

CITY OF BURNABY

TRAFFIC AND TRANSPORTATION COMMITTEE
(TRAFFIC SAFETY DIVISION)

HIS WORSHIP, THE MAYOR
AND COUNCILLORS

A. THE SPEED LIMIT ALONG MARINE WAY

RECOMMENDATION:

1. THAT the Ministry of Transportation and Highways be requested to consider:
 - i) lowering the speed limit on Marine Way to 70 Km/hr.
 - ii) signalizing the Nelson Avenue/Marine Way and Greenall Avenue/Marine Way intersections.
 - iii) improving the lighting on Marine Way.
 - iv) installing a median barrier along Marine Way.

R E P O R T

At the regular Council Meeting held on 1992 November 02, Council received the attached staff report (Appendix 1) prepared in response to concerns expressed with regard to the speed limit along Marine Way.

Upon consideration of the staff report, Council referred same to the Traffic and Transportation Committee, Traffic Safety Division for review.

The Traffic Safety Division, at its meeting held on 1993 January 05, directed that the Ministry of Transportation and Highways be requested to consider lowering the speed limit on Marine Way to 70 Km/hr as well as signalizing the Nelson Avenue/Marine Way and Greenall Avenue/Marine Way intersections. The Committee further requested that the Ministry consider installing a median barrier and improving the lighting along Marine Way.

: COPY - CITY MANAGER
- DIRECTOR ENGINEERING
- DIRECTOR PLANNING & BUILDING

B. PROPOSED STOP SIGN CONTROL SCHEME IN THE AREA BOUNDED BY WILLINGDON, PARKER, DELTA AND HASTINGS.

RECOMMENDATIONS:

1. THAT the proposed stop sign control scheme in the area bounded by Willingdon, Parker, Delta and Hastings be implemented.
2. THAT staff review this area after one year to determine its effectiveness.

The Assistant Director Engineering - Traffic and Engineering Systems submitted the following report to the Committee:

R E P O R T

"A report dated 1992 October 22 was received responding to concerns of traffic accident frequency at the Beta Avenue/Frances Street intersection. Staff reviewed this intersection for warrants for stop sign installation but the warrants could not be met at that time. However, staff also reviewed other intersections in the area and noted that there are problems at the grid street intersections in this area. As a result, the Committee requested that staff prepare a scheme of alternating stop signs for the grid streets in the neighbourhood bounded by Willingdon, Parker, Delta and Hastings, and to poll the affected area to determine the level of acceptance.

Staff delivered approximately 610 questionnaires (see attached Appendix 2) in the neighbourhood and have received an overwhelming response in favour of the installation of the stop sign control scheme. After one week of responses, the results were as follows:

'I would be IN FAVOUR of the proposed stop sign control scheme'... 241

'I would NOT BE IN FAVOUR of the proposed stop sign control scheme'... 7

Most residents who appended comments were concerned about the increase of speeding 'through' traffic in their residential neighbourhood, the increase of traffic accidents at uncontrolled intersections, and applauded the initiative.

Accordingly, staff recommends that the implementation of the stop sign control scheme start as soon as possible. We expect that speed and accidents will be reduced as will the extraneous traffic but staff will review this area after one year to determine the scheme's effectiveness."

C. TRAFFIC SIGNAL AT RUMBLE AND MACPHERSON

RECOMMENDATIONS:

1. THAT a pedestrian signal be installed at the intersection of MacPherson and Rumble at an estimated cost of \$70,000.
2. THAT Mr. Ron Lowe of the Burnaby South - Jericho Hill Parent Advisory Committee be sent a copy of this report.

The Assistant Director Engineering - Traffic and Engineering Systems submitted the following report to the Committee:

R E P O R T

"The issue of signalization of the subject intersection was dealt with in a previous report to the Committee, appearing on the agenda for the 1992 June 02 meeting. This report concluded that a signal would be desirable and would be prioritized with other emergent 1993 projects subject to budget approval. Potential projects for 1993 have now been set and \$70,000 has been included in the 1993 Traffic Management Budget for the installation of this pedestrian signal. This project will be treated as one of our top priorities and will be started immediately upon budget approval. Completion is anticipated to be in late spring of 1993."

