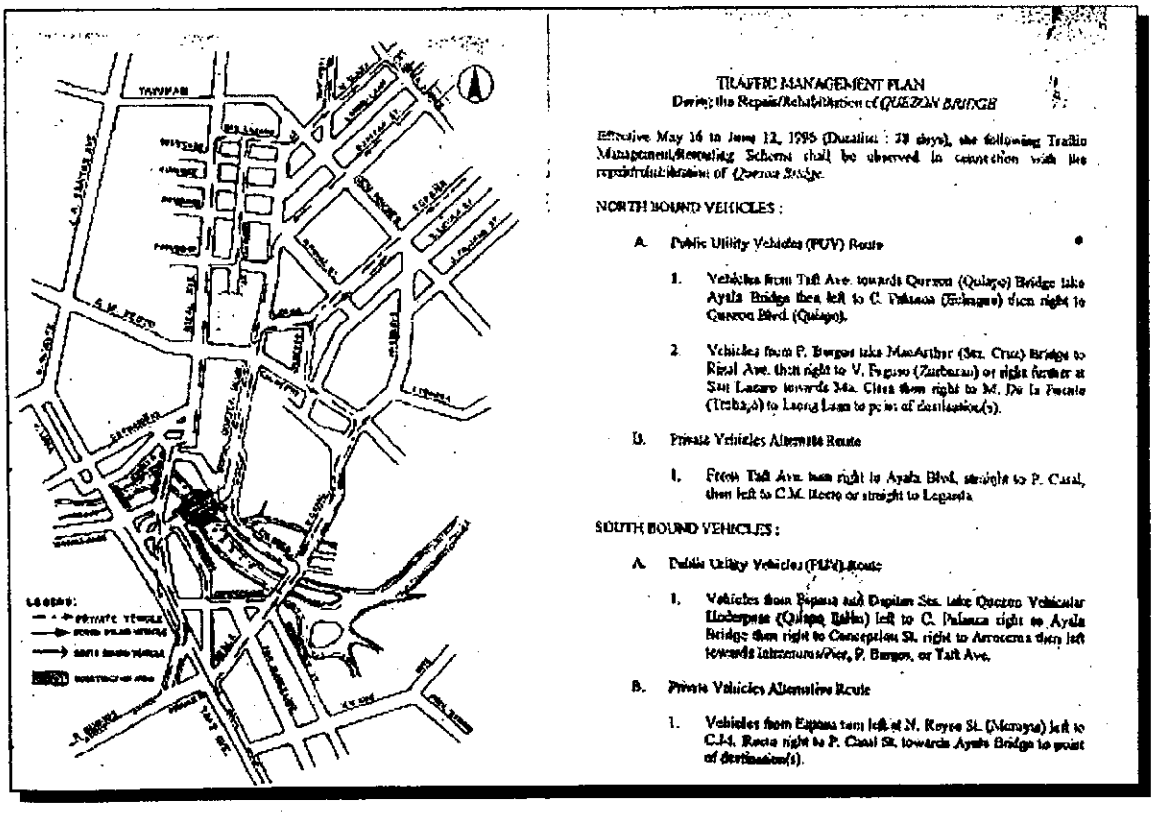
Among the mitigation measures that can be undertaken are:

- Perform the road works only when traffic volume is low, e.g., at night time
- Road occupancy for a short segment of the road one at a time;
- When the street has more than two lanes, close only one lane at a time;
- Minimize the area to be occupied or utilized by the road works, by ensuring that earthworks and other construction materials are removed from the roadway or placed off-the roadway;
- Proper signage and information boards are installed to guide motorists;
- Formulate a traffic diversion or re-routing plan;
- Time the period of road occupancy such that other road works nearby do not occur simultaneously or overlap as to render the diversion scheme inutile;
- Adopt construction tunneling method, where feasible, so that roadway surface remains undisturbed;

5.2.4 **Traffic Re-routing Plan**

An example of a traffic re-routing plan is shown in Figure 5.2-1.

Figure 5.2-1 **An Example of a Traffic Mitigation Plan for a Road Works**



5.3 Dealing with Public Transport

5.3.1 Public Transport

Local government units are not empowered to regulate buses, jeepneys and taxis for hire. They have full powers, however, in the case of motorized tricycles and non-motorized pedicabs.

Nevertheless, the certificates of public convenience granted by LTFRB to buses, jeepneys and taxis do not carry with them the license to violate traffic rules and regulations. Hence, their street behaviors are subject to control of local traffic enforcers. Along this line, the LGUs can:

- Modify the turning points of these vehicles, to minimize traffic congestion;
- Regulate their terminals in accordance with the Building Code as well as ensure no adverse traffic impact arises from their operations;
- Recommend to the LTFRB major modifications of the transport routes, as well as suggest limitations in the number of operating units or object to the grants of new units in their respective jurisdictions.

For tricycles and pedicabs, the local Traffic Regulatory Unit (TRU) and/or local *Sangguniang Panglungsod / Sangguniang Bayan* should secure comments of their local traffic management authority (LTMA) on applications for operating permits. This way, the negative impact of tricycles can be minimized or planned for.

In advising approvals or disapprovals of new or additional tricycles (or pedicabs), the LTMA should perform the following tasks:

- Determine if the proposed area of operations will utilize only local or neighborhood roads, and will not intrude into congested or busy streets;
- Ensure safety by disapproving the intermixing of tricycles with heavier vehicles like trucks, buses and jeepneys on the same roadway;
- Off-street terminals or tricycle stands are available to accommodate the proposed operation;
- Tricycle drivers undergo training on proper traffic behavior and traffic rules;
- Units are equipped with working signals and lighting system, including a reflectorized red tape (at least 2" x 6") at the rear.

For existing tricycles, the traffic enforcers of LTMA should make sure that:

- Tricycles follow traffic rules and regulations;
- Tricycles do not load/unload on the streets, or within 25 meters of busy intersections;
- Tricycles do not wait for passengers on sections of roads not designated for such purposes;
- Tricycles do not overload or exceed their capacity, which is usually 2 passengers plus driver.

5.4 Traffic Calming

5.4.1 What is Traffic Calming?[5]

Traffic Calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users.

Current city planning practices in the Philippines have not created communities that are efficient in their use of natural resources and available public monies, or that provide the best quality of life for all residents. Urban areas cannot and should not be expected to continuously hand over more and more of their living space (such as residential areas) to cars. Many city planning authorities in other countries have already abandoned traditional planning methods and in their place have adopted a new planning approach, after undergoing an evaluation of their previous practices. In some countries, such as Germany, this new planning approach has even been enacted into federal law. A similar reexamination of general traffic management practices is needed in the Philippines, which is one of the outcomes of the SSTRIMM project.

Traffic calming is a holistic, integrated traffic planning approach that seeks to maximize mobility while reducing the undesirable effects of that mobility. Another definition of traffic calming is environmentally compatible mobility management. This means that the ultimate objective of traffic calming is to make traffic management consistent with environmental concerns. This includes issues of air quality, safety in residential areas, and efficient energy usage.

There are several varying definitions of *traffic calming*. Some include all three "Es," traffic education, enforcement, and engineering. Others focus on engineering measures, but include all kinds. Still others focus on engineering measures that compel drivers to slow down, excluding those which use barriers to divert traffic.

Some published definitions are as follows

> "*Traffic calming involves changes in street alignment, installation of barriers, and other physical measures to reduce traffic speeds and/or cut-through volumes, in the interest of street safety, livability, and other public purposes.*" (Institute of Transportation Engineers, United States, in "Traffic Calming: State of the Practice")

> "*Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users.*" (Subcommittee on Traffic Calming, Institute of Transportation Engineers, United States)

[5] Adapted from Hoyle, Cynthia L. Traffic Calming. Planning Advisory Service Report Number 456, American Planning Association

> *"Traffic calming involves altering of motorist behavior on a street or on a street network. It also includes traffic management, which involves changing traffic routes or flows within a neighborhood."* (Canadian Guide to Neighbourhood Traffic Calming)
>
> *"Traffic calming consists of operational measures such as enhanced police enforcement, speed displays, and a community speed watch program, as well as such physical measures as edge lines, chokers, chicanes, traffic circles, and (for the past four years) speed humps and raised crosswalks."* (Montgomery County, Maryland, United States)

Traffic calming is generally distinguished from street-scaping, route modification, and the installation of traffic control devices. Traffic signs such as "Give Way" signs and speed limits are traffic control devices which would need enforcement. Traffic calming measures, in general, are intended to be *self enforcing*. The Institute of Transportation Engineers (United States) also made the distinction that while some elements involved in traffic calming such as streetscaping and street furniture (facilities) are complementary to traffic calming, they do not necessarily compel motorists to drive at slower speeds. Traffic calming measures generally rely more on the laws of physics rather than human psychology.

5.4.2 **Goals and Objectives**

The overall goals of traffic calming measures include the following:

- Increase the overall quality of life;
- Incorporate the preferences and requirements of the people using the area (e.g., working, playing, residing) along the street(s), or at intersection(s);
- Create safe and attractive streets;
- Help reduce the negative effects of motor vehicles on the environment (e.g., pollution, sprawl); and
- Promote pedestrian, non-motorized and public transport

These may be achieved through any of the following general objectives:

- Achieve slower speeds for motor vehicles,
- Reduce collision frequency and severity,
- Increase the safety and the perception of safety for non-motorized users of the streets,
- Reduce the need for police enforcement,
- Enhance the street environment,
- Encouraging water infiltration into the ground,
- Increase access for all modes of transportation, and
- Reduce cut-through (by-pass) motor vehicle traffic.

5.4.3 **Traffic Calming in the Urban Environment**

Unregulated and inappropriate vehicle speed is a significant contributory factor to traffic accidents and to the reduction of quality of life, particularly in residential areas. Traffic calming is applied in developed cities and may find increasing application in developing cities particularly as measures which control vehicle speeds through physical or operational means (such as traffic signal timings) can eliminate some of the usual traffic police enforcement problem of speed limits. It should be noted that traffic calming on main roads must be treated differently from traffic calming on lesser roads.

On main roads, it would add to accident hazards to introduce some of the more extreme physical traffic calming measures which are used to reduce traffic speeds on lesser roads and thus major roads measures can include:

- Signs and road markings emphasizing speed limits;
- "Rumble devices" which involve surfacing the carriageway in materials which create noise or vibration when crossed by vehicles and thus warn drivers of approaching hazards;
- "Bar markings" which comprise lateral road markings (lines at right angles to the road) on high speed approaches to urban junctions; the lines are increasingly closely spaced as the junction is approached and create a visual effect such that drivers slow;
- Road texture and color on the approaches to critical locations (junctions, pedestrian crossings etc); and
- Linking of traffic signal timings at successive junctions to control and maintain a desired safe speed of traffic progression.

On roads with less traffic volumes, the range of physical traffic calming measures for speed control may include:

- Pedestrian refuges which narrow the effective road width, control vehicle overtaking and do not permit vehicles to reach high speeds;
- Road-speed control humps which reduce vehicle speed;
- Road narrowing such that some classes of vehicle cannot use the road (such as trucks);
- Road narrowing such that only one direction of vehicles can pass at one time – thus opposing vehicles must give way;
- "Chicanes" such that vehicles have to following a tortuous route through a short section of road and thus must reduce speed;
- Raised junctions comprising a plateau or flat topped road hump built across an entire junction; and
- Planting which can be used to change the perceived width of a road to cause traffic to slow.

On roads with less traffic volumes, the range of physical traffic calming measures for speed control may include:

5.4.4 Traffic Calming Principles

Principle 1. Streets are not just for cars.
The function of a street is not solely to act as a corridor for traffic. Streets are also for social interaction, walking, cycling, and playing. Different roadways will serve different functions in a community-but, on a street, no one function should dominate to the exclusion of all others.

Principle 2. Residents have rights.
Residents have a right to the best quality of life a city can provide. This includes the least noise possible, the least pollution possible, the safest environment possible, and an environment that fosters a rich community life in which individuals are free to reach their fullest potential.

All residents, regardless of age, financial status, or social standing, have rights to an equal share of the mobility that a city can responsibly provide for its residents. No person or group has the right to increase their mobility at the expense of another person's mobility. This means recognizing that an overemphasis on car transportation discriminates against a large section of society. We must ask questions like, "should we automatically favor automobiles over pedestrians?"

Principle 3. Maximize mobility while decreasing the costs.
Trips are usually only a means to achieving a desirable end. Therefore a trip is a "cost" we must pay to enjoy a "benefit" at journey's end. That cost involves time, money, energy, and social and environmental effects. It therefore makes sense to minimize the costs a city and its residents must pay to enjoy access to a wide range of destinations.

This principle involves managing the already existing transportation resources of a city with maximum efficiency. It means maximizing the efficiency of an inefficient road and public transportation network before new infrastructure is built.

5.4.5 What to Look Out For

In implementing Traffic Calming measures, care must be taken not to introduce new hazards such as may be caused by poorly designed and/or inappropriately located and/or inconspicuous (especially at night) speed control humps. Measures introduced should not adversely affect bicycles or, particularly public transport operations – public transport speed control humps are generally incompatible and other designs such as speed tables and speed cushions have better operational characteristics for public transport vehicles.

The tendency for a "stop-accelerate" type of driving should also be controlled, as these generally increase vehicle emissions.

