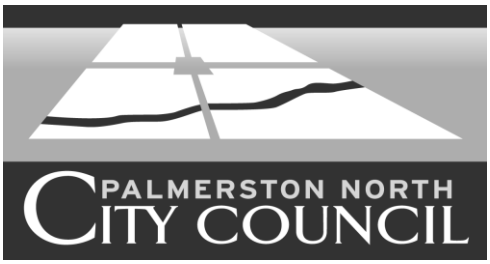


LOCAL AREA TRAFFIC MANAGEMENT POLICY and GUIDELINES

DM#295899 June 2003

CONTENTS

1 INTRODUCTION

Palmerston North City invests considerable resources each year into road improvements to maintain both the safety and efficiency of the city's roading network or, where possible, enhance it. As the arterial road network becomes increasingly busier extraneous through-traffic intrudes into local residential streets, sometimes travelling greater than the speed limit. This intrusion can spoil a previously quiet neighbourhood prompting local communities to look to council for relief.

Generally this leads to requests for the installation of controls such as speed humps, chicanes, road narrowing and roundabouts.

It is important to provide a definition of a local residential street and to differentiate between improvements described as Local Area Traffic Management (LATM) schemes and those described as Minor Safety works.

A **Local Residential Street** is a street within a residential area whose major function is to provide access to the properties that front it.

Local Area Traffic Management (LATM) schemes introduce a series of controlling measures that encourage a constant speed environment promoting a residential environment applicable to the surrounding land use and promotes safety along that road. Local Area Traffic Management schemes are often introduced more for reasons of enhancing the quality of life for residents rather than for pure traffic reasons.

Minor Safety works are improvements to a site to alleviate an identified problem where accidents have occurred in a small area (e.g. - reshaping of a bend in a road to minimise accidents where drivers have lost control of their vehicles). Often these sites are identified as Accident Blackspots.

(Note: Council also undertakes works to enhance the capacity and safety on the city's roads. This work is generally termed "traffic management" and is usually confined to more significant roads within the network such as principal and arterials and major intersections. These may include installation of painted flush medians, traffic lights and intersection channelisation.)

Various schemes and solutions have already been implemented within Palmerston North City. While no formal data has been documented about the comparative effectiveness of these works, informal observations indicate that there has generally been an improvement. These controls have been extensively used in other countries and research of documented results indicate that a 30% reduction in accidents and a 10 kph reduction of the 85th percentile speed (i.e. the speed at which 15% of motorists exceed).

While these schemes are consistent with council's safety objectives, to implement all requests would require extensive funding. **It is estimated that to implement every request received over the last five years would require around $3 million.** Therefore a system is required which investigates the merits of each request,

determines whether local area traffic management measures are appropriate and then ranks them in order of priority depending on the severity of the problem and feasibility of the improvements. This enables the council to plan for the provision of appropriate funds in each year's Annual Plan. It also allows the council to inform residents when any measures may be expected to be installed so that residents expectations are not raised unnecessarily.

The purpose of this document is to provide the basis on which informed decisions can be made and to formalise the decision making process. This document is not intended to be a design guide but may, at times, indicate the type and frequency of measures commonly used. This helps to create a greater understanding of the impact that LATM schemes may have on a particular neighbourhood and surrounding street network.

For a scheme to be successful, the need must come from, and belong to, the community. The role of the council is to advise and co-ordinate solutions to the problem.

Residential Street before treatment

Note straight unrestricted alignment that can tend to encourage high speeds.

Residential Street after treatment

Note changed nature with introduction of bends and narrower road.

2 OBJECTIVES

High traffic volumes and speed in a residential street can effect: -

- safety, increasing the risk of an accident and its severity
- the residential environment, due to unnecessary traffic use, increased traffic noise and restricted movement across the road for pedestrians
- convenience, because of delays in entering the traffic stream.

Local Area Traffic Management or "traffic calming" involves introducing measures to alleviate one or all of the above problems. They are generally carried out on existing roads and involve the installation of controls such as speed humps, chicanes, intersection controls and, sometimes, complete road closure. The objective is to modify the street to provide an environment which :-

- provides a high level of safety for all street users including motorists, pedestrians and cyclists
- provides a reasonable level of convenience to all users
- makes residential streets pleasant places to live minimising the impact of traffic.

Photograph 1 - On-street parking restricted by control

Photograph 2 - Property entrances restricted by kerbside islands

3 BENEFITS AND EFFECTS

The installation of a LATM scheme should result in one or more of the following :-

- fewer accidents
- lower vehicle speeds
- lower traffic volumes, particularly through-traffic
- exclusion of undesirable traffic (such as heavy vehicles and speedsters)
- a better looking streetscape

In striving to meet these objectives within one residential street, consideration must be given to the effect on the adjacent street network. This will ensure that the problems are not merely transferred and that the adjacent streets are able to cope with any additional traffic that may divert.

While there are benefits to be gained within the affected area, residents may also face adverse consequences created by the changes. These impacts need to be recognised by the community requesting the modifications, as they are the users who are going to be the most affected.

The adverse effects may include the following :-

- loss of on-street parking (refer photograph 1), especially adjacent to the traffic calming controls, such as chicanes and speed humps
- increase in noise due to braking and acceleration of vehicles (particularly if they are heavy vehicles)
- restricted access to properties adjacent to where controls are installed (refer photograph 2)
- restricted mobility to residents living in the modified area
- reduced emergency and service vehicle access or increased response time to emergencies
- diversion of traffic to other residential streets where the impact of traffic is equally undesired.

While the intrusion of traffic onto a local residential street may impact on the local residents, the rights of other users also need to be considered. It may therefore be necessary to achieve a compromise between the local interests and the wider community's need for mobility, particularly the mobility of commercial traffic.

It is important that the adverse effects as outlined above do not outweigh the benefits arising from meeting the desired objectives. It is also important that residents understand and accept both the advantages and disadvantages at an early stage before any detailed work is carried out.

Without the community's acceptance and approval the scheme is bound to fail.

Figure 1 indicates the positioning and frequency of controls in order to meet the scheme's objectives. It can be seen from this diagram that the controls can be quite restrictive within the treated area and therefore impact heavily on the residents of that area. It also indicates the types of measures that may be used depending on the specific problem and street hierarchy.