D. NORTHBOUND HYTHE, FAR SIDE EMPIRE DRIVE
BUS STOP RELOCATION

RECOMMENDATION:

1. THAT the northbound Hythe, farside Empire Drive bus stop relocation be approved as outlined in the following report.

The Assistant Director Engineering - Traffic and Engineering Systems submitted the following report to the Committee:

R E P O R T

"In previous correspondence, B.C. Transit had requested a 26m extension to the bus zone at this location citing difficulties in maneuvering the left turn from Empire due to the construction of a traffic island. Transit felt this relocation necessary to allow the bus adequate distance in which to pull parallel to the curb. This would result in a safe, level passenger landing area and free flow of through traffic on Hythe Avenue. This item was brought forward to the Committee and was subsequently sent back to staff for further review.

The figure provided, 26m, was also to allow the bus to fully pass a driveway to a property on Hythe Avenue. Since the original request this lot has redeveloped and the driveway is now redundant and will be removed. This will result in a shorter overall bus zone by approximately 6m.

Discussions on the final location of this stop have been ongoing for some time, the issue should be resolved. To summarize, B.C. Transit feels that this stop is required as part of their transit plan. We support this, as do several area residents who have contacted us stating such. This was an existing bus stop location. Due to intersection roadworks at Empire and Hythe it was made less accessible and consequently less safe. Transit and ourselves wish to alleviate this concern. A slight relocation of the stop and extension to the bus zone will accomplish this. We have attempted to impose on any on-street parking as little as possible and with the pending removal of a redundant driveway crossing we have lessened the zone an additional 6m."

E. NORTHBOUND WILLINGDON AVENUE, FAR SIDE NAPIER STREET BUS STOP RELOCATION

RECOMMENDATION:

1. THAT the northbound Willingdon Avenue, farside Napier Street bus stop relocation be approved as outlined in the following report.

The Assistant Director Engineering - Traffic and Engineering Systems submitted the following report to the Committee:

R E P O R T

"B.C. Transit has requested the relocation of this bus stop to the farside of Parker Street. This will allow users to take advantage of the signal control at Parker Street for pedestrian crossing, and with the new ramps and wheelchair pad allow wheelchair accessibility.

Again, the affected resident has been notified. It should be noted that parking is not an issue as it is not permitted now."

F. RESIDENT ONLY PARKING

RECOMMENDATION:

1. THIS is for the information of Council.

The Assistant Director Engineering - Traffic and Engineering Systems submitted the following report to the Committee:

R E P O R T

"BACKGROUND

At its last meeting the Committee, reflecting the concern of the Chair, recommended 'that staff report on the feasibility of resident only parking on the south side of 4400 block Irmin Street'.

Previously, in 1992 April a resident of 4400 block Irmin St. wrote to the Director Engineering requesting a 'residents only' parking zone on her block. Accompanying the letter, was a petition signed by other residents of the same block. This request was precipitated by a seeming lack of available on-street parking for residents because of an increase in demand for parking by vehicles belonging to employees of and visitors to St. Michael's Centre (7451 Sussex Ave.).

In June 1992, Engineering Department staff wrote to Mr. Paul Jemson of St. Michael's Centre, requesting that whenever possible their staff utilize on-site parking facilities rather than street parking. Mr. Jemson was also informed of the 3 Hour Parking Bylaw which states '... No person shall, between the hours of 8:00 a.m. and 6:00 p.m., park any vehicle on any street abutting any premises used for residential or commercial purpose for more than 3 hours unless such premises are the property or residence of such person or the property of his employer. ...'.

The complainant's letter also suggested that the opening of the South Slope Elementary School at 4446 Watling St. will increase the demand for street parking. Parking in the area adjacent to the school has been restricted, but for the most part, these regulations are only in effect between 8 a.m. and 5 p.m. on school days. Although this may exacerbate the perceived parking problem during those hours, the overall effect on residents should be minimal.

A written response was forwarded to Ms. Gisela Wilhelm, the resident who had initially complained, outlining the 3 Hour Bylaw and informing her that officials of St. Michael's Centre had been contacted. A suggestion was made that the residents may desire a time limit on parking between 7 a.m. and 6 p.m. It was explained that these regulations would also pertain to residents.

SUMMARY

Several staff members of the Traffic Division have been in contact with Ms. Wilhelm of 4400 block Irmin regarding her concerns and outlining available options.

Either enforcement of the 3 Hour Bylaw or a time-limited parking zone should be sufficient regulation to ameliorate the concerns which Ms. Wilhelm has raised. Our most recent site visits have not indicated an obvious problem. In conclusion, we would not recommend a review of the present policy concerning 'resident only' parking without direction from Burnaby Council."