5.4.6 Traffic Calming Techniques

The techniques discussed in this section all share the same general objective of modifying the driving behavior of automobile users. These techniques are not completely unfamiliar to the Philippines. However, the variety of forms of application and the non-uniformity of design are reflective of nearsightedness in planning a lack of concern for the transport system at large. In some cases, a locally applied "traffic calming" measure may have implications to an area wider that where it is actually applied. With this cautionary note expressed, we now proceed to the techniques.

Technique 1. Reduce the speed at which automobiles travel by altering roadway design.

Reducing speed has the following effects:

1. Slower traffic emits less noise and fumes if traveling at an even pace.
2. There are fewer accidents.
3. Accidents that happen are less severe.
4. The capacity of the existing road space is increased.

This last point surprises many people. It is natural to think that the faster traffic is traveling, the more traffic the road would be able to handle in an hour. What is overlooked is that, as you increase speed, you must increase the safe traveling distance between each vehicle. There is an optimum speed for all roadways. At speeds below or above the optimum level the number of vehicles the roadway can move in an hour drops.

There are two types of techniques that can be employed to reduce the speed of vehicles on roadways: active and passive controls. A comprehensive document done in 1980, State of the Art Report: Residential Traffic Management, by Daniel T. Smith et al. for the U.S. Department of Transportation's Federal Highway Administration discusses in detail the effects of applying various traffic control techniques to residential streets. Key points of this report's findings, in addition to those of other research on various traffic control techniques, are discussed in the following paragraphs.

Active physical controls include: speed bumps, speed tables, rumble strips, median barriers, cul-de-sacs, semi-diverters, traffic circles, chokers, interrupted sight lines, neck-downs, chicanes, changes in direction, and protected parking. Active controls change driver behavior and are therefore largely self-enforcing. They create the visual impression that a street is not meant for through traffic and that other users of the roadway, such as pedestrians, cyclists, and children playing, have an equal right to use of the street. The drawback to use of active controls is their cost, the possible negative impact on emergency

and service vehicles, and the negative response of motorists who are inconvenienced by their introduction.

Passive control devices are primarily traffic signs (e.g., Stop, Yield, speed limits, turn prohibitions, one-way, "Slow, School Zone," "Do Not Enter," "Not a Through Street," "Dead End," "Local Access Only," truck restrictions, etc.). Other passive control devices include traffic signals and pavement markings, such as crosswalks and lateral bars.

Passive control devices, while using regulatory signs to inform drivers, do not physically prevent action. Thus, drivers easily violate the purpose of these devices. Their advantage lies in the fact that they can be in force during only selected time periods of the day, thus allowing full access to travelers at other times of the day. They also do not block access for emergency or service vehicles.

Passive control devices are most effective in areas where compliance can be expected to be high and enforcement is possible. In such cases, experience has shown that, even with some violations, the devices can produce a significant improvement in the level and effect of traffic. If there is little enforcement of the law and drivers resent the limits on their travel, however, compliance will be low, and the devices will be ineffective. For example, if Stop signs are used to try to reduce major traffic flow or "No Through Traffic" signs are installed in a neighborhood used for cut-through traffic where no better alternative exists, numerous violations can be expected.

Technique 2: Change the psychological feel of the street through design or redesign.

This technique emphasizes the street "experience" and how that may be used to affect driver behavior. Recognizing a street as a place rather than as simply conduit for vehicles will change the psychological feel of the street for all users. To create this sense of place, one may apply the following policies (attributed to Homburger, et. al. 1989):

1. Traffic management devices and changes to street design should be compatible with the character of the neighborhood.
2. Traffic control devices and street designs should be easy to maintain.
3. The landscaping used for street design should be safe for pedestrians.
4. Street trees should be planted to enhance the image of a street as a place with which residents can identify

Technique 3: Increase incentives to use public transport

This is consistent with society's goals of increasing energy efficiency, improving air quality and reducing traffic congestion while increasing mobility options. However, there is a need to improve the quality of public transport services being offered in the Metro Manila, in terms of safety, emissions levels and fuel efficiency. This can be done through driver/operator education, stricter assurance of vehicle and engine quality, and

improvement of the general route structures of existing services. By tackling these issues, public transport can be made even more attractive to the commuting public.

Technique 4: Discourage use of private motor vehicles.

Raising parking fees in the CBDs as well as designating pedestrian areas has derived benefits for countries such as Germany. This is to be done in tandem with the previous technique so that the full benefits may be enjoyed. It would be counterproductive to discourage private usage if viable alternatives are not offered.

Technique 5: Encourage people to organize their own travel more efficiently.

Through a public education campaign, people can be made more aware of the implications of their trip-making decisions on the performance of the transport systems, going back to how that performance affects them while in transit. Thus they would be encouraged to make their trips in more rational manner.

Technique 6: Create strong viable local communities.

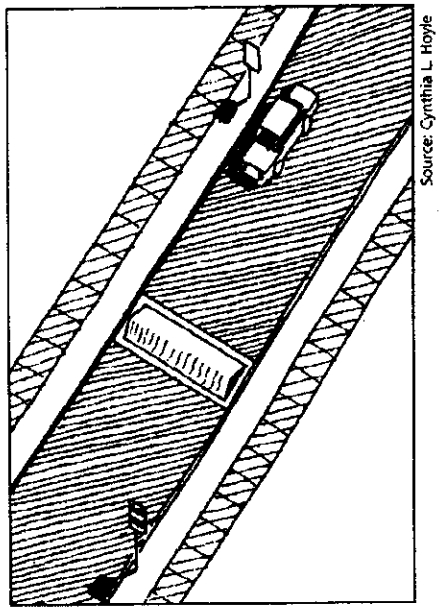
Rather than building large centralized facilities which encourage the aggregation of traffic and hence traffic congestion, facilities should be made available at the "community scale." Thus more trips can be made by walking instead of using motorized transport. The decision to support this kind of development is a long-term one, but can be expected to contribute greatly to the reduction of motor vehicle usage.

5.4.7 Traffic Calming Measures

The following sections briefly discuss the advantages and disadvantages of various active and passive traffic control devices.

Speed Bumps and Speed Tables

Speed bumps and speed tables are raised humps in the paved surface of a street that extend across the roadway. Normally, they have a height of less than five inches. A speed table must be long enough for both the front and rear wheels of a car to be on top of the table at once, meaning that the table has to be 2 to 4 meters long. Speed tables can be comfortably crossed at 25 to 40 kilometers per hour. Speed bumps are normally less than 1 meter in length. In the Philippines, speed bumps are more often referred to as "speed humps" although these are hardly standard in the nature of their construction, the material used and even placement. Their effect has ranged from the negligible to the blatantly destructive towards passing vehicles. As for the implementing entity, this has ranged from residential subdivision developers to individual homeowners. On the other hand, there are no known applications of the speed table in this country.



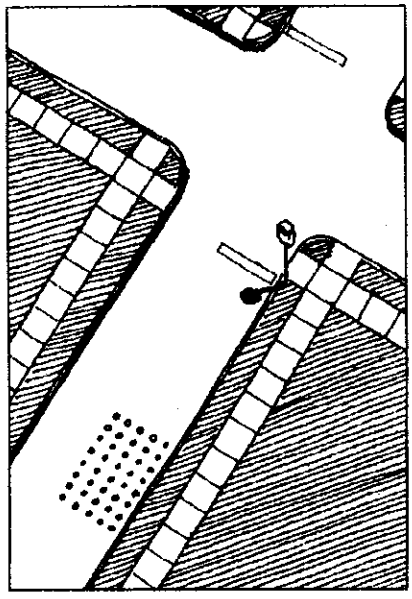
Speed Bumps

Studies done in Great Britain on speed tables that were 4 meters long (in the direction of travel) and 0.1 meter high showed that they not only reduce the speed of vehicles, they also reduce traffic volumes (TRRL 1976,1977).

U.S. traffic engineers do not favor the use of speed bumps. In most cities in the U.S., speed bumps have been removed from public roadways where they are considered an unacceptable hazard. Speed tables appear less likely to cause such problems.

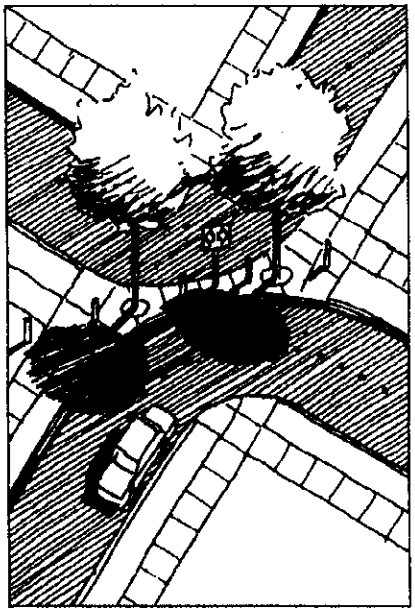
Rumble Strips or Changes in Roadway Surface

Patterned sections of rough pavement (rumble strips) or cobblestone strips across the road cause a slight vibration in the car, which causes the driver to become more alert and/ or slow down. Studies have shown the effects of a change in road surface on speed to be mainly at the upper end of acceptable speeds in residential areas. However, studies have also shown that such strips have noticeably reduced accidents when placed in advance of stop signs (Smith et al. 1980). Changes in road surface are sometimes objected to by bicyclists, but this problem could be addressed by not altering the road surface within a designated bike lane. The noise produced by rumble strips has raised objections from nearby residents in some cases.



Source: Cynthia L. Hoyle

Rumble Strips



Source: Cynthia L. Hoyle

Diagonal Diverters

Diagonal Diverters

A diagonal diverter is a barrier placed diagonally across an intersection to convert the intersection into two unconnected streets, each making a sharp turn. Its primary purpose is to make travel through a neighborhood circuitous, while not preventing such travel. Used alone, the diverters will affect only the two specific streets involved. This application is most effective in reducing traffic volumes if used as part of a planned system for the neighborhood that will discourage through traffic.

Smith et al. (1980,31) note that, "In a system of devices, traffic on streets with diverters can be reduced from between 20 to 70 percent depending on the system of devices in the area." Diverters are effective in reducing traffic volumes, whereas speed is reduced only in the immediate vicinity of the diverter, within about 200-300 feet. Studies done in Seattle, Washington, and Richmond and Berkeley, California, have shown a significant reduction in the number of accidents in the neighborhoods. Usually, however, the actual number in each case was small originally (Smith et al. 1980, 31).

In order to have diverters function safely and effectively, they should incorporate the following features:

Visibility. Devices should have painted curbs, rails, reflectors, directional signs, street lights, and elevated landscaping.

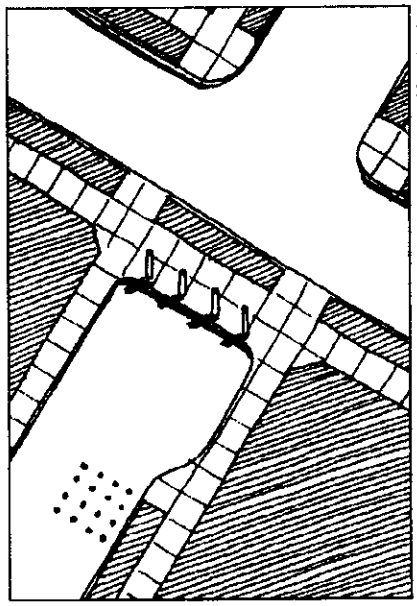
Delineation. Centerline pavement striping and, where possible, pavement buttons are helpful in identifying the driving path.

Emergency vehicle access. The design of the diverter should allow for passage of emergency vehicles while restricting automobile passage.

Pedestrian, bicycle, and disabled access. Sidewalks across the diverter should allow such access.

Dead-end Streets or Cul-de-sacs

In some communities, traffic volumes in older residential areas have become so problematic that streets have been converted to dead- ends or cul-de-sacs to prevent cut- through traffic. A cul-de-sac is a complete barrier of a street at an intersection or mid-block that leaves the block open to local traffic at one end while physically restricting through traffic. Studies have shown cul-de-sacs or dead- end streets to be very effective in reducing traffic volumes.


Source: Cynthia L. Hoyle

Cul-de-sac

Due to the need for adequate turning radius, retrofitting an existing street can be very expensive. On existing streets, it is often the case that only an 18- to 20-foot turning radius can be provided, whereas in new subdivisions 35 feet (10.5 m) is standard. The appropriate length of a street that can be dead-ended should be determined by traffic volume and the number of houses on the street.

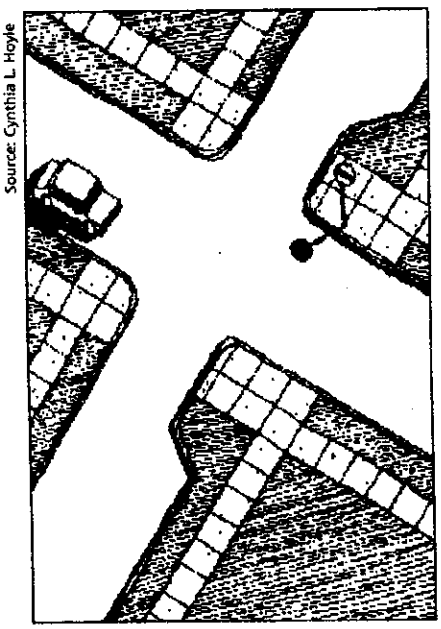
In general, however, cul-de-sacs should probably not be installed on streets longer than 500 feet when lots are 50 feet wide, meaning there would be approximately 20 houses on a street generating eight to 10 vehicle trips per day (NAHB 1990, 55). Streets longer than 500 feet tend to lose the advantages of installing a cul-de-sac because there are likely to be increases in traffic speeds and mid-block turnarounds, a potential safety hazard. The number of properties on a longer street also

means an increase in the volume of trips on that street, again reducing the safety factor that the cul-de-sac should bring.