Streets that have LATM schemes implemented can incur higher maintenance costs due to the need to maintain the controls and any landscaping. In addition road maintenance costs are increased due to the concentration of traffic on a single path rather than spread across a wider lane. This is particularly true if block paving is used. This can lead to an overall increase in general road maintenance costs city wide.

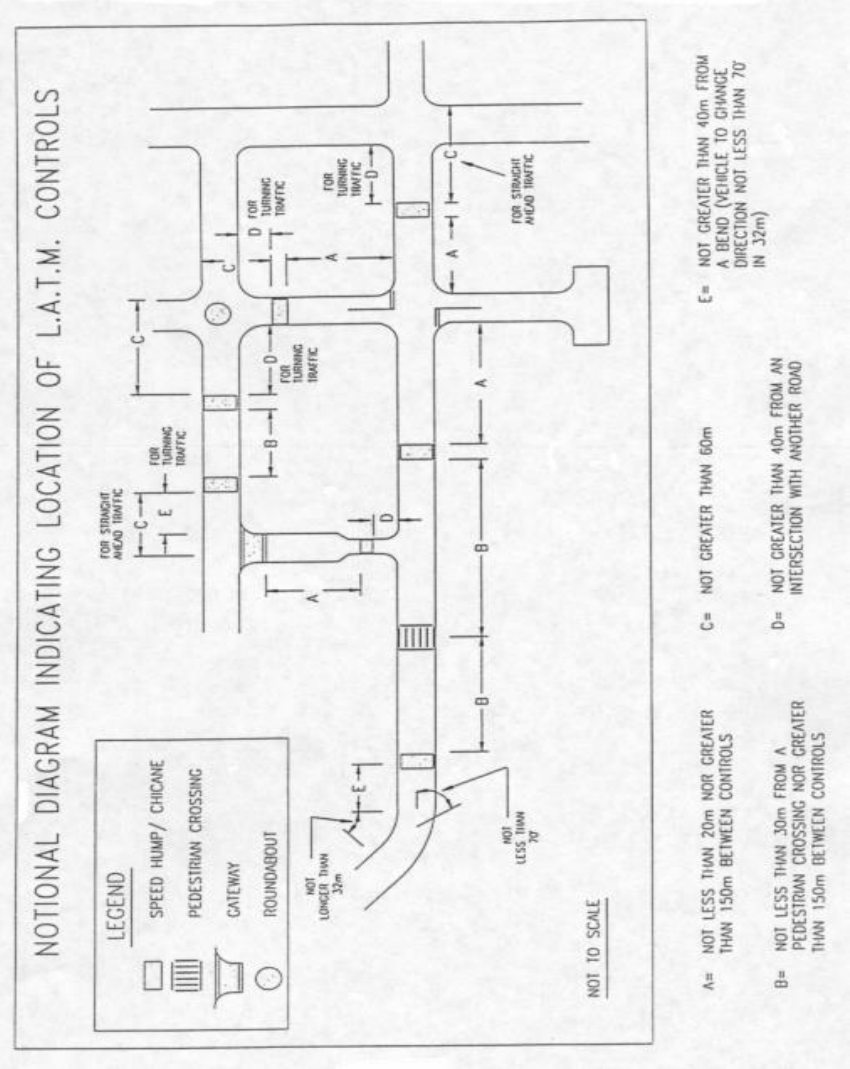

NOTIONAL DIAGRAM INDICATING LOCATION OF L.A.T.M. CONTROLS
LEGEND
SPEED HUMP/ CHICANE
PEDESTRIAN CROSSING
GATEWAY
ROUNDABOUT
FOR STRAIGHT AHEAD TRAFFIC
FOR TURNING TRAFFIC
NOT LONGER THAN 32m
NOT LESS THAN 70
NOT TO SCALE
A= NOT LESS THAN 20m NOR GREATER THAN 150m BETWEEN CONTROLS
B= NOT LESS THAN 30m FROM A PEDESTRIAN CROSSING NOR GREATER THAN 150m BETWEEN CONTROLS
C= NOT GREATER THAN 60m
D= NOT GREATER THAN 40m FROM AN INTERSECTION WITH ANOTHER ROAD
E= NOT GREATER THAN 40m FROM A BEND (VEHICLE TO CHANGE DIRECTION NOT LESS THAN 70 IN 32m)

Figure 1

4 TYPES OF CONTROLS

This section describes the types of control measures most commonly used in LATM schemes and reviews their effects. It is included only to indicate the types of controls available and does not recommend any particular control. Each scheme will differ in its characteristics and therefore should be assessed individually using experiences from previous schemes as a guide. Normally, schemes will include a combination of the controls listed below.

Controls can be described in three basic categories :

- signs
- vertical displacement controls (e.g. speed humps)
- horizontal deflection controls (e.g. chicanes)

The common characteristic of the later two is that their physical form forces or restricts a specific action. They have the advantages over signs in that they are largely self-enforcing and create a visual impression, real or imagined, that a street is not intended for through or fast traffic. They also act 24 hours a day.

They do, however, have disadvantages in their cost (including ongoing maintenance costs), with their effect on emergency vehicles, loss of on-street parking and loss of accessibility to some parts of the neighbourhood.

While signs are lower in cost they are not self-enforcing and are liable to be disregarded by a proportion of users. This can be disconcerting to local residents.

4.1 Signs

4.1.1 Stop and Give Way

The basic purpose of these signs is to assign and indicate the right-of-way at intersections. Such signs are often requested with the expectation that they will control speed or reduce volumes in a street, but in reality they have little overall effect in achieving these goals.

Effect on volume - these signs are likely to have little effect on volumes where motorists use the local street to save time instead of travelling along the adjacent collector or arterial street system. However, if an attempted short-cut along the street brings little time savings then the subsequent hold-up at the connecting intersection, due to the loss in priority, may dissuade motorists to use that street. This should lead to reduced volumes on the residential street.

Effect on speed - generally these signs have little effect on speed except within close proximity to the intersection. It is highly unlikely that they would have any effect on the 85th percentile speed (i.e. the speed at which 15% of motorists exceed).

Effect on safety - safety at an intersection may be improved with the better definition of right-of-way priorities but will have no effect along the street.

Signs should be used cautiously. It is felt that the installation of unwarranted "STOP" or "GIVE WAY" signs may reduce safety by fostering either a general disregard for these signs or a hazardous disregard for the specific "unwarranted" sign. This is common where the sign is approached on regular basis and the driver becomes very familiar with the area and less wary of the sign.