G. PEDESTRIAN CROSSING OF CANADA WAY AT HARDWICK STREET

RECOMMENDATIONS:

1. THAT Council approve the installation of a pedestrian operated signal on Canada Way at Hardwick Street.
2. THAT a copy of the report be sent to those who have corresponded on this matter.

The Assistant Director Engineering - Traffic and Engineering Systems submitted the following report to the Committee.

R E P O R T

"1.0 INTRODUCTION/BACKGROUND

At its last meeting, the Committee received a 341 signature petition requesting a crosswalk on Canada Way 'at approximately Fulwell Street'. Prior to that staff had commenced a review of pedestrian crossing requirements which had been accelerated as a result of a letter from the Canada Way Education Centre. As a result the petition was also referred to staff for review. We note that there are no marked pedestrian crosswalks along Canada Way between the signals at Beta and Douglas Road. As shown in the attached sketch (Appendix 3) the alignment of Canada Way in this reach presents special visibility factors for drivers and pedestrians.

2.0 INVESTIGATION

Canada Way is a 4 lane primary arterial which falls under City jurisdiction west of Kensington. This section of Canada Way has a north/south alignment coincident with the extension of the Royal Oak Avenue right-of-way. Canada Way is also a bus route.

Staff obtained traffic counts for Canada Way from Royal Oak Avenue to Westminster Avenue, conducted manual pedestrian counts and noted casual observations at this location.

2.1 Pedestrian Volumes

Pedestrian volume data was gathered during the peak hours on 1992 April 29. Volumes crossing Canada Way were as follows:

Observed Pedestrian Crossings of Canada Way

<u>Time</u>	<u>Fulwell St</u>	<u>Hardwick</u>	<u>Woodsworth</u>	<u>Total</u>
7:00am-9:00am	0	12	0	12
11:00am-1:00pm*	10	8	6	24
4:00pm-6:00pm	1	7	12	20

*See diagram attached as APPENDIX 3

2.2 Traffic Volumes on Canada Way

The following table shows previous recent demand samples:

Vehicle Volumes on Canada Way (Royal Oak Ave to Westminster Ave)
(Average Weekday Total)

<u>Volume by Direction</u>			
<u>East</u>	<u>West</u>	<u>Both</u>	<u>Date</u>
11,053	11,354	22,407	89/06/01
10,819	11,544	22,363	89/06/31
	10,724		87/11/24

2.3 Accident History

The table below shows the recent accident history of the area for the proposed pedestrian traffic signal.

<u>Intersection</u>	<u>Occurrences</u>		
	<u>1991</u>	<u>1990</u>	<u>1989</u>
Canada Way/Fulwell St	0	1	2
Canada Way/Hardwick St	2	2	4
Canada Way/Woodsworth St	-	-	-

None of the intersection accidents recorded in the past 3 years at these intersections includes pedestrians. There would appear to be no significant accident problem at Woodsworth Street but it is difficult to desegregate occurrences at Woodsworth Street/Canada Way from the more significant vehicular accident history at Canada Way/Royal Oak Avenue by the cemetery entrance.

3.0 PEDESTRIAN PROTECTION

Warrants for pedestrian crossings are currently under development, however, using the guidelines set out by the Ministry of Transportation & Highways for child pedestrian crossings, the number of crossing opportunities per hour is estimated to be only between 10 and 25.

While not directly applicable in this case, the Ministry of Transportation & Highways guidelines for school crosswalks states:

'At this level of conflict, the use of a grade separated crossing should be considered for wider roadways of four lanes and up. Again, investigation is needed to determine the amount of pedestrian need for this work.'

Recent draft Transportation Association of Canada warrants suggest that the minimum crosswalk protection given the number of crossing opportunities and (weighted) pedestrian counts should be a special crosswalk (such as the one we have at the Royal Oak SkyTrain station).

While we are not wholly satisfied with the level of driver and pedestrian understanding the following special considerations have lead us to conclude that a higher level of protection is required.

1. The combination of limited crossing opportunities, relatively high vehicle speeds and limited visibility.

2. The special needs of pedestrians in this area. The Burnaby School Board operates an alternative education program (for at risk teenagers) and a dental clinic from the Canada Way Education Centre on Woodsworth. We also understand that neighbouring school properties are used by the Burnaby Association for the Mentally Handicapped to provide a group home, sheltered workshop and daycare.
3. The users of the special facilities listed above typically travel by bus and hence have to cross Canada Way on at least one leg of their journey. The same applies to cemetery visitors, who are often seniors. The bus stops in this stretch of Canada Way are located immediately north of Hardwick (the eastbound bus stops nearside Hardwick). Because Hardwick is situated at the midpoint of the target section of Canada Way it is also a logical crosswalk location although driver visibility requirements still dictate a need for advance warning flashers.