A cul-de-sac should be clearly identified by signs indicating that the street is not a through street. In some cases, provision for passage of emergency vehicles through the cul-de-sac may be desirable.

Existing movement of pedestrians, bicyclists, and people with disabilities will need to be evaluated and accommodated by provision of through sidewalks and/ or ramps.

The use of dead-end streets and cul-de-sacs to reduce traffic volumes is one of the most expensive and least desirable techniques employed for traffic calming due to issues of accessibility for emergency vehicles, buses, etc. Caution should be employed in making use of this technique.



Source: Cynthia L. Hoyle

Semi- Diverters

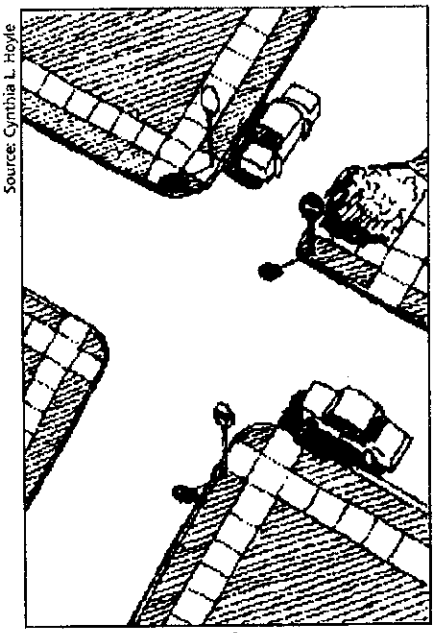
Semi-diverters, Neck-downs, Chicanes, Chokers, and Protected Parking

A semi-diverter is a barrier to traffic at the intersection of two streets in which one direction of the street is blocked, but traffic from the opposite direction is allowed to pass through. A semi-diverter blocks only half of a street and is easily violated. Semi-diverters are best used when one direction on a street is used as a shortcut.

Studies have shown that semi- diverters can significantly reduce traffic volumes. Studies of a neighborhood in San Francisco, where semi-diverters were placed at opposite ends of block pairs, showed an average reduction on four streets of 40 percent to an average of 1,000 vehicles per day on those streets (San Francisco Dept. of Planning 1977). The same study in San Francisco showed a 50 percent reduction in the number of accidents over a four-month period. Neck-downs are the same in design as semi-diverters but are located mid-block. They allow two- way traffic for only a portion of the block.

Protected parking provides a landscaped island projecting out from the curb; the island creates protected parking bays. These devices are meant to reduce the speed of vehicles through neighborhoods rather than reduce traffic volumes, as do semi- diverters located at intersections. However, in some cases, they may also act to reduce traffic volumes.

Chokers are basically the same type of device as semi-diverters or neck-downs, depending on whether they are located at the intersection or mid-block on a street. They can also be alternated from side-to-side on a street, thereby creating a chicane.



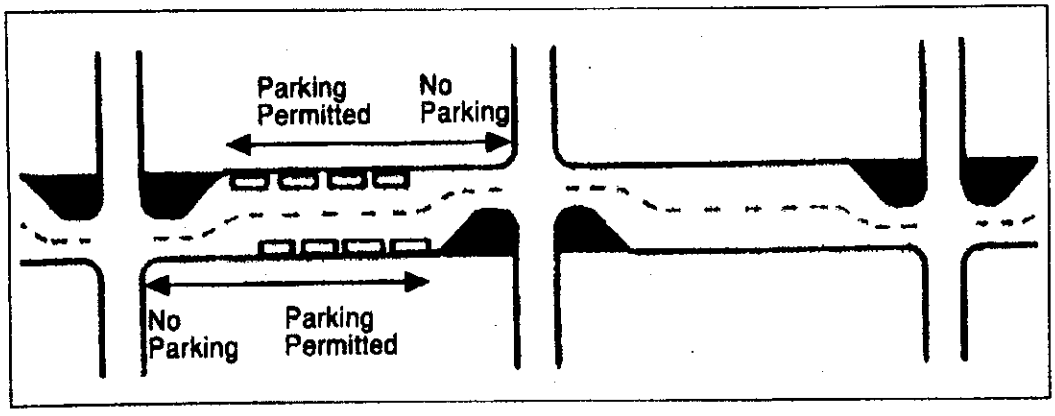
Chokers / Narrowing

Chicanes

Chicanes are a form of curb extension which alternate from one side of the street to the other. A study of the use of chicanes in Seattle, Washington, done in 1988 showed varying decreases in traffic volumes ranging from six percent on very-low-volume streets to 48 percent on higher-volume streets (Seattle, Transportation Division 1988). The study also found significant reductions in vehicle speeds-a decrease of 26 percent in speed since the chicanes were installed. The authors of the study concluded that "Speeds have continued to increase on neighboring streets without chicanes. Thus chicanes have proved to be a long-term effective means of reducing speeds in residential areas."

Accident rates appeared to be unaffected by chicanes. Emergency vehicles were not slowed significantly by the chicanes; however, it was recommended that the chicanes be constructed by use of curb bulbs rather than wooden barriers to allow emergency vehicles to run over the curb when opposing traffic was met. Maintenance of the wooden barriers was also problematic due to breakage.

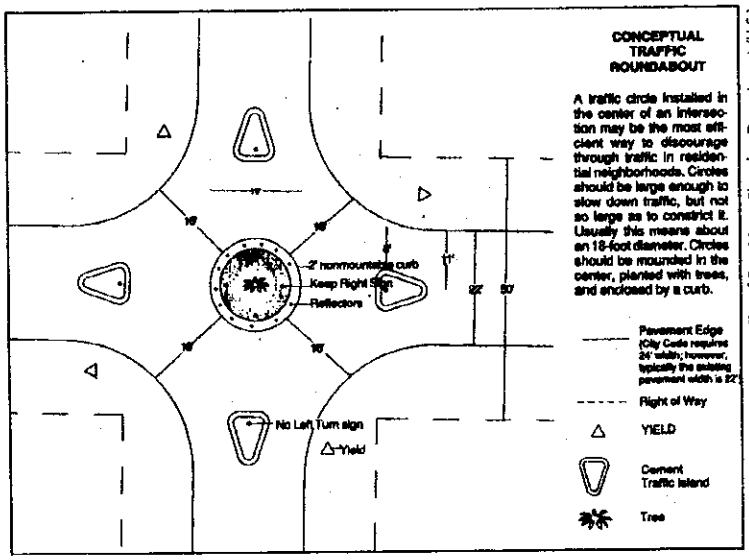
Chicanes have the advantage of not blocking emergency vehicle access; however, drivers are also more likely to violate chicanes, especially at intersections with low traffic volumes. The devices should be made visible with signs, painted curbs, landscaping, reflectors, and streetlights.



Chicanes

Traffic Circles or Roundabouts

A traffic circle or round-about is a raised island, which is usually landscaped and located at the intersection of two streets. The use of these devices is recommended on residential non-arterial streets where they have been found to be very effective in reducing traffic speeds and accidents without diverting traffic onto adjacent residential streets. Wallwork (1993, 240) reports that traffic circles reduce crashes by 50 to 90 percent when compared to two-way or four-way Stop signs and traffic signals by reducing the number of conflict points at intersections. He also notes that they are cheaper to maintain than traffic signals, provide equal access to intersections for all drivers, and provide a good environment for cyclists.



Conceptual Traffic Roundabout

Seattle, Washington, and Portland, Oregon, have done extensive analysis on the effectiveness of traffic circles. In Seattle, the city's engineering department did a study that found the circles to be "highly effective in reducing both intersection and mid-block collisions. Intersection collisions are reduced by up to 90 percent and mid-block collisions are reduced by at least 39 percent" (von Borstel n.d., 80-81). Traffic circles were also found to significantly reduce the speed of traffic on non-arterial streets both at the intersection and mid-block (McLaughlin et al. 1987, 7). While the studies did not find that traffic volumes were significantly decreased by the installation of traffic circles, residents perceived that there was a reduction in traffic volume. The explanation offered for this phenomenon was that the reduced speed of the vehicles in the neighborhood made them less noticeable and, therefore, made it seem as if there were fewer cars on the street.

Seattle has chosen to limit the use of Stop, Yield, and speed limit signs as speed or volume reduction traffic control devices because they were found to be much less effective than traffic circles. Seattle has installed 190 traffic circles with a 98 percent success rate in providing effective traffic control (von Borstel n.d., 81).

Portland, Oregon, reached similar conclusions in its study of traffic circles. That city's technical evaluation committee found that "Traffic circles are successful at reducing the number of vehicles traveling at high speeds (30-35 mph) on residential streets. ...After traffic circles were installed, vehicles rarely exceed 35 mph" (Portland 1992, 1). Portland also found that traffic volumes on streets with traffic circles did not significantly change and that accidents had been reduced by installation of traffic circles. The report also concluded that larger radius circles appear to reduce vehicle speeds more than smaller traffic circles.

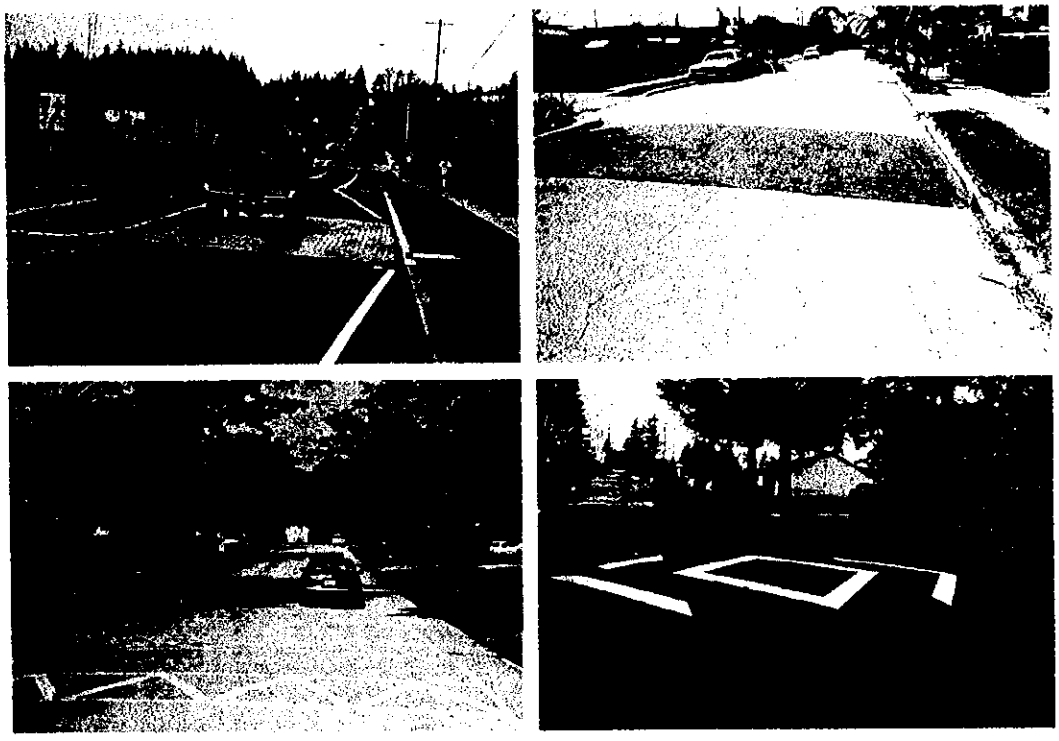
Traffic circles have been found to be a popular and effective way of providing safer and quieter neighborhoods in the view of the residents. If the traffic circles are installed strictly as speed reduction devices, they should be installed about 600 to 800 feet apart to maintain the reduced speed (von Borstel n.d., 81).

Traffic circles should be well marked with appropriate traffic signs, pavement markings, street lights, and landscaping. Traffic circles must also have adequate lane width (16 to 20 feet) to allow passage of larger vehicles like emergency and service vehicles.