Indicative cost - low

4.1.2 Prohibited turn signs

These signs include the regulatory "No Right Turn" or "No Left Turn" type signs and are used to prevent undesirable turning movements into residential streets. They are best used on arterial or collector roads on the outskirts of a neighbourhood to prevent traffic entering the neighbourhood altogether. Their success will depend on their general acceptance by the affected motorist and will become less effective if they seem illogical or where convenient alternatives are not available. Enforcement of prohibited turns is always a problem and this can also increase abuse and reduce their effectiveness.

Effect on volume - barring certain turning movements can effectively reduce volumes, however a number of motorists can be expected to disregard the restriction leading to concern from the residents. The mobility of residents can also be reduced as the constraint forces them to take alternative longer routes. As time passes the longer route may become onerous and the resident may then disregard the restriction.

Effect on speed - if the movement being banned had previously been used by motorists as a speedy through route then significant reductions in speeds, adjacent to the turn, could be expected. They are, however, unlikely to affect speeds along the road.

Effect on safety - by removing conflicting vehicle movements at an intersection safety will improve. There is a possibility, however, that the ban will force motorists to make turns at less safe places or by more hazardous manoeuvres such as "U" turns.

Indicative cost - low

4.1.3 One way streets

One way streets can be used to protect a residential area. It is important to note that the scheme needs careful planning so that a reasonable amount of access is maintained and to ensure problems are not merely transferred to an adjacent street. One-way systems are not usually suitable given the traditional roading pattern within the city.

One way street systems are generally accepted by the public although they can be ignored with nothing preventing travel in the opposite direction. Often it is the

residents themselves who are the main offenders and choose to ignore the one-way system as they can incur a loss of accessibility and face increased travel times.

Effect on volumes - one-way street systems can be very effective in reducing volumes.

Effect on speed - speed tends to be higher due to the removal of conflict from approaching vehicles, but the elimination of shortcuts may reduce the number of motorists who formerly used the road as a speedy through route. Therefore a reduction in overall speed may be realised.

Effect on safety - one-way streets tend to be inherently more safe than two-way streets, because conflict from an opposing traffic stream has been removed. When initiating one-way street systems careful consideration must be given to signing at intersections.

Indicative cost - low to medium

4.2 Vertical Displacement Controls (Speed Humps)

Vertical displacement controls are short raised areas of roadway extending across the road. Normally they have a raised height of around 100mm and extend from 3 metres to 10 metres along the roadway. They often have a different texture to the adjacent road surface (e.g. cobblestones or clay pavers).

They can be used over the entire width of the carriageway or in conjunction with a road narrowing to allow either one-way flow over the hump or retain two-way flow. On wider carriageways best results are obtained when used in conjunction with road narrowing.

They can be used as a desirable location for pedestrians to cross but careful design is needed to ensure that they are not mistaken, by the pedestrian, as formal pedestrian crossings and that the priority between the pedestrian and the motorist is not confused.

The position of the control must ensure it does not adversely affect access to properties or carriageway drainage. Depending on their length this can often be difficult to achieve.

This type of control is not recommended for use on roads with steep gradients or when the road is used by a reasonable number of heavy or commercial vehicles. The type and design of the control needs to take into consideration whether the street is a bus route. Experience has shown that certain designs can cause discomfort to passengers or damage vehicles. Some of these problems may be minimised by lowering the height of the raised area, however this can reduce its effectiveness in controlling speed.

The basic purpose of devices such as speed humps is to control speed, however the actual design and uniformity of construction is critical to their performance. The potential reduction in speed is achieved by reducing the length of the road over which

drivers an accelerate, however motorists have been known to simply modify their driving style to a series of short sprints in order to offset the increase in travel time.

Used in conjunction with road narrowing some visual improvements to the streetscape can be achieved as they offer an area that may be landscaped. The use of landscaping is recommended as it helps to emphasise the control and create a more restrictive environment in the eyes of the motorist. However the type of landscaping used must be carefully selected to avoid restricting visibility from driveways or of pedestrians. Landscaping can also assist in offsetting some of the disadvantages to residents who have the controls located outside their properties as it can improve the look of their property frontage.

Speed Humps (Refer photograph 3) - these are the best known form of control and, not surprisingly, are the most commonly requested. Speed humps have a curved profile and rise to 100mm in height with a total length of 3 metres. Design of the humps can differ to suit different vehicle types and speeds. If poorly implemented they can damage vehicles and/or the road surface. Increased noise and vibration can also impact on adjacent residents.

Raised Tables (Refer photograph 4) - these incorporate an 8 to 10 metre length of road raised up to 100mm with 1 in 10 ramps on the approaches. These differ from the standard hump in that the raised section is flat and not curved. This control is more suited for use where there is a reasonable level of heavy or commercial traffic rather than the standard hump.

Effect on volume - usually cause a reduction in volumes since they lower speeds and create longer travel times. They can also cause some discomfort to passengers. The level of reduction is largely dependant on the surrounding street network and whether or not there are other convenient routes. The greater the increase in travel time along the street then the greater the volume reduction is likely to be. This can be affected by the distance between the controls.

Effect on speed - Raised Tables and/or Speed Humps can be highly successful in reducing the overall 85th percentile speed. Experience has shown that a 10 kph reduction in speed between the devices may occur with greater reductions near the Raised Table or Speed Hump.

The level of speed reduction is dependant on the spacing between each device. Generally they should be spaced no greater than 150 metres apart. It is also dependant on the level of unnecessary through traffic. The removal of through traffic (which will have the greatest speeds) will reduce the overall 85th percentile speed in the street. There will be limited effect on the driving behaviour of local residents.

Effect on safety - as a result of the lower speeds and possible drop in volumes the number and severity of accidents can be expected to reduce accordingly.

Effect on environment - because of the increased number of braking and accelerating actions induced when negotiating the control, an increase in noise levels, especially in the vicinity of the control, can be expected. The impact of the vehicles tyres with the

ramped section of the Raised Table or Speed Hump can also increase vibration in neighbouring homes. This is particularly noticeable when used by heavy or commercial vehicles (including buses).

The use of a lower profile hump may lower noise levels, but the effect of lowering speed is also reduced.