Staff gave serious consideration to integrating pedestrian signal with a full signal at the junction of Canada Way and Royal Oak but concluded that pedestrians would not be as well served as with a signal at Hardwick. While ultimately we expect that the Canada Way/Royal Oak intersection will be signalized the improvement to the intersection will require substantial right-of-way acquisition and reconstruction. Costs of this have not been estimated or included in the Capital Budget.

5.0 CONCLUSION

Due to the heavy traffic flow and consequent low number of crossing opportunities, the unique user profile, and the geometry of this section of Canada Way, a signal controlled pedestrian crossing is recommended. The proposed location of the crossing is on Canada Way at Hardwick Street due to the roadway geometrics and demand pattern. Additionally, we have the expectation that any future vehicle activated signal at a reconfigured Royal Oak Avenue intersection would not render a signal at Hardwick redundant (see pedestrian count diagrams). The signal is estimated to cost \$70,000. Funding for installation has been included in the 1993 Capital Budget for Traffic Management."

H. TRAFFIC CALMING

RECOMMENDATIONS:

1. THAT lane narrowing, using pavement marking, be tried on an expermental basis on the Bond/Nelson collector between Willingdon and Grange and the Burke Street collector between Willingdon and Patterson subject to resident concurrence.
2. THAT staff develop and test a prototype local residential street road hump program, based on resident initiative and funding.

The Assistant Director Engineering - Traffic and Engineering Systems submitted the following report to the Committee:

R E P O R T

"With increasing traffic due to local and regional growth the traffic problems on local residential streets have grown. While traffic volumes are often perceived as the problem by residents the indication also is that vehicle speeds are a major issue. Staff have reviewed the literature regarding management of local street traffic - traffic calming. It is clear that there is a paucity of North American experience and arguably the Vancouver Metropolitan area is more advanced than most cities in the application of devices such as road closures, diverters, roundabouts and the like.

The attached discussion paper (APPENDIX 4) reviews some of the devices available particularly in a local context. Notwithstanding economic constraints that limit the opportunity for more resource intensive initiatives at this time there is scope for testing and evaluating potentially cost effective solutions. We note that in a companion report (Item B) there is a recommendation for conversion of courtesy corners to stop sign control for the area bounded by Delta, Hastings, Willingdon and Parker. This initiative if approved will be evaluated after one year.

This report, on the basis of the attached review (APPENDIX 4), recommends definition and testing of a pavement undulation prototype program. This initiative would be modelled on our very successful lane speed bump program, which relies on resident initiative and funding. It would be important to obtain input from the emergency services during the prototype testing process.

In addition to the lane control/markings recently implemented on Parker at Holdom, we are also proposing using lane lining/edge marking along the Burke Street and Bond/Nelson local collectors which have been the subject of some resident anxiety in recent years. There would be data gathered before and after implementation of these experimental programs including a post implementation survey of residents' satisfaction."

MEMBERS:

Respectfully submitted,

Mr. D. Rankin
Mr. W.B. Bennett
Mr. M. Bloomfield
Mrs. L. Brown
Mrs. M. Canessa
Mrs. G. Evans
Mr. T. Hulme
Mr. E. Fourchalk
Mr. D. Ramsbotham
Mr. W.B. Roxburgh
Mr. R. Weston

Councillor J. Young
Chairman

Councillor D. Evans
Member

Councillor D. Lawson
Member

Councillor C. Redman
Member

ITEM	2
MANAGER'S REPORT NO.	68
COUNCIL MEETING	92/11/02

TO: CITY MANAGER

DATE: 1992 10 27

FROM: DIRECTOR ENGINEERING

FILE: 55-01-04

SUBJECT: THE SPEED LIMIT ALONG MARINE WAY

PURPOSE: To respond to Council's request for a staff report outlining the background to the speed limit on Marine Way.

RECOMMENDATION:

1. THAT a copy of this report be sent to Wm. Baker, District Highways Manager, Ministry of Transportation & Highways.


REPORT

At its meeting of 1992 September 28, Council requested "that staff prepare a report providing the rationale for the increase in the speed limit on Marine Way from 70 km per hour to 80 km per hour".