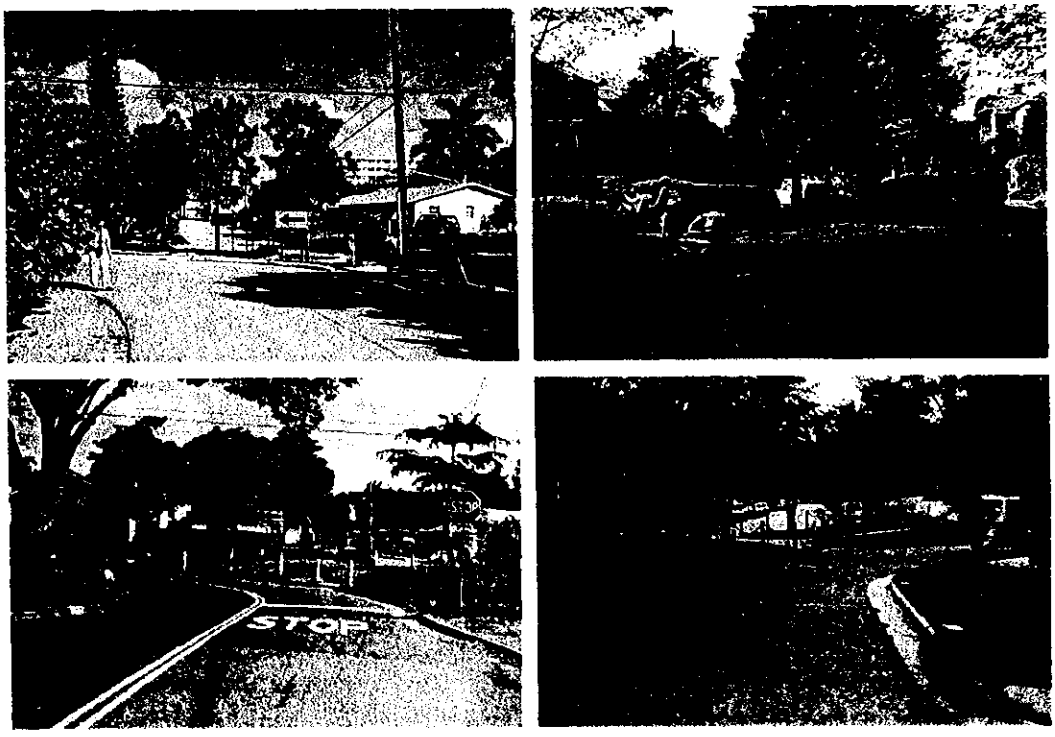
5.4.8 Pictures of Selected Traffic Calming Measures

(Taken from the Internet from websites about Traffic Calming)

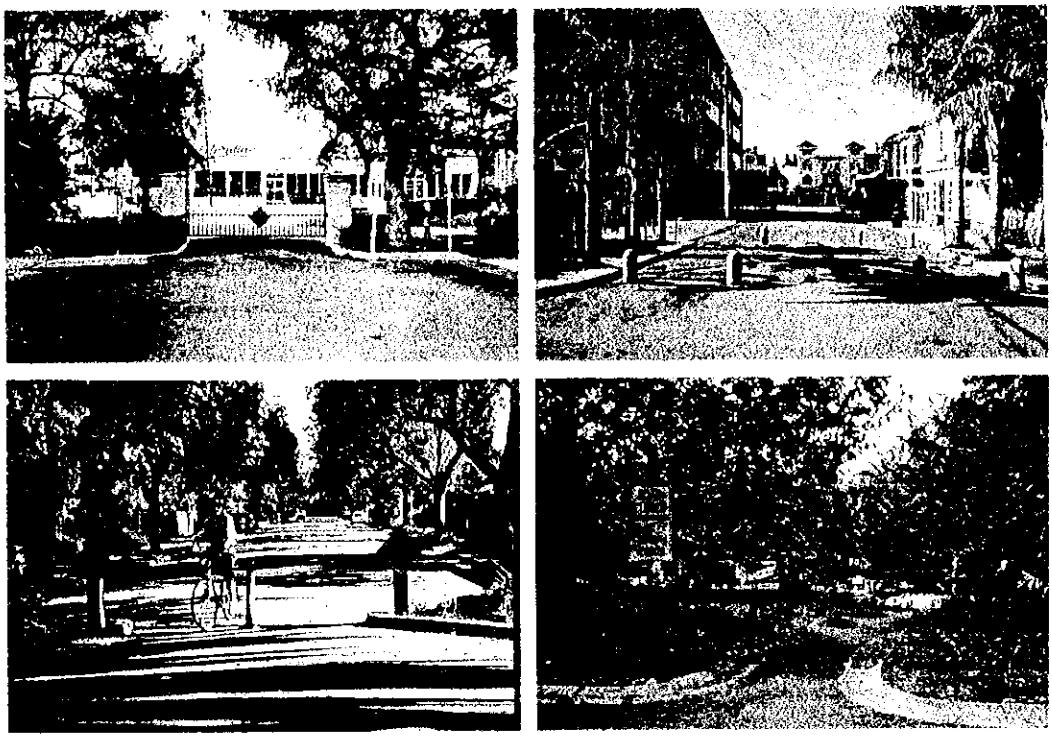
Speed Humps



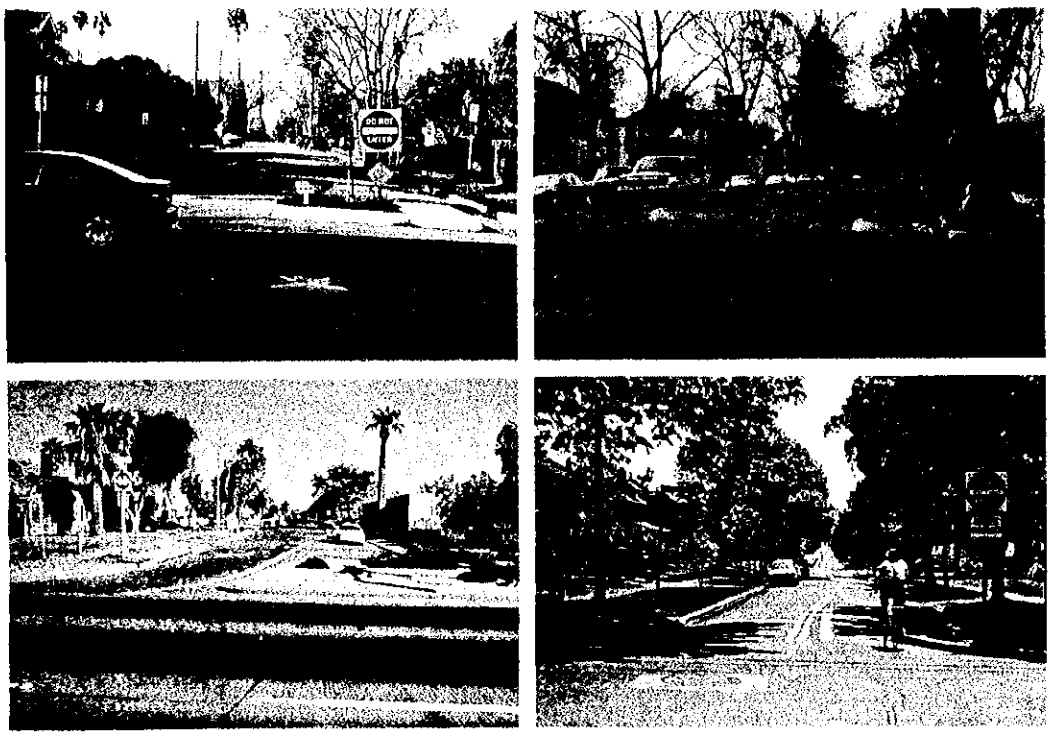
Diagonal Diverters



Dead Ends / Full Closure



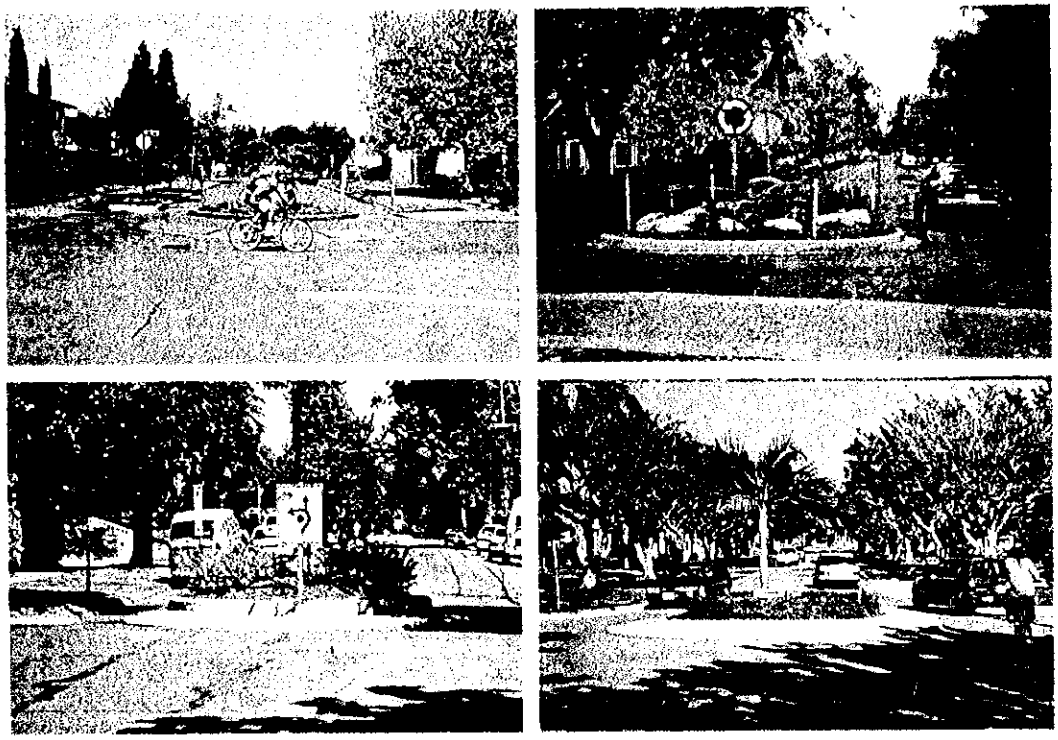
Half Closure



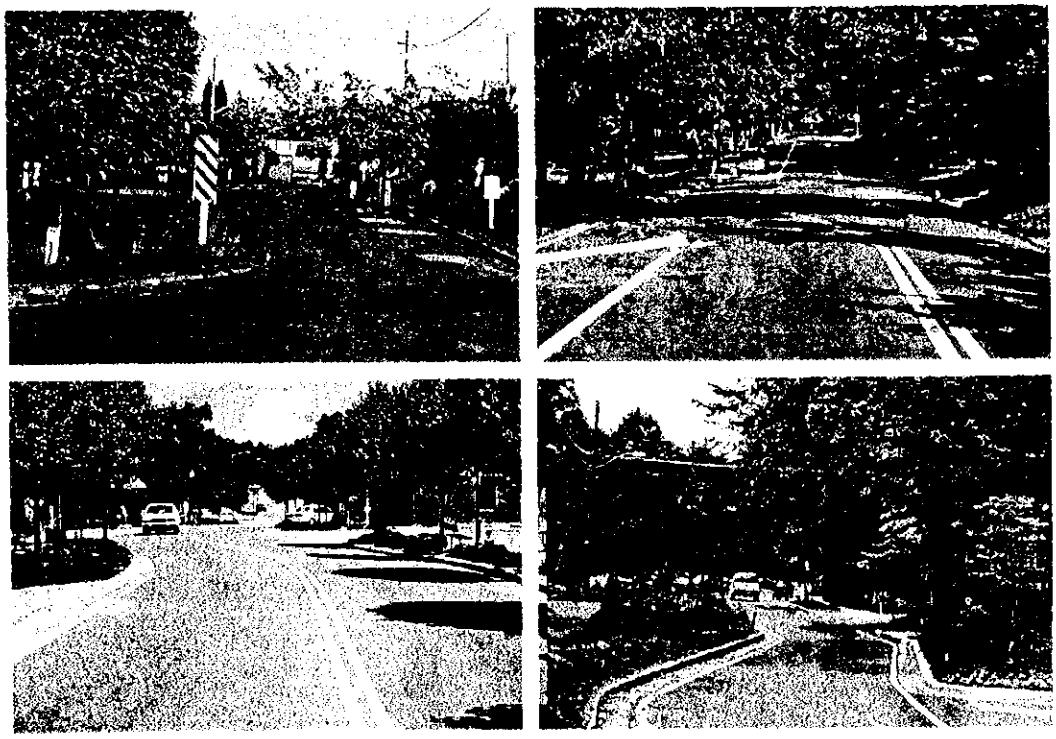
Forced Turns

Raised Intersections

Traffic Circles



Chicanes



5.4.9 Expected benefits from Traffic Calming

Drawing from the experiences of other countries, such as Denmark, Holland, Sweden, Japan, Italy, Switzerland, Germany, USA, England, Canada and Australia, these planning and management techniques have been tried in various combinations, with varying degrees of success. However, the following general results can be expected:

1. Noise and pollution reduction (up to 50 percent)
2. Top speed reduced by 50 percent. (Even though speed dropped by 50 percent, journey time is only increased by 11 percent because of less stop-start driving).
3. Less heavy traffic and less cut-through traffic.
4. Smaller roads move the same number of people. The extra space created by closing lanes or narrowing existing lanes is transformed into tree-lined avenues, bikeways, walkways, mini-parks or squares.
5. Greater safety for drivers, pedestrians, cyclists and children (and adults) playing in the street.
6. A 43 to 60 percent less chance of being killed or seriously injured in an accident involving a car.
7. Up to 30 to 50 percent less traffic on the roads in peak hours
8. Greater choice of travel methods for everyone, particularly for those who don't have access to a car
9. Increased viability of community life
10. Less stop-start driving
11. Enhancement of neighborhoods with an increase in greenery and decrease in visual intrusiveness of the roads and parked cars; also a decrease in the number of traffic lights and signs.

In sum, traffic calming aims to give you the best of both worlds – mobility and better quality of life. Traffic calming is clearly not a narrow concept. It involves cars, streets, roads, public transport, layout of the city and the education of residents. It is a holistic planning concept aimed at improving the quality of life.

However, care must be exercised in implementing traffic calming measures. As a general rule, they are applied to residential streets, not to arterial roads. Traffic calming should not be mistaken for such traffic management measures along major roads that try to solve bottleneck points by eliminating one or more turning movements.