Photograph 3 - Typical Speed Hump

Photograph 4 - Typical Raised Table

Residents should expect some loss of on-street parking as a result of installing these devices, but the amount lost would be less than if controls such as chicanes were used as they are generally shorter.

The kerbside islands can tend to trap rubbish and debris, often creating an untidy streetscape which has led residents living adjacent to these controls to complain.

Increased streetlighting may be required to ensure that the controls are visible at night. While this can improve street security some residents may not appreciate the increased intrusion of light into their houses.

Indicative cost - low to medium depending on whether the control includes narrowing of the road. It is also dependant on the degree of landscaping and/or streetlighting necessary and the extent of alterations to property accesses. The cost of maintaining streets with Raised Tables and/or Speed Humps installed is generally higher due to the additional cost in keeping the control and associated landscaping tidy and repairing any damage. There is also increased wear on the road with vehicles putting greater stress on reduced area in which they may travel.

4.3 Horizontal Deflection Controls (Chicanes)

Horizontal deflection controls involve the realignment of the kerbline over a short length of road (typically 10 metres to 15 metres). The aim is to eliminate long, wide straight sections of road and this is generally achieved by kerbside islands and/or central islands. Often the carriageway within the control has a different texture, such as cobblestone paving. Vertical displacement may also be used in conjunction with horizontal deflection.

Traffic flow can be restricted to create one-way flow in proximity of the control with priority given to one direction and alternated between successive controls. Alternatively two-way flow may be retained. Reduction to one-way flow may serve a dual purpose of reducing speeds (achieved by the curved alignment or vertical displacement) and secondly, to deter through-traffic (achieved by the motorist losing priority which can increase congestion and travel time). One-way flow controls are only recommended on streets that have low traffic volumes as an excessive increase in congestion may occur if volumes are high.

They can be used as a desirable location for pedestrians to cross but careful design is needed to ensure that they are not mistaken by the pedestrian as formal pedestrian crossings, and that the priority between the pedestrian and motorist is not confused.

Horizontal controls offer more scope to improve the appearance of the street as there is generally more space that may be landscaped. The use of landscaping is recommended as it helps to emphasise the control and create a more restrictive environment in the eyes of the motorist. However the type of landscaping used must be carefully selected to avoid restricting visibility from driveways or of pedestrians. Landscaping can also assist in offsetting some of the disadvantages to residents who have the controls located outside their properties as it can improve the look of their property frontage.

Chicanes or Angled Slow Points (Refer photographs 5 and 6) - these are kerbed islands or kerb extensions protruding into the road leaving a gap that is angled to the centreline. If two-way flow is permitted a central median island may also be included to separate opposing traffic flows and provide greater visual restriction.

These controls can be the most difficult to locate, due to their length, without adversely affecting property access or road drainage. They also have the greatest impact on reducing the amount of on-street parking available.

Slow point (or road narrowing) - these are similar to the above except that traffic travels through the control parallel to the centreline or kerbline. The narrowing can be created by kerbside extensions or by installing a central island.

Effect on volume - can reduce volumes since they force drivers to travel more slowly. If one-way flow controls are used they can increase congestion and travel time due to inconsistent priority. The amount of reduction is largely dependant upon the type of control, the number of controls along the route and whether there are other convenient routes. The more controls there are then the greater the volume reduction is likely to be.

Effect on speed - these controls can be highly effective in reducing the 85th percentile speed. Experience has shown that a 10kph reduction may result between the controls with greater reductions being measured adjacent to the control. The extent of the reduction is dependant on the spacing between each control. Generally they should be spaced no greater than 150 metres apart. A negative effect of these controls is the challenge they can present to drivers who push themselves to maintain a constant speed throughout the street.

Effect on safety - as a result of the lower speeds and possible drop in volumes a corresponding reduction in the number and severity of accidents should be expected.

Effect on environment - because of the increased number of braking and accelerating actions induced when negotiating the control, an increase in noise levels, especially in the vicinity of the control, can be expected. This is particularly noticeable when used by heavy or commercial vehicles (including buses). The increase in noise should be less than if Raised Tables or Speed Humps were used.

Loss of on-street parking and restricted access to nearby properties can be a disadvantage when using these controls. This may require redesign and/or relocation of driveways to suit the new environment.

Photograph 5 - Chicane with two way flow

Photograph 6 - Chicane with one way flow

The kerbside islands can tend to trap rubbish and debris, often creating an untidy streetscape which has led residents living adjacent to these controls to complain.

Increased streetlighting may be required to ensure that the controls are visible at night. While this can improve street security some residents may not appreciate the increased intrusion of light into their houses.

Indicative cost - medium to high depending on the required level of landscaping, streetlighting and alterations to property access.

As with the previous type of control streets with LATM measures installed require a higher level of maintenance due to the increased stress on the road pavement and the need to maintain the devices and planting.

Gateway - physically narrows the road at or near the entrance to a local street to enhance the residential nature of the area. They make drivers aware that they are entering a street in which care is needed and are usually the first control encountered by the motorist.

They are similar to slow points as they narrow the roadway by extending the kerb or by introducing a central median island. Gateways can be positioned on the street adjacent to the intersection or along the route to indicate the start of the affected area.

Roundabouts can be used at intersections as a form of gateway treatment.

Effect on volume - used along the route they have a similar effect as slow points. Traffic volumes may be reduced when used adjacent to an intersection as they can discourage motorists entering the street unnecessarily.

Effect on speed - their main purpose is to make motorists aware that they are entering a special area and they should reduce their speed accordingly. Therefore some reduction in speed at the entrance to the effected area should occur, however they will have little effect in maintaining lower speeds along the route.

Effect on safety - they have little impact on improving safety along the route. However safety by the gateway should be improved particularly when used adjacent to an intersection.

When used at an intersection, pedestrian safety should be improved because of the lower speeds and because there is better visibility between the motorist and the pedestrian. They also reduce the width of road that a pedestrian has to cross and be in conflict with vehicles.

Effect on environment - no significant effects have been identified.

Indicative cost - medium

5 SCHEME IMPLEMENTATION PROCESS

Local Area Traffic Management schemes are generally implemented only after all other alternatives have been considered. The council must be sure that a real problem exists. The Scheme Implementation Process ensures that a systematic approach to the analysis and implementation of schemes is used and that they are identified as being the correct solution. **The process also ensures that the majority of the residents support the schemes.**

The implementation process and criteria described in this document relate to requests initiated by residents. In some circumstances, for traffic safety reasons or in conjunction with some other council road safety initiative such as the Safe Route To Schools programme, council may choose to initiate and install Local Area Traffic Management schemes without adhering to the criteria or process described below.