For most of its length in Burnaby Marine Way has a posted maximum speed limit of 80 km per hour (50 mph). West of Greenall the speed limit transitions to 50 km per hour (30 mph), the urban limit which is in effect in Vancouver.

The speed limit was recently raised to 80 km per hour from 70 km per hour. That change had originally been proposed by the Ministry of Transportation & Highways in 1985 but was deferred at Burnaby's request pending implementation of the signal at Byrne Road. It is our understanding that the choice of speed limit reflects consideration of safety relative to factors such as road standard, access, setting, traffic mix, user behaviour, etc. MOTHS staff further advise "that the Ministry's Highway Safety Branch reviewed the accident history of Marine Way and found that the accident frequency and severity was below typical rates.". The 80 km per hour limit is not considered atypical for a highway in this setting.

It is recommended that a copy of this report be sent to Wm. Baker, District Highways Manager, Ministry of Transportation & Highways.


DIRECTOR ENGINEERING

Residents of Burnaby Within the Neighbourhood Bounded by Willingdon, Parker, Delta, Hastings

Dear Resident:

Re: Proposed Stop Sign Control Scheme

At its last meeting the Burnaby Traffic Safety Committee received a staff report regarding safety concerns at the Beta/Francis intersection.

"Arising from the discussion of the report, the Committee requested that staff prepare a scheme of alternating stop signs for the grid streets in the neighbourhood bounded by Willingdon, Parker, Delta and Hastings. The Committee also requested that residents in the area be polled to determine the level of acceptance for the scheme."

The enclosed diagram represents a scheme which we believe is responsive to the direction of the Committee and addresses the concerns voiced by a number of people in the neighbourhood. You will note that by placement of stop signs at every intersection the "courtesy corner" priority of movement will be redefined. The stop priority is alternated along each road in order to deter "through" traffic by requiring vehicles to stop at least every second block. If implemented the scheme would be reviewed after one year to determine its effectiveness.

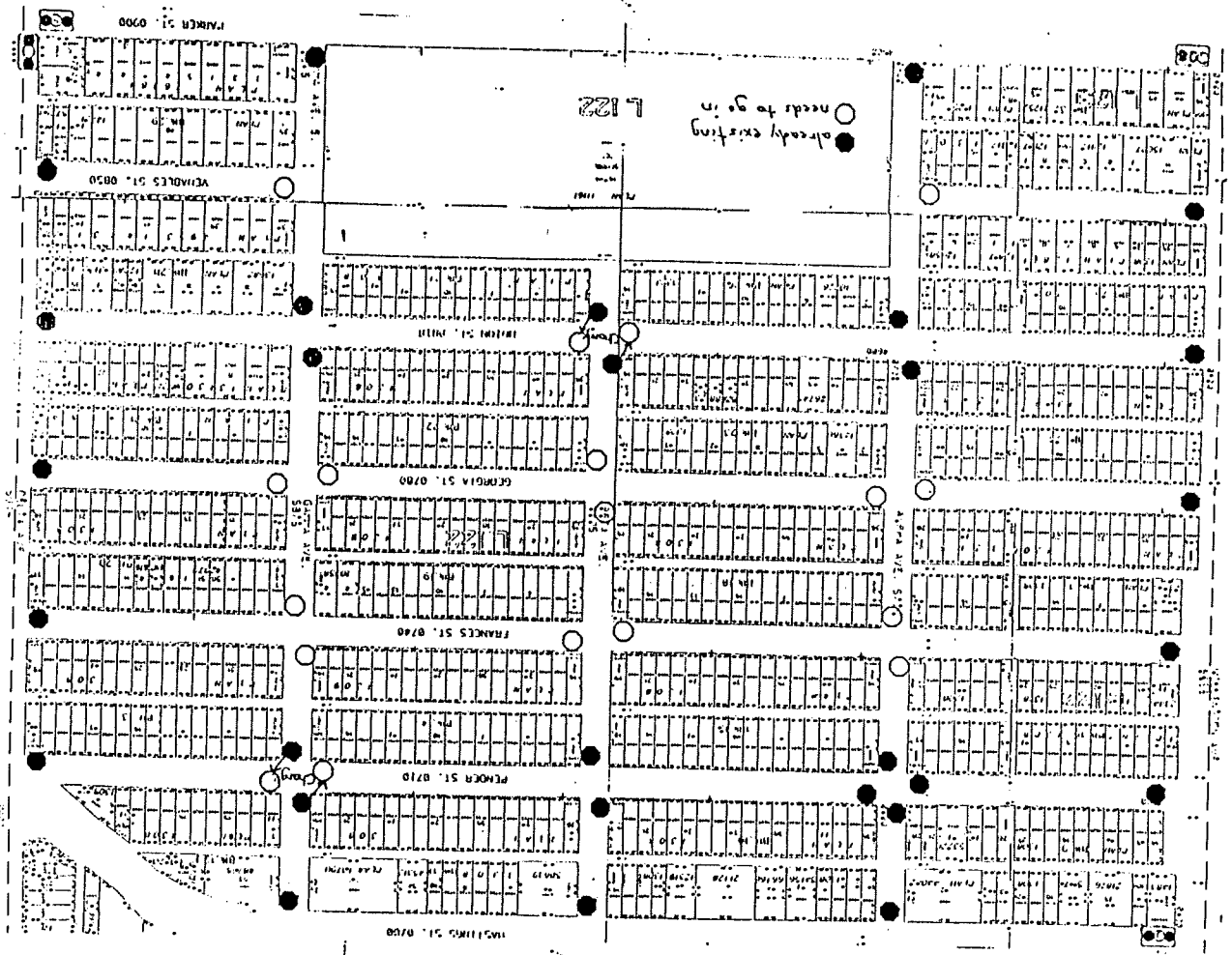
The Committee and ourselves feel residential input is imperative before implementing any scheme and accordingly, we would like to know your thoughts and receive your comments on this proposal. Please return this questionnaire in the addressed envelope provided as soon as possible. If you have any further questions, please contact Ernie Jensen or Sheryl Pordan of the Engineering Department at 294.7440.