5.5 Event Management

An "event" in the context of traffic management is any activity that will result in the modification of traffic flow patterns in the affected area. An example might be a barangay fiesta requiring the closure of some community roads. As a fiesta is a community activity that contributes to the quality of life of its inhabitants, this closure of a road and subsequent diversion of traffic may be done, for as long as the following conditions are satisfied:

- A traffic rerouting plan is prepared by the entity desiring the temporary closure of the said road(s).
- Based on this plan, consent from the LMTA is acquired.
- Information about the traffic rerouting plan is disseminated to residents and other affected stakeholders.
- Rerouting information signs are placed at critical traffic decision locations, where motorists will make decisions about their route.

Normal activities which may be classified as an "event" in the context of event management are the following:

- Festivals / fiestas
- Special gatherings (e.g. *Miting de Avance*)
- Other LTMA specified activities for which the LTMA would specifically allow the road closure and subsequent rerouting of traffic

There are also certain "events" that are generally not foreseen in terms of schedule of occurrence, but which still require certain alterations to prevailing traffic. These are otherwise referred to as "traffic incidents". They require swift action to close down some roads, and require subsequent management of alternate routes to accommodate diverted motor vehicle traffic. These incidents are those related to the following:

- Accidents
- Floods
- Fires and similar incidents
- Crimes
- Other abnormal events which are not planned activities as may be specified by the LTMA, or those which present conditions dangerous to life and limb.

In preparation to such incidents, the LTMA will enact their own emergency traffic management plan, in support activities such as rescue of victims or protection of the general public. Therefore, such plan needs to be drawn up in advance, so that when the need arises, traffic flows can still be managed.

5.6 Pedestrian Districts

The creation of pedestrian districts builds upon one of the principles of traffic calming, in particular the first one, which states that the function of a street is not solely to act as a corridor for motor vehicle traffic, but to cater to other users as well, including pedestrians and cyclists.

During the past 40 years, particularly in developed cities, pedestrian districts have been used as means for controlling traffic in crowded city centers, which typically are characterized by a very high density of vehicles with a wide range of activities. Central business districts of cities and smaller towns threatened with the development of suburban shopping facilities, as well as in the historic cores of some cities in Europe, the creation of traffic-free streets represents the opening up of new territory.

In the simplest terms, a pedestrian district, or mall, discourages the use of private vehicles. The commercial success of the pedestrian district, however, relies heavily on its being part of an overall traffic management plan, which is capable of solving the technical and human problems of commuting to work, travel for shopping and general transport of residents from one place to another with a maximum of comfort and ease through the use of low-cost, efficient, and attractive public transportation, while at the same time providing for goods delivery.

5.6.1 Arguments for and against traffic-free zones[6]

The major argument presented against traffic-free zones is that the closure of certain streets from vehicular traffic only forces them to other adjacent streets in the vicinity, which can become more crowded. However, there seems to be truth in the notion that vehicular traffic is dependent on the availability of road space, i.e. the more roads there are, the more opportunities for motor-vehicle use exist. The other side of this notion is that if there is less road space made available for motor vehicles, the fewer cars there will be.

If congestion is not managed and allowed to worsen such that vehicle speeds in the central business district slow down to about 10 to 15 kilometers per hour, traffic may seem to disappear. This is because people turn to other modes of transport, in particular public transport and walking. Therefore, reducing the amount of vehicular space will not create a monumental traffic jam. It will simply reduce the amount of vehicular traffic.

There are other players in central business districts that would argue against creating traffic-free zones. Foremost of these would be the business establishments, which believe

[6] Adapted from Brambilla, Roberto and Longo, Gianni. For Pedestrians Only: Planning, Design, and Management of Traffic Free Zones. Whitney Library of Design. New York. 1977.

that by eliminating motor vehicle access, they would lose their clientele base, and thus their profits.
Properly managed, however, retail establishments tend to gain more business from the creation of pedestrian districts with the added volume of potential customers. While many would further argue that such open spaces may not be conducive to a country with a tropical climate such as the Philippines, there are several means by which American and European pedestrian districts may be replicated here in the country.

Even in the country's foremost financial district, the Makati CBD, some streets have already been closed to vehicular traffic (portion of Legaspi St. between Herrera and Ayala Ave.), and an elevated pedestrian walkway system has been constructed. This is an attempt to bring back some balance between road space demand from pedestrians and from motorists.

5.6.2 Discouraging use of private vehicles

The impact of pedestrian streets on downtown conditions has been strengthened in a number of cities in other countries by taking additional measures to discourage people from driving into the central area. Reducing the number of parking spaces, increasing parking rates, and instituting time restrictions for parking have all proved very effective strategies. Makati CBD has taken concrete actions towards this end.

A large residential population in an urban center creates the problem of providing parking for residents, while discouraging parking by commuters. Reducing parking facilities, however, does not eliminate through traffic. A standard solution to this problem has been the creation of traffic diversion routes. Almost all large cities are surrounded by major arteries which allow different degrees of access to the central area.

Primarily in Europe, inner rings have been created to allow for circulation around pedestrian zones, and one-way loops have been constructed to accommodate service and deliveries to the area. In a number of cities, a combination of peripheral parking, improved public transportation, and a ring road was adopted. Shoppers and commuters coming into the city by car use a mini-bus shuttle between parking areas and downtown. Chicago, among other cities, has experimented with such a system.

Encouraging Use of Public Transportation

Improved public transportation is fundamental to the success of a pedestrian zone. Public transportation has always been necessary for people who do not own cars. Once traffic restrictions are initiated in an urban center, however, public transportation provides the easiest access for everyone to shopping and business areas. The most common measures for increasing the capacity and appeal of public transport have been creating additional bus stops, increasing the frequency of service, introducing reserved lanes for public transit,

and extending routes. Some cities have introduced express buses that provide nonstop service from peripheral areas.

Yet another alternative in the area of public transportation has been the development of "para-transit" systems, such as car pools, shared taxis (FX), etc. Para-transit, which is now operational in many cities, also includes demand-response services, such as dial-a-ride service.
Para-transit has gained popularity because of its adaptability to specific traffic-control objectives and because it affords a change from poor conventional public transportation systems. Furthermore, these systems have proved particularly useful to the elderly and the handicapped. Para-transit is inexpensive and can be quickly organized. The flexibility of the systems allows for gradual implementation which can parallel other improvements in public transportation.

Dial-a-ride is a basic form of para-transit, incorporating features of both bus and taxi travel. Vehicles are dispatched in response to telephone requests. The bus or taxi carries a person to the requested destination, while at the same time picks up and delivers other passengers who have called. The number of stops depends on the type of service, time of day, and other passengers who have called.

Combining para-transit measures with existing conventional transport systems increases mobility and, at the same time, decreases the use of private automobiles.

5.6.3 Improving access to central business district

In a number of cities in other countries, pedestrian streets have been created to provide better accessibility to downtown stores and offices. Therefore, emphasis has been on reorganizing traffic patterns, than reducing the number of automobiles. Smaller cities in the US rely on cars to bring people downtown and usually do not have sophisticated public transportation. Any reduction of access routes into the city center could cause a serious loss of activity in the central business district. Furthermore, because of the grid layout of most cities, banning cars from one street can have repercussions on all downtown traffic. Therefore, pedestrian streets must be created in conjunction with revised traffic patterns. And because cars remain the primary mode of transportation in such cases, adequate parking facilities must be ensured. Failure to take these two elements into account not only affects downtown traffic, but can also jeopardize the success of a traffic-free zone.

Revising Circulation Patterns

The point of traffic-free zoning is not to eliminate the private car, but to separate vehicular and pedestrian movement. In order to accomplish this, most cities have reduced, as much as possible, the number of streets crossing the pedestrian zone, and have rerouted crosstown traffic so that major streets do not cut through pedestrian areas.

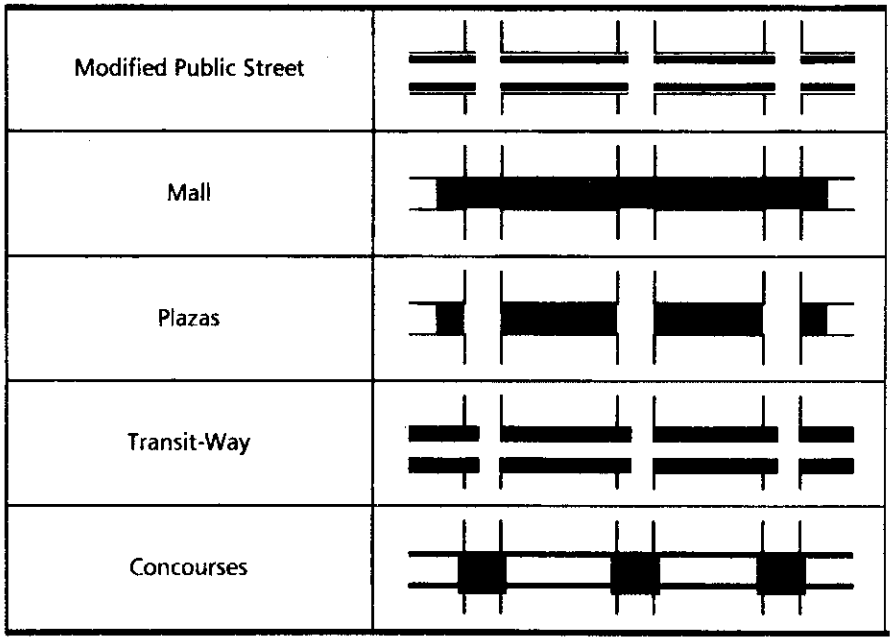
Providing Parking Facilities

In order to compete with the convenience of major shopping centers, cities must provide enough space for people to park near traffic-free zones. Parking is usually a problem in downtown areas, and the creation of pedestrian zones adds to the problem by eliminating a number of spaces. Usually, surface lots have provided most of the off-street parking near pedestrian malls in other cities, but they have become battlegrounds of the fight for space between shoppers and downtown employees. Furthermore, these lots have usually provided only indirect access to pedestrian areas. Long-term parking for commuters has been constructed separately.

5.6.4 A Menu of Pedestrianization Schemes

Figure 5.6-1 shows a menu of pedestrian street schemes that Metro Manila cities and municipalities may possibly implement in their CBDs.

Figure 5.6-1 **Pedestrian Street Schemes**



Source: Transportation Planning Handbook, Institute of Transportation Engineers, 1992.

The dark areas represent zones dedicated for pedestrian use. Cross streets may be closed or open to vehicular traffic, depending on the scheme. Priority on the cross street also varies depending on the scheme.

The modified public street enhances sidewalks for pedestrians, but they will have to wait for their proper turn to cross at cross streets. The Pedestrian Mall takes it to the extreme

where pedestrians have the sole use of the whole area, including intersections with cross streets. Plazas, in turn, devote the whole street width for pedestrian use, although vehicles are allowed along the cross streets.

Transitways are streets wherein only public transport vehicles are allowed along the main street, mixing with pedestrian traffic. Concourses allow pedestrian priority at intersections of the main street and the cross streets.

5.6.5 Involving the Community

Traffic-free zoning proposals have usually generated enormous controversy. Opponents fall into several categories: those who are most directly affected by the project, such as merchants on the site who fear a loss of business if the project fails; taxpayers who object to public funds being spend on a pedestrian zone; taxi-drivers, truckers, and private bus companies which see traffic-free zoning as a threat to their interests; and automotive firms which tend to object to any street being closed off. Even city traffic planning agencies often resist the idea of having their present Street system disrupted. And conservative political organizations add their objections to the rest, arguing that pedestrian zones represent a bureaucratic intervention in the private sector—one more threat to free enterprise and freedom of choice.

Whatever the scope of a pedestrian project, it affects the lives of everyone working or residing in the area. For this reason and because the forces of opposition are themselves often powerful and well organized, it is necessary to have a well-organized approach to the development of plans: the success of a traffic-free project can depend upon a group's capacity to involve the right people in the implementation and planning processes, as well as in the sharing of actual (not token) leadership.

Those who are affected by pedestrian projects should always have the opportunity to participate in the decisions which influence their various roles in the community.

Role of the Public

As project is developed, the time comes when the public is called on to support it, whether for rezoning, patronage of business, or payment for improvements. In the most successful examples, the public has been involved from the very outset of the process—during its inception, throughout planning and implementation, and on into the operational phase. In cities where projects have been developed without public participation, the results were often disastrous, and in the final analysis, it was the community that made a traffic-free zone viable or allowed it to die.

It is important to determine which people should be involved when and how their participation can be obtained. Residents are voters and taxpayers with the power to approve public expenditures of money and influence boards, the city council, and local

officials on new ordinances, zoning, and building codes. Unresponsive officials can be voted out of office, and people can try to stop civic projects which they do not consider to be in their interest. As consumers, residents shop in the area of a planned pedestrian precinct. Adolescents and young adults, although they are not taxpayers, are major consumers and supporters of the theater, arts, and other activities. Property owners and renters may be required to rehabilitate business properties and their homes or else may have to move if demolition, rezoning, or reorganization of the area is required as part of a traffic-free zone.

5.6.6 The Process of Creating Traffic Free Zones

The book "For Pedestrians Only: Planning, Design and Management of Traffic Free Zones" outlines a series of stages that should be followed from inception to operation, and serves as a useful reference for cities and city officials intending to undertake a traffic-free zone project in their jurisdictions.