There are four key aspects to the implementation process:-

- Is the installation of a LATM scheme the appropriate solution?
- Is the scheme technically feasible?
- Is the proposed solution supported by the local residents and other affected parties such as bus operators, the police, emergency services etc.?
- Is the scheme sufficiently high on the priority list to obtain funding from the appropriate budget?

A process has been developed to ensure that residents' requests are investigated in a consistent manner and that appropriate schemes are put in place. The steps in the process, known as the Scheme Implementation Process, are shown on the flow chart in Appendix A and the primary steps are described below.

5.1 Step 1 - Initial Inquiry

Aim *- To provide the residents with information on the policy and implementation process.*

The need for a LATM scheme generally arises from a request by a resident or residents of a street where they perceive that the traffic characteristics of their street (i.e. volumes, speed, accident history) are making the neighbourhood an unpleasant or unsafe place to live.

Requests are normally received by council through correspondence from a resident or residents' group, submissions at Ward Committee meetings or by telephone. When a request is received a letter and flowchart detailing the procedures is sent to the applicant.

5.2 Step 2 - Initial Assessment

Aim *- To assess the merits of a request and to determine whether an LATM treatment is the appropriate solution.*

Council's Traffic Engineer considering the initial assessment criteria described later in this document will make the initial assessment. They will visit the site to determine whether the topographical and traffic characteristics of the street are suited to the installation of a LATM scheme and whether it has merit.

If the initial assessment indicates that the request may have merit it will be programmed for technical assessment as described in Step 3 of the process.

If the initial assessment indicates that a LATM scheme may not be the appropriate solution then residents concerns may be investigated and any solutions actioned under the Minor Safety Improvements category of works (refer Step 2a). Examples of these include increased signing of difficult bends, improved streetlighting to alleviate night time accidents or improving road surfaces and/or signage where accidents are occurring through drivers losing control of their vehicles. Step 2a will be carried out by council's Traffic Engineering staff if required.

5.3 Step 3 - Technical Assessment

Aim *- To undertake a technical assessment of the merits of the proposed LATM scheme, to ensure that the scheme is technically feasible and to determine the type and extent of treatment required.*

Council's Traffic Engineering staff will carry out the technical assessment. Traffic volumes, average speeds, 85th percentile speeds, traffic composition information will be gathered and the accident history researched (Note - only accidents that may have been alleviated or minimised by the proposed improvements will be considered during the investigations and subsequent priority ranking). It may also be necessary to gather information on existing travel/delay times, traffic generation characteristics from adjacent developments and use of on-street parking. This data is important to determine the severity of the problem before developing a solution and later evaluation of LATM scheme.

Initial consultation will be held with the resident who raised the issue so that the residents' concerns and local knowledge are put to their best use.

It will also investigate the effects on the neighbouring streets and determine whether the scope of the proposed solution needs to be expanded to include adjacent streets.

NOTE :- it is important to stress that this step can be costly in both financial outlay and in officer's time and, therefore all requests are collated throughout the year and investigations are initiated in July of each year depending upon the availability of resources. Part of each year's budget to implement LATM schemes may need to be set aside to investigate new requests.

Council's Traffic Engineer will undertake steps 4 to 8. Step 6B will be conducted through the Ward Committee meetings.

5.4 Step 4 - Acceptance Ranking

***Aim** - To provide a formal and consistent basis to determine whether the request meets the specified technical criteria and report the findings to the Ward and Work Operations Committee.*

The results of the investigations conducted in Step 3 will be categorised and graded depending on their severity or benefits and an Acceptance Value (A.V.) formulated. Each criteria will be graded with the most desirable features given the highest grade and the less desirable features at the lower end of the scale. The A.V. is then calculated by the addition of all the graded criteria and dividing by a constant. An A.V. greater than 1 indicates that the proposed treatment shows technical merit and should be consulted with the residents to determine whether the required level of support (75% of residents) is achieved for the proposal.

The findings of the technical assessment undertaken in Step 3 and the calculated A.V. will be reported to Ward Committee and Works Operations Committee following the completion of the investigations which will be initiated in July each year.

Should the A.V. be greater than 1 then the residents will be consulted on the proposal and if there is sufficient support the recommendation to the Ward Committee and Works Operations Committee would be that the proposal be added to the list of schemes to be implemented when funding becomes available.

If the A.V. is equal to or less than 1 then it is likely that the report would recommend that the request be considered under the Minor Safety Works category (refer Step 2a).

***It is important that residents accept the proposed LATM scheme at this stage, otherwise it is pointless for the proposal to proceed any further**.*

5.5 Step 5 - Scheme Implementation List

***Aim** - To provide a listing of all approved schemes in order of priority.*

All approved requests will be included on the Scheme Implementation List in order of their A.V. ranking.

Council officers, the Ward Committees and Works Operations Committee will review the rankings of all listed schemes each year prior to projects being considered for funding in the next year's Annual Plan. Each Ward Committee will be provided with a list of approved schemes within their particular ward.

Schemes that have been on the list for more than three years without receiving funding may be assigned a higher listing than indicated by their A.V. if the scheme is felt to have a wider benefit to the community.

NOTE :- *the inclusion of a project on the Scheme Implementation List does not guarantee that funding for that project will be allocated in subsequent Annual Plans. Budgets for each work category, including implementation of L.A.T.M schemes, are allocated during the Annual Plan process. This means that whether any scheme proceeds is dependant on its cost, its priority ranking and the level of funding available in the Annual Plan.*

5.6 Step 6 - Funds Allocated and Final Design Completed

Aim *- to complete the consultation process and finalise the detailed design for implementation.*

The Annual Plan process determines the level of funding available for L.A.T.M schemes for the following financial year. Those projects identified as having the highest priority on the Scheme Implementation List and above the funding limit will be nominated for construction during that financial year. Each Ward Committee will be advised which projects have been nominated for implementation.

Those schemes that have successfully achieved funding will proceed to the final design stage. The final design process involves procedures as indicated in steps 6, 6a, 6b and 6c of the Scheme Implementation Process (see Appendix A). The residents, Police and other affected parties will be forwarded plans of the proposed solution and invited to discuss the issues and highlight their concerns.