Yours truly,

W. C. Sinclair, P. Eng.
DIRECTOR ENGINEERING

[Handwritten Signature]

by: P. Liivapagi, P. Eng.
ASST. DIRECTOR ENGINEERING,
TRAFFIC & ENG. SYSTEMS



PL:jb

I would be IN FAVOUR of the proposed stop sign scheme.

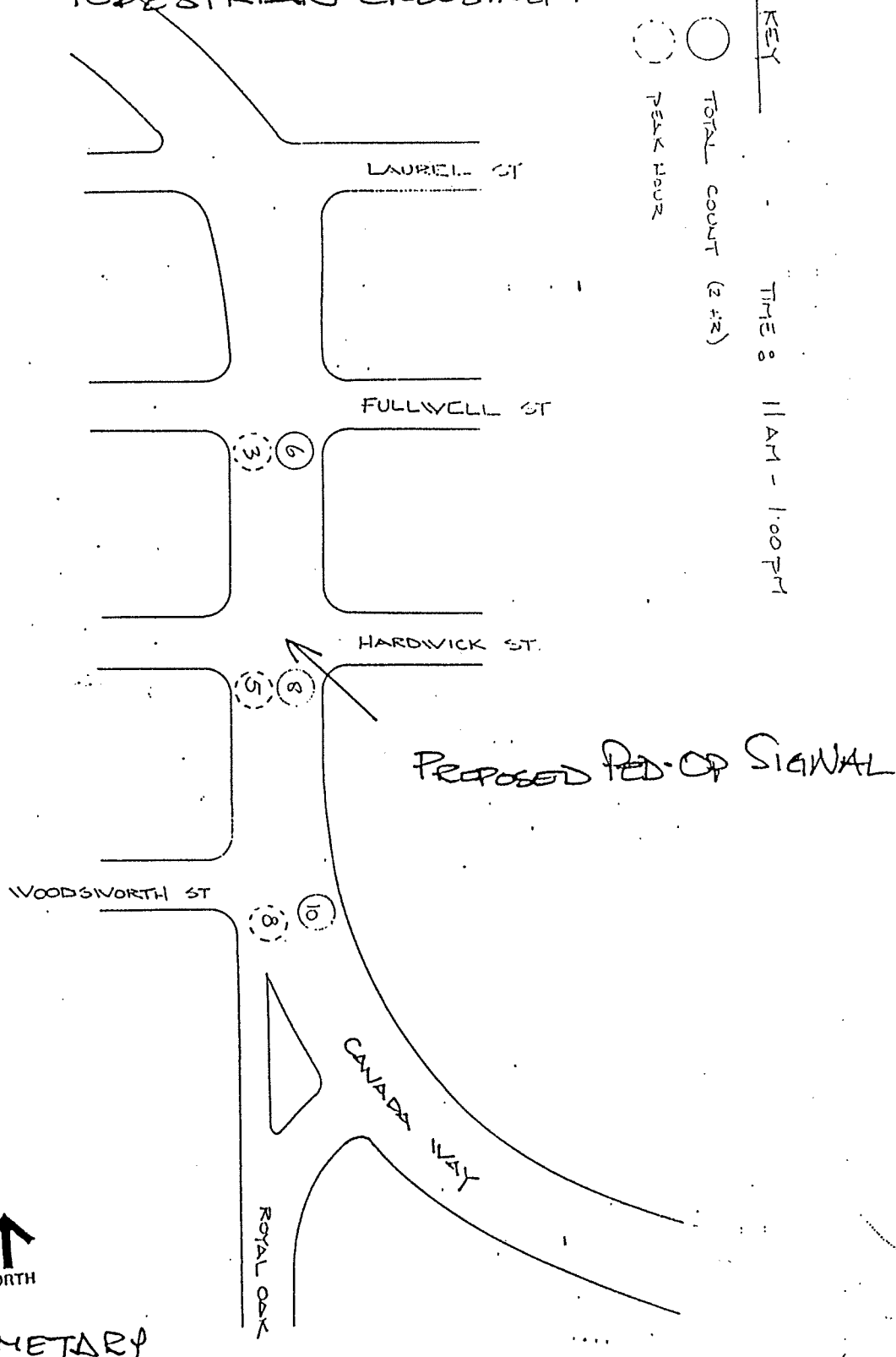
I would NOT BE IN FAVOUR of the proposed stop sign scheme.