Stage 1: Identifying Key Participants
The first step is taken when a private citizen, public official, or organization makes a decision to begin the action process in support of a traffic-free zone. The potential actors in the local theater of action must then be identified: local government, prominent citizens, the business community, civic groups, the academic community, and the media, all of whom will play a major role in various phases of the overall project.

Stage 2: Expanding Community Involvement
Once the potential participants have been identified, they must be contacted. The first meetings and discussions on how to proceed will most likely have a ripple effect; word should spread establishing preliminary interest throughout the Community.

Stage 3: Organizing Meetings
The first meeting should both explore and generate public interest: potential difficulties should be highlighted, local problems and concerns reviewed, additional participants included or identified for future involvements, and essential information located and collated.

Stage 4: Developing an Organization
As soon as a certain level of energized interest has been generated, it is necessary to begin channeling that energy into an efficient organizational structure. This is a difficult stage; the real workers are separated from those whose interest temporary, and attempts must be made to engage as many people as possible in a satisfying way and convert their capacity for ideas into the capacity for action. Existing and potential resources must be evaluated, including funds, human power, and services; it must also be noted whether these sources involve city government, private organizations, or individual citizens. A staff, responsible for planning, administration, and promotion, must be selected and divided

into different categories of personnel. The staff should include program management, responsible for planning and administration; special consultants, responsible for specific aspects of the plan; and survey workers.

Up to this point, media and public communications may have been sporadic. They must be clearly established, and procedures must be set up for consulting with and advising the community, city officials, and business groups on a regular basis.

Stage 5: Setting Goals

Setting goals gives a focus to the project: it educates and inspires participants, crystallizes the intent of the project as an aid to communication and publicity, provides a guide to determining which studies and surveys may be necessary, and establishes clear-cut reference points for choosing among alternate solutions.

Stage 6: Preparing Surveys and Special Studies

Studies and surveys are divided into two general categories:

Comprehensive Surveys, in particular, feasibility studies, are needed to formulate local planning. These surveys cover such areas as land use, building conditions, economics, and preparation of base maps.

Detailed Studies of a more specific nature are required for particular aspects of the project. These focus on such areas as parking, traffic analysis, truck deliveries, and bicycle paths. Areas of investigation are usually defined at the outset, since data from one study will often be applicable to that of another study. In addition, existing research should be studied, because each community has quite a bit of information already on hand. This can save a significant amount of time and money.

The responsibility for carrying out studies and surveys is often split into two groups: those responsible for supervising the studies and those who will do the actual survey work. There is enormous potential for community involvement in survey work. Not only does using citizen volunteers save money while producing results, but it also helps build local support for the project.

Once the coordinating organization is set up, it is ready to proceed with gathering information, making critical reviews, tabulating and analyzing data, and developing recommendations based on its findings. Analysis of the information can take place in joint planning workshops, with community goals serving as the framework for discussions. It is important that the community be made aware of the findings. The more information available to the public during the initial stage of the process, the greater the possibility of its support.

Stage 7: Setting Objectives

In contrast to general goals, objectives represent a synthesis of the recommendations from various surveys and studies, a comprehensive list which forms a plan of action for determining the ultimate aim. These objectives should be quantified and scheduled as far as possible. Together with general goals, they represent a statement of the community's specific desires for the area.

Stage 8: Establishing Concepts, Plans, and Implementation Procedures

Any conflicts that have arisen among objectives should be solved at this stage: Idealism and practicality must be reconciled on a fundamental level. Some objectives will be modified and others eliminated altogether for reasons of suitability or because prospects for their realization are simply too slim, too costly, or too time consuming. Planners and Urban Designers at this point help to focus on the technical aspects of execution. Careful evaluation of alternatives, different land use patterns, desired "images," services, facilities, and so on should always draw upon as much public participation as possible. Public hearings or a series of smaller meetings with various local groups can help to settle on a single concept for the project.

The plan resulting from these deliberations is then presented for acceptance by the municipality as official policy. Usually, this is when a series of public hearings will be held, prior to taking any formal action. All segments of the community should be involved in these public hearings; they can both review the decisions which have already been made and provide additional ideas, criticisms, information, and evaluation. These hearings represent a critical turning point for the project—a time when community support is either gained or lost. To ensure their greatest effectiveness, the plan should be fully disseminated beforehand, and communications with the media should be firmly established.

Stage 9: Monitoring Operation

Successful managing of the implementation process requires careful monitoring of the project's progress, since the long-term success of a traffic-free zone depends on a awareness of changes both within and around the project and upon an understanding of all the elements which have the power to influence it. Timely completion of the various stages must be assured; necessary changes in the planning strategy must be made; individual projects in the area must be made consistent with the ultimate goals of the plan; and construction must be coordinated with the existing needs of the local community.

Figure 5.6-2

REASONS TO CREATE TRAFFIC FREE ZONES

(From "For Pedestrians Only: Planning Design and Management of Traffic Free Zones")

THE ARGUMENTS IN FAVOR OF TRAFFIC-FREE ZONING SPEAK FOR THEMSELVES IF THE PROJECT HAS BEEN WELL THOUGHT OUT AND WELL DOCUMENTED WITHIN THE CONTEXT OF A CITY PLAN. THE MOST PERSUASIVE ARGUMENTS ARE THOSE DEMONSTRATING THAT THE PROPOSAL IS A RESPONSE TO THE SPECIFIC NEEDS OF THE LOCAL COMMUNITY. THE FOLLOWING LIST OF 10 GOOD REASONS TO CREATE TRAFFIC-FREE ZONES WAS PREPARED AS PART OF A DEMONSTRATION PROGRAM SPONSORED BY THE UNITED NATIONS IN CONJUNCTION WITH 1976 WORLD ENVIRONMENT DAY. IT CANNOT SUBSTITUTE FOR UNIQUELY LOCAL ARGUMENTS, BUT THE LIST PROVIDES SOME GENERAL, USEFUL POINTS.

1 TO ATTRACT PEOPLE. MORE PEOPLE MEANS MORE OPPORTUNITIES FOR SHOPPING, SOCIALIZING, BUSINESS, AND FUN. MORE BUSINESS MEANS MORE MONEY FOR BOTH THE CITIZENS AND THE CITY.

2 TO PROVIDE A SENSE OF PLACE THAT STRENGTHENS COMMUNITY IDENTITY AND COMMUNITY PRIDE. THIS IMPROVES COMMUNITY RELATIONS AND REDUCES FEELINGS OF ALIENATION, WHILE CREATING A PLACE FOR ALL TYPES OF PEOPLE TO CONGREGATE.

3 TO REDUCE NOISE AND AIR POLLUTION.

4 TO PROVIDE A SAFE AND ATTRACTIVE ENVIRONMENT IN. WHICH CHILDREN CAN PLAY AND SENIOR CITIZENS CAN MEET AND REST.

5 TO IMPROVE THE VISUAL ENVIRONMENT. SIGNS, LIGHTS, SPACES, COLORS, AND TEXTURES CAN BE DESIGNED TO RELATE TO THE PERSON ON FOOT, RATHER THAN TO THE PERSON ON WHEELS.

6 TO PROMOTE URBAN CONSERVATION, ENVIRONMENTAL PRESERVATION, BUILDING RESTORATION AND RENEWAL.

7 TO INCREASE PROPERTY VALUES AND, CONSEQUENTLY, THE CITY'S REVENUE FROM REAL ESTATES TAXES

8 TO SPECIAL RIGHTS-OF-WAY TO BE RESERVED FOR BICYCLES AND PUBLIC TRANSPORTATION VEHICLES. THIS IMPROVES MOBILITY THROUGH THE CITY CENTER AND HELPS SAVE ENERGY.

9 TO DECREASE THE NUMBER OF MOTOR VEHICLE-RELATED ACCIDENTS, SAVING LIVES, POLICE WORK, AND JUDICIAL TIME.

10 TO PROMOTE CITIZENS' PARTICIPATION IN THE INCEPTION, MANAGEMENT, MONITORING, AND IMPROVEMENT OF THE PEDESTRIAN AREA. THUS, THE PROJECT BECOMES A LIVELY INSTRUCMENT FOR PUBLIC EDUCATION IN URBAN LIFE.

Figure 5.6-3 **Checklist of Potential Assets**

A CHECKLIST OF POTENTIAL ASSETS

1. General Appearance

☐ a. Interesting skyline if clutter eliminated.

☐ b. Open spaces could be landscaped.

☐ c. Vistas could be created to certain major buildings.

☐ d. Unifying design concept possible among buildings.

☐ e. Unnecessary poles, signs, and wires could easily be removed.

☐ f._____

2. Buildings

☐ a. Buildings with interesting architectural details.

☐ b. Buildings of historical value.

☐ c. Rear entrances could be improved.

☐ d. Vacancies allow space for expansion.

☐ e. Most buildings in sound structural condition.

☐ f._____

3. Signs

☐ a. Obsolete signs easily removed.

☐ b. Interesting old signs to restore.

☐ c. Sign panels harmonizing with building possible.

☐ d. Flush mounted wall signs could be easily viewed.

☐ e. Uniform "under-canopy" signs could be used.

☐ f._____

4. Streets and Alleys

☐ a. Wide main street right-of-way.

☐ b. Pavement width could be reduced.

☐ c. Traffic markings and signs easily replaced.

☐ d. Regular street clean-up program could be initiated.

☐ e. Street resurfacing could be programmed.

☐ f._____

5. Traffic

☐ a. Traffic could circulate around main shopping street.

☐ b. One-way movements could be eliminated

☐ c. Some turning movements could be eliminated.

☐ d. Through traffic could bypass CBD.

☐ e. Better locations possible for loading zones or bus stops.

☐ f._____

6. Parking

☐ a. Some on-street spaces could be eliminated.

☐ b. Locations available for more off-street parking.

☐ c. Existing parking lot-design and layout could be improved.

☐ d. Space available for landscaping and screening.

☐ e. Employees could park in locations other than customer spaces.

☐ f._____

7. Pedestrian Facilities

☐ a. Sidewalks could be widened.

☐ b. Spaces for benches, fountains, and restrooms could be created.

☐ c. Landscaped arcade through midblock to parking area possible.

☐ d. Mall or semimall could be developed.

☐ e. Canopy could be installed along entire street.

☐ f._____

8. Land Use

☐ a. Reasonably compact shopping core.

☐ b. Some non-CBD uses would be willing to relocate.

☐ c. No major outlying commercial uses yet.

☐ d. Good variety of retail uses.

☐ e. Adjacent land available for expansion.

☐ f._____

9. Utilities

☐ a. Water and sewer systems feasible to improve.

☐ b. Overhead wires could be relocated or placed underground.

☐ c. Street lighting ready soon for replacement.

☐ d. Storm drainage can be improved.

☐ e. Utility companies cooperative and interested in community.

☐ f._____

10. Merchandising and Customer Relations

☐ a. Good market available for quality goods and services.

☐ b. Experienced and knowledgeable business officials.

☐ c. Active Chamber of Commerce.

☐ d. Aggressive and creative young business people.

☐ e. Some businesses draw from outside trade area.

☐ f._____

11. Community Attitude

☐ a. Strong community spirit.

☐ b. Have worked for educational, recreational, and medical service improvements in past.

☐ c. Progressive local government.

☐ d. Government and business will cooperate.

☐ e. Take pride in high quality of local improvements.

☐ f._____

12. Planning Activity

☐ a. Active planning agency and planning program.

☐ b. Good zoning ordinance.

☐ c. Plan has been discussed.

☐ d. Public officials recognized value of professional assistance.

☐ e. Funds available for continuing planning program.

☐ f._____

13. Area Trends

☐ a. Trade area population has increased spendable income.

☐ b. Larger farms require more goods and services.

☐ c. Our community is center for governmental, educational, or medical services.

☐ d. Good recreational or tourism potential.

☐ e. Metropolitan population decentralizing into our trade area.

☐ f._____

14. Other

☐ a._____

☐ b._____

☐ c._____

☐ d._____

☐ e._____

☐ f._____

Source: *Central Business District Improvement Manual for Iowa Communities* (Des Moines, Iowa: Division of Municipal Affairs, Office for Planning and Programming, 1971).

Figure 5.6-4 **Problem Checklist**

PROBLEM CHECKLIST

1. General Appearance

☐ a. Cluttered, unattractive entrances.

☐ b. Lack of landscape plantings and green spaces.

☐ c. Dirty, littered streets, sidewalks, and alleys.

☐ d. Visual chaos of poles, signs, and wires.

☐ e. Lack of design harmony among buildings.

☐ f. Lack of views, vistas, and visual focal points.

2. Buildings

☐ a. Poorly maintained exterior appearance.

☐ b. Drab, uninteresting interiors.

☐ c. Functionally obsolete size and shape.

☐ d. Vacant upper stories.

☐ e. Dirty, cluttered rear entrances.

☐ f. Inharmonious remodeling.

☐ g. Absentee ownerships.

3. Signs

☐ a. Excessively large.

☐ b. Overhang public right-of-way.

☐ c. Poorly maintained.

☐ d. Gaudy, garish, and ugly.

☐ e. Difficult to read.

☐ f. Poorly designed.

☐ g. Inharmonious with building architecture.

4. Streets and Alleys

☐ a. Too narrow for traffic and parking needs.

☐ b. Poor surface condition.

☐ c. Inadequate storm drainage.

☐ d. Lack proper markings and directional signs.

☐ e. Rough railroad crossings.

☐ f. Dirty and littered.

5. Traffic

☐ a. Congested, slow moving.

☐ b. Inconvenient circulation pattern.