Once the consultation process is complete the council's Traffic Engineer will report to the Ward Committee outlining the proposed scheme, the residents' acceptance (or otherwise), identify any problems that may result from the scheme's implementation and recommend an appropriate course of action. Residents will be forwarded copies of the final plans and invited to attend the Ward Committee meeting at which the scheme will be discussed.

5.7 Step 6d - Safety Audit

Aim *- to ensure that the proposed solution meets all appropriate design standards and will not themselves become a hazard or reduce safety.*

A safety audit of the proposed scheme may be undertaken in conjunction with steps 6c and 7. The audit provides an independent check that the proposed design/scheme is safe and that nothing has been omitted that may create a problem.

5.8 Step 7 - Project Construction

Aim *- to implement the scheme.*

Once the scheme has been approved the design will be tendered and the treatment will be constructed.

5.9 Step 8 - Evaluation

Aim - *to ensure the works have been successful and to analyse the project so that the results can be applied to future schemes.*

The success of the scheme will be evaluated approximately 12 months after implementation to see if it has been successful and the initial objectives have been met. The evaluation will involve measuring of the latest traffic volumes and 85th percentile speeds. It may also involve consultation with the residents.

Accident history over the previous year will also be researched.

If the review indicates that the scheme's objectives have not been met further investigations will be carried out to identify deficiencies and recommend modifications.

Note : the evaluation process is also important as it identifies the controls and types of schemes which bring the greatest benefit so that they can then be used in future schemes.

6 POLICY STATEMENT

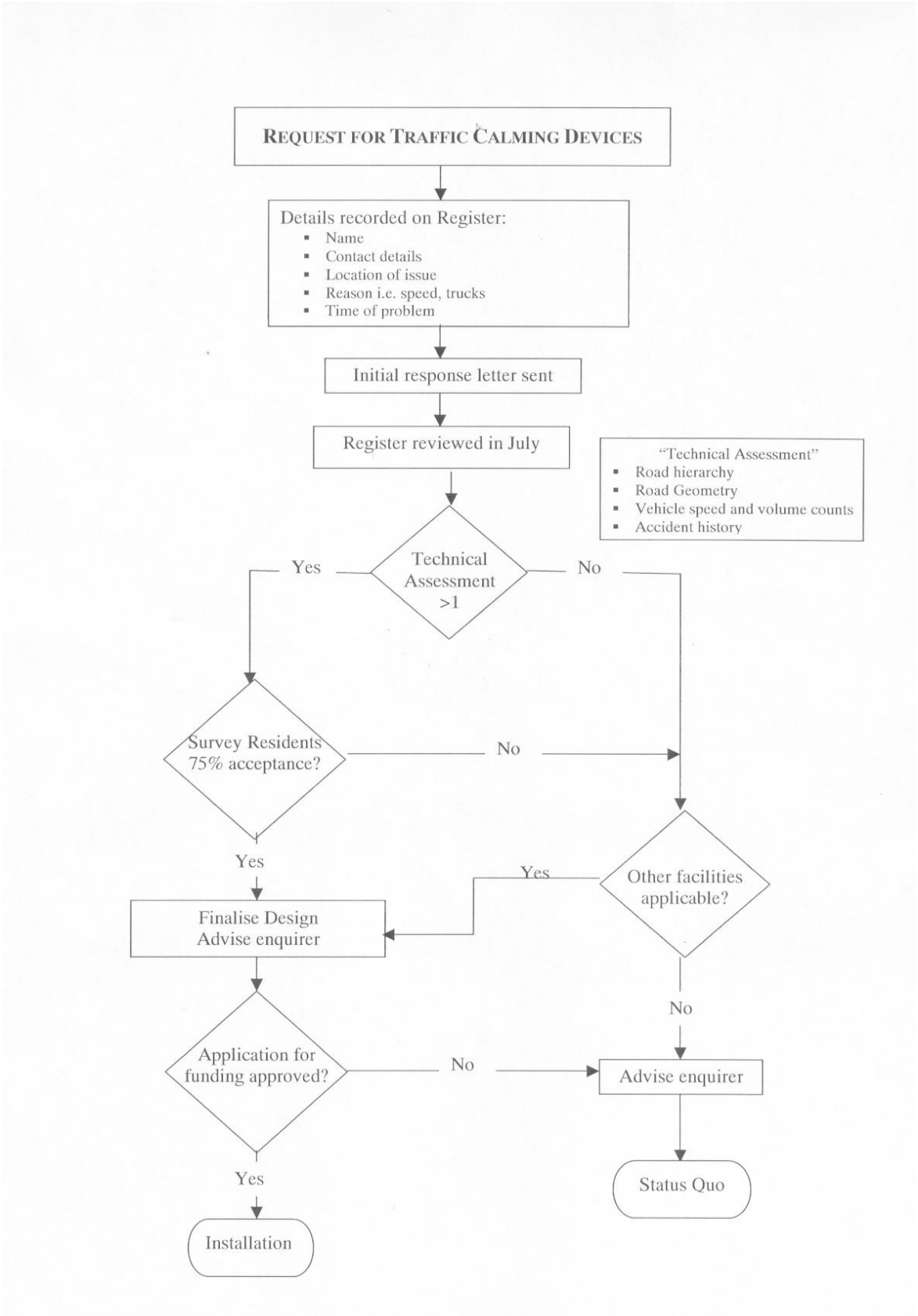
IMPLEMENTATION - Local Area Traffic Management schemes may be implemented providing there is a need and that the procedures and criteria described in this document are met.

Projects are to be implemented on a ranked basis dependant upon the availability of funds. The ranking system will give highest priority to those schemes showing the greatest benefit to the community. Rankings will be reassessed, on a yearly basis, before the presentation of the Draft Annual Plan.

FUNDING - The council may consider the provision of funds as an ongoing budget in each year's Annual Plan with funding being allocated as part of the Annual Plan budgeting process.