NAME: _____

ADDRESS: _____

CANADA WAY IN THE VICINITY OF HARDWICK

PEDESTRIAN CROSSING DATA



TRAFFIC CALMING: A DISCUSSION PAPER

1.0 BACKGROUND

Traffic Calming is a new name for the older objective of subjugating the automobile to enhance and maintain the livability of residential areas. Rooted in European cities, the concept of neighbourhood protection from extraneous traffic has been an integral component of Burnaby's adopted transportation policies since 1979. In the early 1980's, draft terms of reference for a participatory process for implementing residential neighbourhood protection were adopted in principal by the Transportation Committee but never applied. However, the slant of traffic calming, as considered in this report, differs from the previous neighbourhood protection initiatives. Those initiatives tended to focus on limiting through traffic. This report on traffic calming is more directed toward reducing speed to enhance safety; but hopefully reducing through traffic as by-product.

This background paper briefly examines the various devices available for traffic calming in the context of Burnaby, outlines issues of cost, and outlines the potential for funding programs.

2.0 TRAFFIC CALMING MEASURES

There is an array of measures that have been used for neighbourhood traffic calming. Some are illustrated in a copy of the attached leaflet published by the U.K. government. The devices used represent a range of intervention and their applicability individually or in concert would vary from case to case. There is no question that the more draconian measures, which force changes on intra-neighbourhood travel patterns such as road closures or diverters, would require a more intensive implementation process. There would have to be a thorough data gathering exercise to confirm existing perceptions of traffic and to estimate the ramification of the changes to be deployed. Similarly the public consultation process would have to be well managed in order to allow for both meaningful and equitable participation.

Our comments with regard to some of the less draconian neighbourhood traffic calming measures are below.

TRAFFIC CALMING: A DISCUSSION PAPER (Cont.)

2.1 Traffic Circles

Traffic circles were recently installed on Lakefield Drive where they have been subject to mixed reviews by the residents. In retrospect, it would appear that this device is better suited to grid street intersections rather than T junctions as on Lakefield Drive. Both the cities of New Westminster and Vancouver have installed traffic circles in specific areas with some apparent success. Seattle uses traffic circles at individual intersections as part of its neighbourhood traffic control program. There the installation procedure is initiated by petition. Intersections are then point rated on the basis of accident history, traffic demand, and traffic speed. Low rated intersections are not considered eligible for the limited fund pool. Typically, the process takes 6-18 months. Seattle City Engineering Department views the traffic circle program an operational success, at least in part because it has reduced the demand for unwarranted 4-way stop sign control.

One of our major concerns is that traffic circles are not well understood by North American motorists and the courtesy corner ambiguity which results in right angle collisions is not necessarily alleviated. This could be mitigated by forcing traffic entering the circle to yield to traffic in the roundabout as occurs in Europe. This would result in a free flow intersection - once motorists learned - but this objective is counter to the North American rationale for installing them.