☐ c. Turning conflicts of intersections.

☐ d. Loading zone conflicts.

☐ e. Poor access routes.

☐ f. Through traffic conflicts.

☐ g. Excessive truck traffic

6. Parking

☐ a. Insufficient number of spaces.

☐ b. On-street spaces conflict with traffic.

☐ c. Unattractive, poorly designed lots.

☐ d. Inconvenient location.

☐ e. Dirty, muddy, or rough surface.

☐ f. Poorly lighted.

☐ g. Slow turnover.

☐ h. Employees use prime customer spaces.

☐ i. Spaces too small, difficult to use.

☐ j. Obsolete fee structure.

7. Pedestrian Facilities

☐ a. Rough, broken sidewalks.

☐ b. High curbs.

☐ c. Pedestrian-automobile conflicts.

☐ d. Dark side streets.

☐ e. Unattractive routes between stores and parking areas.

☐ f. Lack of benches, fountains, rest rooms, phones, trash containers, and information centers.

☐ g. No protection from inclement weather.

☐ h. Narrow sidewalks.

☐ i. Excessive noise, dust, or objectionable odors.

8. Land Use

☐ a. Lack of major shopping store.

☐ b. Noncommercial dead spots in shopping frontage.

☐ c. Excessive vacant buildings and land.

☐ d. Lack of room for expansion.

☐ e. Objectionable uses that produce noise, dust, odors, smoke, or traffic conflicts.

☐ f. Lack of compact, convenient retail core.

☐ g. Outlying retail uses complete with CBD.

9. Utilities

☐ a. Water system old and undersized.

☐ b. Inadequate fire demand storage, pressure, or hydrants.

☐ c. Sanitary sewer old and undersized.

☐ d. Poor storm drainage.

☐ e. Tangled mess of overhead wires.

☐ f. Inadequate, unattractive street lighting.

☐ g. Streets continually torn up for repairs.

10 Merchandising and Customer Relations

☐ a. Limited selection and variety.

☐ b. Lack competitive pricing.

☐ c. Poor quality.

☐ d. Unattractive window and interior displays.

☐ e. Lack prompt and courteous attention to customers.

☐ f. Lack of product knowledge.

☐ g. Irresponsible service and maintenance practices.

☐ h. Obsolete styles.

☐ i. Failure to recognize potential markets.

11. Community Attitude

☐ a. No community concern or pride in CBD.

☐ b. Businessmen not interested in improving their stores.

☐ c. No public-private cooperation.

☐ d. It's too late to save the CBD.

☐ e. No imagination.

☐ f. Nobody wants to spend money.

☐ g. Don't need any help.

12. Planning Activity

☐ a. No active planning agency.

☐ b. No plans prepared for improvement.

☐ c. Plan prepared, but gathering dust.

☐ d. Inadequate or no zoning ordinance.

☐ e. Inadequate or no construction codes.

☐ f. Inadequate or no sign regulations.

13. Area Trends

☐ a. New regional shopping center within 60 miles.

☐ b. New highway connection to major cities.

☐ c. Declining rural population.

☐ d. Neighboring community has improved CBD.

☐ e. Unstable employment base.

☐ f. Workers commuting farther to larger cities.

14. Other

☐ a._____

☐ b._____

☐ c._____

☐ d._____

☐ e._____

☐ f._____

☐ g._____

Source: *Central Business District Improvement Manual for Iowa Communities* (Des Moines, Iowa: Division of Municipal Affairs, Office for Planning and Programming, 1971).

5.7 Transport Demand Management

5.7.1 The Concept Underlying Transport Demand Management

Travel Demand Management (TDM), or Urban Traffic Management (UTM) has become a popular terminology in the late 1970's to describe a system of actions whose purpose is to alleviate traffic problems through improved management of vehicle trip demand. These actions, which are primarily directed at commuter travel, are structured to either reduce the dependence on and use of single-occupant vehicles, or to alter the timing of travel to other, less congested time periods. With the increase in the amount of freight transportation, TDM measures for physical distribution or logistics has been a vital tool for urban transportation planning.

The LGUs comprising Metro Manila are familiar with the "odd-even" scheme and its current incarnation called Unified Vehicle Volume Reduction Program. These two techniques fall under the rubric of transport demand management solutions. However, they are by no means the only tools available to decision makers grappling with metropolitan traffic congestion. Neither can they be considered most effective or efficient.

5.7.2 Purpose of TDM

The purpose of TDM is to maximize the movement of 'people' or 'goods', not vehicles, within the transportation system. Many of the so-called TDM actions were once referred to as Transportation System Management, or TSM strategies, and had the same overall objective of trying to 'stretch' the capacity of existing transportation system, and avoid expensive new construction. What distinguishes TDM from TSM is its emphasis on shaping travel demand, as opposed to effecting improvements to the transportation system itself. What is also different is the way that these actions are applied, and the responsibility for their applications. The responsibility in TDM programs is shared by both public and private sectors.

TDM is normally directed at commute travel. The major reasons for this are the following;

(a) The most significant demand placed on the transportation system usually occurs during weekday peak periods. This period is dominated by commuter travel, which is characterized by the lowest vehicle occupancy rates of all travel purposes.
(b) The day-to-day regularity of commuter trips and the comparatively high travel densities make this travel market the most suitable for finding alternatives.
(c) Conditions at the workplace, in terms of employer practices, are important targets for modification with TDM actions.

5.7.3 **Urban Traffic Problems**

Problems related to traffic may be categorized into 5 groups;

(a) Mobility – for road users, pedestrians, cyclists, goods movement, etc.
(b) Environment – noise, vibration, air pollution, severance, visual intrusion
(c) Safety – drivers, pedestrians, cyclists, etc.
(d) Energy – undue delay due to frequent stops and starts
(e) Financing Public Transport – high operation costs, decrease in revenues due to less passengers

People have realized that these problems could not be solved only through infrastructure investments. Expansion of infrastructure tends to take a long time and many cities cannot afford the large cost involved. Or even if the city can afford the expenditure, it is sometimes physically impossible to do so in the older towns without destroying the town itself.

5.7.4 **Approaches to TDM**

There are two basic approaches of transport demand management:

(a) change the demand to meet system capacity, and
(b) change system capacity to meet demand.

More often associated with TDM are those techniques under the first category. These, in turn, fall into four major groups:

- Reducing the number of vehicles used to meet existing travel demand by increasing vehicle occupancy;
- Re-orienting travel to off-peak periods;
- Redirecting travel to less congested alternative routes; and
- Reducing total demand for travel itself.

5.7.5 **Classification of TDM Measures**

Table 5.7-1 shows a compendium of various TDM measures that have been used worldwide. The types of measures are categorized into two, namely; a) demand side, i.e., those which can be applied at the source of travel/trips, and b) supply side, i.e., those which can be applied to the facilities where the travel or trips happen.

Table 5.7-2 gives descriptions for different TDM techniques, as well as indications in usability by the LGUs.

Table 5.7-1 **A Compendium of TDM Measures**

Type of Measures	Strategy Class	Measures
DEMAND SIDE	Land-use & Zoning	Land-us & Zoning Policy Site Amenities & Design
	Communications Substitute	Telecommuting Tele-conferencing Tele-shopping
	Travelers Information Services	Pre-trip travel information Regional Rideshare Matching
	Economic Measures	Congestion pricing Parking pricing Transportation allowance Transit & rideshare financial incentives Public transport pass program Innovative financing
SUPPLY SIDE	Administrative Measures	Transportation partnerships Trip reduction ordinances and regulation Alternative work schedules Auto restricted zones Parking management
	Road Traffic Generation	Entrance ramp controls Travelers information systems Traffic signalization improvements Motorway traffic management Incident management Traffic control at construction sites
	Preferential Treatment	Bus lanes Carpool lanes Bicycle and pedestrian facilities Traffic signal pre-emption
	Public Transport Operations	Express bus services Park and ride facilities Services improvements Public transport image High capacity public transport vehicles
	Freight Movements	Urban Inter-city

Source: *Congestion Control and Demand Management, Organization for Economic Cooperation and Development, Scientific Expert Group TT1 / TT2, Final Report, June 1994.*

Table 5.7-2a **Traffic Constraint Techniques**

Technique	Descriptions	Usable By LGU
Traffic restriction in residential areas	Employ on-street parking control, street closure, road hump, elimination of curb, etc. to improve residential environment	Yes
Odd and even numbers	Vehicles with odd plate numbers are banned to enter controlled area during odd working days, and even plate numbers on the other days.	No
Traffic Cell System	Divide an urban area which is only mutually accessible by public transport or by circuitous route. Barriers are set up in streets to prevent private vehicles from passing though the area.	Yes
Auto-restricted zone on CBD	Delineate an auto-restricted zone where autos are totally eliminated from the zone, and set a new circulation system for buses, pedestrians, taxis, and delivery trucks; giving priority to buses.	Yes
Area licensing	Charges are applied to low-occupancy vehicles entering a congested area during peak periods	No
Vehicle ownership restraints	Discourage vehicle ownership through high taxes, vehicle registration, annual licensing fees.	No
Cordon toll gates	Install toll gate at the cordon around the controlled area, and collect tolls	No
Tolls at particular barriers to movement	Charge tolls at particular barriers like tunnels and bridges	No
Pedestrian streets	Selected streets are closed to vehicles by means of road signs at selected locations to reduce congestion, and to promote safety of pedestrians and pleasure of walking	Yes

Table 5.7-2b **Peak Period Dispersion Techniques**

Technique	Descriptions	Usable By LGU
Staggered working hours	Make the beginning of working hours staggered to spread peak-hour travel demand	??
Shortened work week	Work is shortened to 4 days per week, but with longer working hours such as 10 hours/day	No
Flextime working hours	Permit employees to have flexibility in starting and finishing times for working, within clearly defined limits	No

Table 5.7-2c **Land Use Control Techniques**

Technique	Descriptions	Usable By LGU
Removal of schools to outside the city center	Remove or relocate schools with large enrolment from or near CBD to outside the city	No
Removal of provincial bus terminals	Remove intercity or provincial bus terminals from CBD area or congested area, to periphery	Yes
New Towns	Provide a self-sufficient satellite town to reduce unnecessary trips	No
Sidewalk improvements and walkways	Encourage walking, instead of riding cars, by providing pedestrian overpasses as well as landscaped and covered walkways.	Yes
Require traffic impact studies and mitigation schemes	Large-scale property developments are required to submit traffic impact statements, before a building permit is granted	Yes

Table 5.7-2d **Parking Control Techniques**

Technique	Descriptions	Usable By LGU
On-street parking restriction	Regulation of on-street parking supply; allocation of supply among various uses	Yes
Parking meters or parking pricing	Typically used to control parking on streets within and adjacent to major activity centers	Yes
Parking control strategies in support of traffic restraint in CBD	Parking priority given to visitors and short-time users. Long parking is provided on the periphery or far from CBD	Yes
Residential parking restriction program	Restrict on-street parking to reduce hazardous traffic condition resulting from the use of streets within residential areas by those vehicles for commuting or commercial or industrial uses	Yes
Exclusive parking guidance	Message displays directed at those seeking parking lots which have available space to decrease traffic in downtown area	Yes
Differential parking charge	Set the charge comparatively low for an initial short period, and apply progressively higher charges for longer period to discourage commuters from parking in the area.	Yes
Park and Ride	Provide parking facilities at the transit terminals outside the CBD	Yes
Parking taxes	Impose a citywide tax on all parking for which a fee is charged.	Yes
Control of parking fee for private car park	Control the fees of existing privately-owned car park. Control parking demand and supply.	?
Parking restriction through wheel clamping	Violators of no-parking rule are subjected to a metal clamp that fits over the wheel and prevents the car from moving	Yes
Remote parking	Run shuttle buses to remote parking facilities to resolve parking problem and to reduce trips	No
Car-pool parking program	Provide parking spaces to be used free of charge to licensed car pools	No
Parking supply control against private cars in CBD	Encourage use of public transit over private cars through parking supply control such as limiting total number of parking spaces, setting parking ratios, permitting new buildings without parking spaces	Yes
Commuter parking lots	Provide commuter parking lot for car pool, van pool and park-free ride operation	Yes
Campus parking restrictions	Restrict parking through increased parking cost and limited parking permits to restrict private car usage on campus.	No
Reduction in tax for private car parks	Provide reduction or exemption from property taxes to promote the supply of parking facilities	Yes

Table 5.7-3 illustrates the typical applications of TDM measures for the demand side, while Table 5.7-4 illustrates those for the demand side.

Table 5.7-3 **Application of Demand-Side TDM Measures**

Strategy Class	Measures	Application of Measures							
		Urban	Inter-urban	Peak	Off-peak	Holiday	Construction / Maintenance	Special events	Incident Management
LAND-USE & ZONING	Land Use & Zoning Policy	■	O	■	O	–	–	■	–
	Site Amenities & Design	■	O	■	O	–	–	■	–
COMMUNI-CATION SUBSTITUTES	Telecommuting	■	–	■	–	–	O	–	–
	Tele-Conferencing	O	■	O	O	–	–	–	–
	Tele-Shopping	O	–	O	O	–	–	–	–
TRAVELLER INFO SERVICES	Pre-Trip Travel Information	■	■	■	O	■	■	■	■
	Regional Rideshare Matching	■	–	■	–	–	O	O	–
ECONOMIC MEASURES	Congestion Pricing	■	■	■	O	■	O	■	–
	Parking Pricing	■	–	■	O	–	–	■	–
	Transport Allowance	■	–	■	–	–	–	–	–
	Transit & Rideshare Financial incentives	■	–	■	O	–	–	O	–
	Public Transport Pass Program	■	–	■	O	–	–	O	–
	Innovative Financing	■	–	■	–	–	–	–	–
ADMINIS-TRATIVE MEASURES	Transportation Partnership	■	–	■	–	–	–	–	–
	Trip Reduction Ordinances & Regulations	■	–	■	–	–	–	–	–
	Alternative Work Schedules	■	–	■		–	–	–	–
	Auto Restricted Zone	■	–	■	■	–	–	■	–
	Parking Management	■	–	■	■	–	–	■	–

Note: ■- Significant Application, O - Some Application, (–) – No Application

Source: Congestion Control and Demand Management, Organization for Economic Cooperation and Development, Scientific Expert Group TT1 / TT2, Final Report, June 1994.