APPENDIX A

SCHEME IMPLEMENTATION PROCESS FLOW CHART


REQUEST FOR TRAFFIC CALMING DEVICES
Details recorded on Register:
Name
Contact details
Location of issue
Reason i.e. speed, trucks
Time of problem
Initial response letter sent
Register reviewed in July
"Technical Assessment"
Road hierarchy
Road Geometry
Vehicle speed and volume counts
Accident history
Technical Assessment >1
Yes
No
Survey Residents 75% acceptance?
No
Yes
Other facilities applicable?
Yes
Finalise Design Advise enquirer
No
Application for funding approved?
No
Advise enquirer
Yes
Status Quo
Installation

APPENDIX B

ASSESSMENT CRITERIA

INITIAL ASSESSMENT CRITERIA

These criteria are to assist council's Traffic Engineer to determine whether or not a scheme is worthy of consideration (under step 2 of the Implementation Process detailed previously).

The suitability of the street should be assessed according to the following :-

The street **should** :-

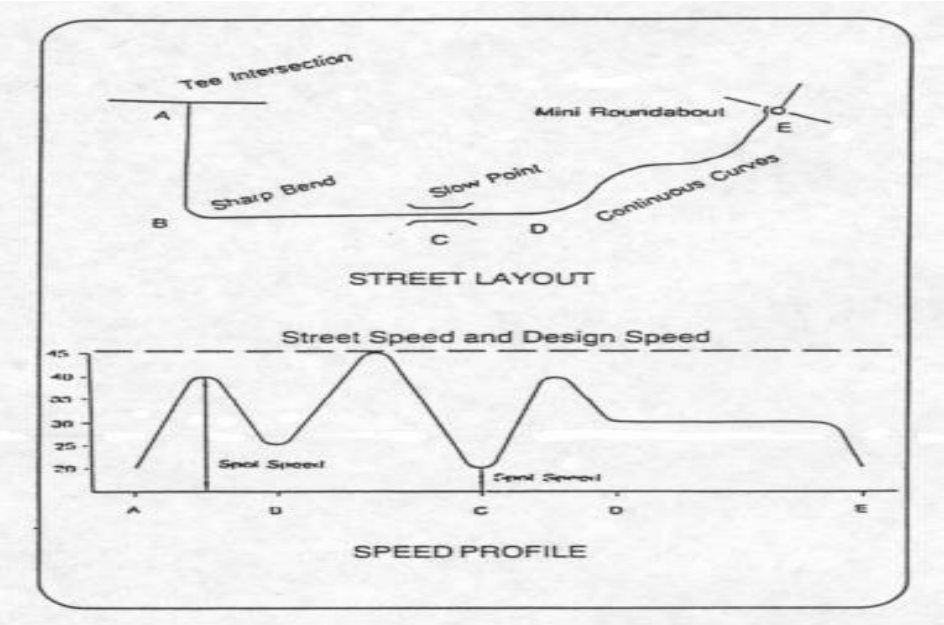
- be a local residential street
- have suitable alternative routes to absorb diverted traffic
- have the identified problem occurring along the length of the street and not at one particular location

The street **should not** :-

- require treatment over a length greater than 1km.,
- be a cul-de-sac,
- have a series of tight curves close together or be on an excessively steep slope (preferably a gradient of less than 8% (i.e. 1 in 12.5))

The initial assessment should consider the street geometry as this plays an important part in the behaviour of motorists who use that street and the speed at which they travel. Typically speed along the street will vary with the street geometry, slow at entry (i.e. adjacent to the intersection), accelerating to a maximum, then decelerating to the end of the street, intersection or tight bend.

Only on a long straight, or through a long gentle curve will the maximum speed be sustained. It is in these sections of a street that a LATM treatment will have its greatest effect. The figure below shows the relationship between the speed profile and the street geometry.



Relationship Between Street Geometry and Speed Profile

TECHNICAL ASSESSMENT CRITERIA

The following criteria are included as a guide to council engineering staff carrying out the technical assessment of a request and to ensure a consistent approach is adopted when assessing requests.

Each criteria will be graded with the most desirable features given the highest grade and the less desirable features at the lower end of the scale. An Assessment Value is then calculated using the following formula:

$$\textbf{Assessment Value (A.V.)} = \frac{\textbf{Sum of all criteria rankings}}{\textbf{K}}$$

where K is a constant number.

An A.V. of less than or equal to 1 indicates that the scheme is not technically viable. To be recommended for the next stage in the implementation process a proposal would need to obtain an A.V. of greater than 1 and achieve resident support of 75% or greater.

1 Road Hierarchy

Local Area Traffic Management schemes should only be considered for use on local residential streets.

(NOTE - Roads designated as Collector Roads in the council's District Scheme may be considered. However, the treatment is likely to be limited to gateway type controls at intersections rather than restraints positioned along the route. Roads designated as Arterial Roads will not be considered.)

Reason - Arterial and collector roads are designed to provide for the efficient movement of high volumes of through-traffic. A local road, on the other hand, is mainly to provide access to properties. Through movements may be possible on local roads but generally are not encouraged.

LATM. schemes can be particularly restrictive on emergency services reducing their speed and increasing response times. For ambulances the controls can create difficulties for the staff and their equipment as well as considerable discomfort for patients. Limiting LATM. schemes to local residential streets minimises the effect on this type of vehicle.

Hierarchy	Grade
Local	5
Collector	3
Principal	0
Arterial	0
Cul de sac	0

2 Vehicle Speeds

For a road to be treated it should have a regulatory speed of no higher than 50kph with the 85th percentile speed measured at greater than 55 kph.

Reason - Where 85th percentile speeds are less than 55kph the introduction of a LATM scheme is unlikely to have a great effect in lowering speeds or to achieve a measurable reduction may require the controls to be overly restrictive.

Roads with regulatory speeds greater than 50 kph are generally arterial or collector roads and hence, as described above, tend not to be suited for treatment.

85^{th} percentile Speed	**Rank**
> 80 km/hr	5
71 to 80 km/hr	4
66 to 70 km/hr	3
61 to 65 km/hr	2
55 to 60 km/hr	1
< 55 km/hr	0

3 Road Geometry

The road should be reasonably flat and straight with no steep gradients or sharp bends close together.

Reason - Vehicle speeds along a street will usually vary depending on the road characteristics. A wide straight road with extended visibility encourages a higher speed. On the other hand, winding and/or narrow roads tend to be treated with greater caution and lower speeds (refer Figure 2 on page 33). Because of this these types of streets are unlikely to benefit from lower speeds if a LATM scheme was introduced.