Table 5.7-4 **Application of Supply-Side TDM Measures**

Strategy Class	Measures	Application of Measures							
		Urban	Inter-urban	Peak	Off-peak	Holiday	Construction / Maintenance	Special events	Incident Management
TRAFFIC OPERATIONS MEASURES	Entrance Ramp Control	■	O	■	O	O	O	O	O
	Traveler Information Systems	■	■	■	O	O	■	■	■
	Traffic Signalization Improvements	■	–	■	■	–	O	O	O
	Motorway Traffic Management	■	O	■	O	O	O	O	O
	Incident Management	■	■	■	■	O	■	O	■
	Traffic Control at Construction Sites	■	O	■	■	O	■	O	–
PREFE-RENTIAL TREATMENT	Bus Lanes	■	–	■	■	–	O	O	–
	Carpool Lanes	■	–	■	O	–	O	–	–
	Bicycle & Pedestrian Facilities	■	–	O	O	–	–	O	–
	Traffic Signal Pre-Emption	■	–	■	O	–	–	O	–
PUBLIC TRANSPORT OPERATIONS	Express Bus Services	■	O	■	O	–	■	O	–
	Park & Ride Facilities	■	O	■	O	–	■	O	–
	Service Improvements	■	O	■	■	O	■	■	O
	Public Transport Image	■	O	■	O	–	■	O	–
	High Capacity Public Transport Vehicles	■	O	■	O	–	■	■	–
FREIGHT TRANSPORT OPERATIONS	Urban Goods Movement	■	–	■	■	–	–	–	O
	Inter-city Goods Movements	O	■	■	■	–	O	O	O

Note: ■- Significant Application, O - Some Application, (–) – No Application

Source: Congestion Control and Demand Management, Organization for Economic Cooperation and Development, Scientific Expert Group TT1 / TT2, Final Report, June 1994.

5.7.6 **Potential Impacts of TDM Measures**

Table 5.7-5 presents the potential or positive impacts of Demand-Side TDM measures on travel and trip making. Table 5.7-6, on the other hand, presents those for the Supply-Side TDM measures.

Table 5.7-5 **Potential Impacts of Demand-Side TDM Measures**

Strategy Class	Measures	Impacts							
		Reduce need to make trip	Reduce length of trip	Promote non-motorized transport	Promote public transport	Promote carpooling	Shift peak hour travel	Shift trips away from congested locations	Reduce traffic / traveler delays
LAND-USE & ZONING	Land Use & Zoning Policy	O	■	■	■	O	O	O	O
	Site Amenities & Design	■	■	■	■	■	O	–	O
COMMUNI-CATION SUBSTITUTES	Telecommuting	■	■	O	O	–	–	O	O
	Tele-Conferencing	■	■	–	–	–	–	–	–
	Tele-Shopping	■	O	–	–	–	–	–	–
TRAVELLER INFO SERVICES	Pre-Trip Travel Information	O	O	O	■	■	■	■	O
	Regional Rideshare Matching	■	–	–	■	■	O	O	O
ECONOMIC MEASURES	Congestion Pricing	O	O	O	■	■	■	■	■
	Parking Pricing	O	O	O	■	■	■	■	O
	Transport Allowance	–	–	O	■	■	O	–	O
	Transit & Rideshare Financial incentives	–	–	–	■	■	O	–	O
	Public Transport Pass Program	–	–	–	■	–	O	–	O
	Innovative Financing	–	–	–	■	■	–	–	O
ADMINIS-TRATIVE MEASURES	Transportation Partnership	–	–	O	■	■	O	O	O
	Trip Reduction Ordinances & Regulations	■	–	O	■	■	O	O	■
	Alternative Work Schedules	O	–	–	■	■	■	–	O
	Auto Restricted Zone	■	–	■	■	–	–	■	–
	Parking Management	O	–	O	■	■	O	O	O

Note: ■ - Significant Application, O - Some Application, (–) – No Application

Source: *Congestion Control and Demand Management, Organization for Economic Cooperation and Development, Scientific Expert Group TT1 / TT2, Final Report, June 1994.*

Table 5.7-6 **Potential Impacts of Supply-Side TDM Measures**

Strategy Class	Measures	Impacts							
		Reduce need to make trip	Reduce length of trip	Promote non-motorized transport	Promote public transport	Promote carpooling	Shift peak hour travel	Shift trips away from congested locations	Reduce traffic / traveler delays
TRAFFIC OPERATIONS MEASURES	Entrance Ramp Control	–	–	–	■	■	O	■	■
	Traveler Information Systems	–	O	–	O	O	■	■	■
	Traffic Signalization Improvements	–	–	–	O	–	–	O	■
	Motorway Traffic Management	–	O	–	O	O	O	O	■
	Incident Management	–	–	–	–	–	–	■	■
	Traffic Control at Construction Sites	–	–	–	O	O	O	■	■
PREFE-RENTIAL TREATMENT	Bus Lanes	–	–	–	■	–	O	O	O
	Carpool Lanes	–	–	–	O	■	O	O	O
	Bicycle & Pedestrian Facilities	–	–	■	–	–	–	–	–
	Traffic Signal Pre-Emption	–	–	–	■	–	–	–	O
PUBLIC TRANSPORT OPERATIONS	Express Bus Services	–	–	–	■	–	–	–	O
	Park & Ride Facilities	–	–	–	■	■	–	O	O
	Service Improvements	–	–	–	■	–	–	–	O
	Public Transport Image	–	–	–	■	–	–	–	O
	High Capacity Public Transport Vehicles	–	–	–	■	–	–	–	O
FREIGHT TRANSPORT OPERATIONS	Urban Goods Movement	–	–	–	–	–	O	O	■
	Inter-city Goods Movements	O	–	–	–	–	O	O	■

Note: ■- Significant Application, O - Some Application, (–) – No Application

Source: *Congestion Control and Demand Management, Organization for Economic Cooperation and Development, Scientific Expert Group TT1 / TT2, Final Report, June 1994.*

5.7.7 TDM for Better Goods Movement

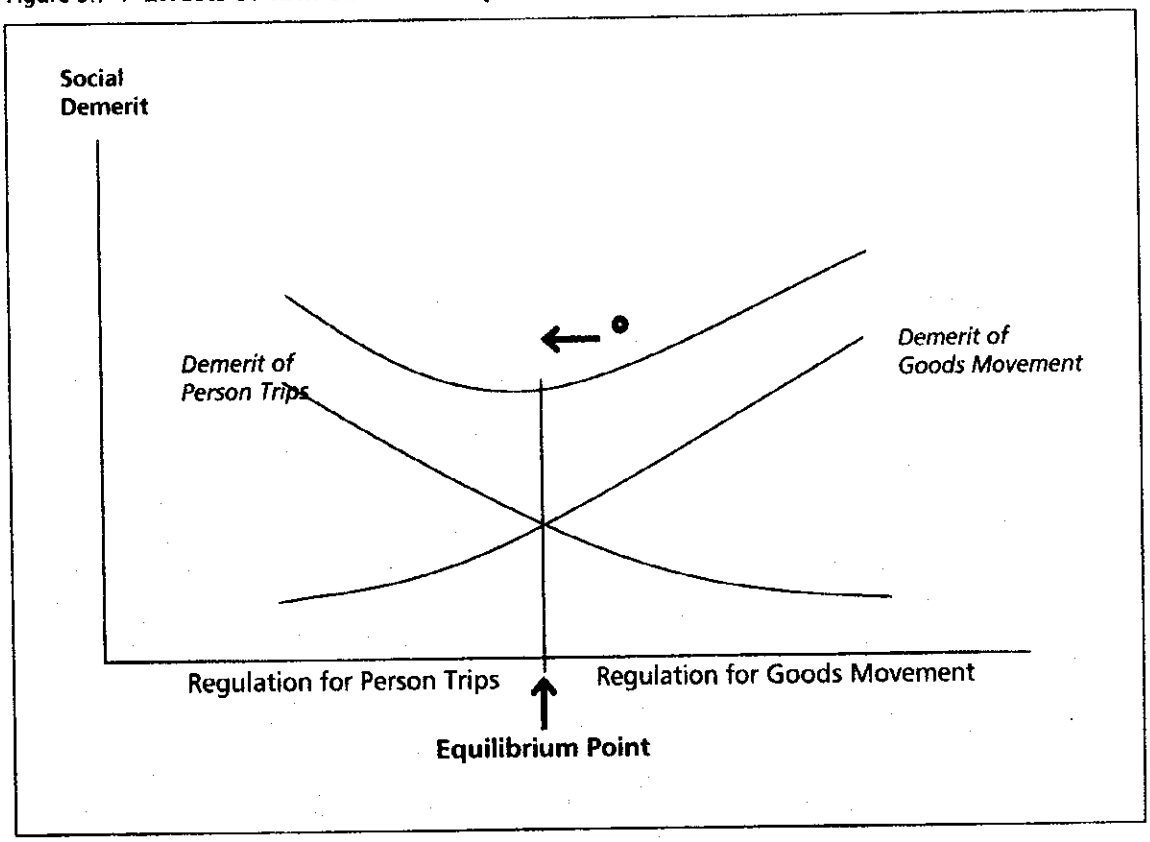
As mentioned previously, most TDM measures are focused primarily on commute travel. However, due to the increasing problems regarding goods movement, some TDM measures must be developed. TOM of goods movement has four types, namely;

a. improvement of trucks
   - electric car, environmental tax, vehicle type regulation
b. management of traffic demand
   - license regulation, passage regulation, parking restriction
c. management of priority
   - truck lane, truck road, truck payment(cargo)
d. management of delivery system
   - cooperative delivery, modal shift(shift in modal split), loading and unloading rules and facilities.

Management of Traffic Demand

The policies and regulations set by the government are largely focused on public utility vehicles like jeepneys, buses, taxis, etc. and privately owned vehicles for good traffic flow of commuters. On the other hand, the private sector focused primarily on goods movement or the distribution of goods and commodities for business purposes. Planners notice that the set policies are biased on person trips whereas the goods movement also need more consideration, planning and administration. Figure 5.7-1 illustrates the need for balance between person trips and goods movement regulations.

Figure 5.7-1 **Effects of TDM on Person Trip and Goods Movement**



5.7.8 Key Factors For Effective TDM Programs

For a TDM measure to be effective, the following factors have to be considered:

A. Planning and Project Development Factors

- Good knowledge of transport phenomenon is needed
- Sound evaluation of alternative strategies is to be made prior to implementation of any measure.
- Monitoring and evaluation of the achievements of the project undertaken must be made to ensure that the TDM measures implemented are achieving the results that are desired.
- Gradual implementation; often programs may begin with small scale demonstration projects, and if they prove to be efficient, they may be extended to a whole area.

B. Financial and Economic Factors

- It is certainly beneficial to have a dedicated funding source for TDM, in order to implement effective measures.
- Involvement of the private sector will be more and more needed to solve traffic problems.

C. Organizational and Institutional Factors

- Need to coordinate the role of the different parties involved in transport and traffic. Coordination mechanisms must be developed:
  - between different public agencies
  - between urban and inter-urban zones
  - between the bodies responsible for constructing, operating and monitoring highways, and especially with traffic management and surveillance authorities, including the police
  - between road users, freight and passenger road transport operators, residents associations, etc., and the bodies which have already been mentioned above,
  - with the operators of other modes of transport.
- Adequate collaboration with land use planners
- Create an authority to organize transport and traffic at metropolitan level.
- Establish special task forces to coordinate the implementation and operation of TDM measures.

D. Legal and Regulatory Factors

- TDM must become an integral part of transport policy at all levels of government

E. Policy Development Factors

- Clear transport policy
- Strong political leadership is vital as any effective policy will encounter intense opposition from many individuals.
- Policy issue should involve discussion between citizens and is not merely a subject of debate between technical experts.

F. Social Factors

- Acceptability of TDM measures should be a prior condition of the implementation of programs.
- Interaction with the public should be permanent; continuing dialogue and mutual understanding are needed between technical experts and the lay public.
- The measures must be equitable.
- TDM programs will have the greatest chance of success if transport and traffic policies are given the support of society.

5.7.9 **Which Concept to Apply?**

Not all those listed can be utilized by LGUs – for a number of reasons. The legal underpinnings may be absent. For example, regulating the rates imposed by private parking owners can be questioned in local courts. Staggered working hours may require much more than a city ordinance. Even if legal, a city may not also adopt a "color-coding" scheme without the cooperation of nearby towns/cities.
LGUs would do well to focus on techniques with localized impact such as parking and land use control techniques.