Any control or obstacle constructed must not create a safety problem. Controls should be located so that they can be clearly seen from an appropriate distance. This is to ensure that drivers have sufficient time to modify their speed or take evasive action if necessary. Appropriate sight distances can be difficult to achieve on tight winding and undulating roads as forward visibility on this type of road tends to be limited. If the control cannot be seen sufficiently in advance then motorists could cross them at speed which could result in dangerous vehicle manoeuvres and property damage.

The gradient factor can be important because heavy vehicles and vehicles towing trailers may have difficulty negotiating the hump or chicane especially if forced to stop. In addition drainage on the higher side of the controlling measure can become a problem on steep grades.

Geometry	**Rank**
Straight and level	5
Moderate curves and moderate gradient	3
Tight bends with steep gradient	0

4 Traffic Volumes

The volume of traffic using the street should not be below 1,500 vehicles per day and should generally exceed 3,000 vehicles per day and the street should not serve as a link between other important routes without alternatives being available.

Reason - Residential streets are not generally expected to carry high volumes of traffic. As volumes increase its impact increases and is noticed by the residents, with a volume of around 3,000 vehicles per day being the threshold accepted by residents.

If a street is carrying more than 3,000 vehicles per day it is important to consider its function within the adjacent road network. It may be that the road is acting as a link between two other important routes. If the surrounding road network does not readily provide alternative routes and it is important to retain the link then the installation of a LATM scheme may not be appropriate and the lower of the scores allocated to this volume would apply.

If, however, it was not considered appropriate for the street to be carrying high volumes, and alternative routes were available, then the street may benefit from a LATM scheme and the higher score would be used. This would generally be the case where the street was being used as a "rat run" to avoid congestion and delays on the major road.

Where volumes fall below 1,500 vehicles per day then it is doubtful that the size of the problem would warrant treatment.

Volume (vehicles/day)	Rank
< 1500	0
1501 to 2000	2
2001 to 2500	3
2501 to 3000	4
> 3001	0

5 Accidents

The street should have a documented accident history of a type that could benefit from a LATM scheme.

Reason - An important objective of a LATM scheme is to improve road safety by reducing the number and/or severity of accidents. Therefore the greatest benefit to the community is realised by treating locations at which accidents are known to be occurring.

Accident details and locations provide important information for the formulation and design of the appropriate treatment. If, for example, motorists are losing control, on a bend, due to high speeds then a LATM scheme may be the appropriate solution. However, if they are losing control travelling at low speeds then it may be more beneficial to improve the road surface, road lighting or signing of the bend rather than

to install an extensive LATM scheme. To ensure that crashes are current data from the preceding 5 years is used.

Crashes	Rank
Fatal crash	8
Injury crash	4
Non-injury crash	2

6 Heavy Vehicle Usage

The street should cater for a low volume of heavy or commercial vehicles and preferably not be a bus route.

Reason - The main function of a residential street is to provide access to the residential properties that front it and hence they are not designed to or expected to carry a high number of heavy vehicles.

Commercial / industrial traffic should be encouraged to use the arterial street system as their use of a residential street can create significant discomfort to residents by increasing traffic noise, vehicle exhaust fumes and vibration. If heavy vehicle use is high, it is likely that the street may be being used as a "rat run" in which case a LATM scheme may be beneficial.

LATM schemes can be particularly appropriate where the street has two distinct sections with one section catering for residential development and the other for commercial or industrial development. In these circumstances the residential section of the street may be being used as short cut to the commercial or industrial area. In these cases residents may benefit from a LATM scheme that restricts and discourages heavy vehicles using that section of the street.

LATM schemes can cause problems to bus services, providing an uncomfortable ride to passengers and causing discomfort to bus drivers, who may have to negotiate the controls several times each day. If the bus route includes several streets with traffic claming installed then an increase in journey times could be incurred which may make it difficult for economic timetables to be followed.

Traffic calming measures cause a greater restriction on public transport than for private motorists and passengers and, of course, private motorist have the option of choosing an alternative route. For these reasons the use of LATM schemes on bus routes should be discouraged.

Heavy Vehicle Volumes	Grade
High (>5%)	5
Medium	3
Low (<1%)	0

7 Road Length

LATM schemes should only be considered on streets between 250 metres and 1 km in length, while cul-de-sacs should generally not be considered.

(NOTE : on streets exceeding 1km it may be appropriate to treat only the part of the street where the problems are occurring. In these instances the problem area must be able to be clearly defined and separated from the rest of the street.)

Reason - The greater the length of street to be treated then the more controls that are required, and the more restrictions imposed on the residents. On longer streets this can create unreasonable delays and frustration for motorists who have to use the street regularly. It also can unduly affect access to emergency vehicles increasing their ability to respond quickly to an emergency situation.

Short roads or a cul-de-sac type streets are not considered appropriate for LATM schemes as due to their short length it can be difficult to locate controls. These types of street are self enforcing as they normally have narrow roads widths and their length does not encourage high speeds.

This type of street may, however, benefit from a gateway treatment at the intersection.

Length	**Grade**
250m to 500m	5
500m to 750m	3
<250m or >1000	0

8 Resident Support

While the street may not meet all of the above criteria it ***must*** meet the requirement of obtaining at least ***75% resident support*** to be recommended for further investigation. A survey of the effected residents is undertaken to gauge the level of support for the installation of traffic calming devices.

A high level of residents support is essential because residents themselves have to live with reduced on-street parking, increased travel times, increase in noise and changes to access. It is important at this stage for residents to understand and accept that while there are advantages to be gained by the installation of a LATM scheme, there are also disadvantages. The impact is especially felt by those residents who have controls installed outside their properties.

If residents cannot accept the advantages and disadvantages at an early stage then it is unlikely that they will accept the final scheme. Without their support the scheme simply will not succeed.

Residents must also accept that a control may be located outside their own property.

APPENDIX C

BIBLIOGRAPHY

- Austroads (Part 10) - Guide to Traffic Engineering Practice - Local Area Traffic Management.

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- Land Transport Safety Authority (formerly Road Transport Division - Ministry of Transport) - Traffic Engineering Information Bulletin - Guidelines for the Use and Construction of Speed Control Humps 1987.

- City of Bellevue (USA) - Pubic Works Department, Transportation Division / Traffic Engineering Section - Neighbourhood Traffic Control Programme.

- The Institute of Municipal Engineering Australia, Queensland Division - Queensland Streets - Design Guidelines for Subdivisional Streetworks.