2.2 Speed Limits and Other Regulations

It would appear that the City could designate a lower speed limit on some or all residential streets. However, we do not believe that enforcement of such a measure is practicable. Indeed part of the current problem in neighbourhoods is that existing speed limits are not obeyed. That is why European jurisdictions which have implemented lower speeds in neighbourhoods rely on some of the other devices discussed here. Other regulatory signs such as turn prohibitions should ideally include some element of self regulation.

Stop sign control of all intersections in a residential area would seem to have considerable popular appeal. While this is not general practice in B.C., it is the norm in other urban jurisdictions. While we are concerned with deviating from local practice, we believe that traffic safety would not be adversely affected.

We continue to have concern with the misapplication of 4-way stops which are generally regarded as a notch below a traffic signal as a control device. The proliferation of 4-way stops at low volume intersections where they are not warranted by any accident history will undoubtedly, over time, erode the credibility and safety of this control.

TRAFFIC CALMING: A DISCUSSION PAPER (Cont.)

2.3 Chicanes, Constrictors, Etc.

Chicanes, constrictors, etc. are uncommon in North American applications but are extensively used elsewhere. In particular, road constrictions at pedestrian crosswalks, including those at intersections, would appear to be a useful device both for protecting pedestrians and slowing down approaching vehicles. A significant constraint to retrofitting these type of measures is the need to accommodate existing drainage a particular problem in our climate.

2.4 Pavement Undulations

Pavement undulations or road humps have a longer profile than the shorter more abrupt speed bumps that the City currently installs in our lanes as a residential initiative. Road humps are popular in Australia and Europe but have not found a significant following in North American traffic engineering practice. We note that there is a traffic calming initiative using road humps in New Westminster. Our understanding is that the early indications are that the New Westminster initiative has been a success. We patterned our North Fraser Way pavement undulations after the design used in New Westminster except that one of the five bumps was installed at three inches high rather than four. In retrospect, we believe that the lower hump profile would have sufficed in fulfilling the objective of eliminating drag racing. Even the lower profile hump however has a significant impact on vehicle speeds, especially trucks. This is a particular concern for emergency services.

2.5 Pavement Markings

Pavement markings are generally not used on residential streets but appear to offer some opportunity for slowing down traffic on local collector streets where the initiatives discussed above are generally not recommended. The Burnaby local collector standards is 36 ft (11m) curb to curb normally with a painted solid centre line. This width allows for one moving lane of traffic per direction with parking on either side. With no on-street parking there is no side "friction" and moving vehicles have an exceedingly generous through lane. We have recently installed parking stall markings on Parker at Holdom to better define the moving lane but there is the possibility of edge lining the moving lane to create a similar effect. Such marking may also improve cyclist safety on collector streets.

TRAFFIC CALMING: A DISCUSSION PAPER (Cont.)

3.0 COSTS

The traffic calming measures discussed in this report come at an expense; both in terms of the initial cost of installation and in subsequent years of maintenance. The former is a capital cost and the latter impacts the annual operating budget. Any program to implement traffic calming measures should address both costs, as typically, operating cost implications are often overlooked after capital costs have been met. If the City is to embark on a comprehensive traffic calming program the costs of doing so must be explicitly estimated and budgeted for.

3.1 Capital Costs

The capital costs of traffic calming measures can vary significantly. Obviously the cost of an individual feature such as a road closure and cul-de-sac is conditioned by the choice of materials, landscaping and so on, but the requirement to relocate or modify existing infrastructure or acquire right-of-way can significantly escalate the cost of any design. For example, our experience with roundabout installations on Lakefield Drive indicates a unit cost of \$8,500 while road humps would typically cost slightly over \$1,000 each. Harder to estimate are "custom" installations such as road closures, constrictions, chicanes, etc. We note that the Maywood/Patterson cul-de-sac, which is not an atypical installation, cost just under \$30,000.

3.2 Administration

Comprehensive neighbourhood protection programs are rich in public participation, which if it is to be done well requires a significant staff resource commitment. Less visibly staff resources are required to collect and analyze data, design improvements and administer implementation.

For less complex traffic calming schemes where the focus is on reducing traffic speeds and the options are well defined the public consultation process can be more truncated. For example, a mail back questionnaire could well be sufficient to establish whether there is a consensus.

However, even a mail back questionnaire requires administrative resources. The resource consumption would increase, potentially significantly if the administrative procedure required is cumbersome. This is inherent in any formal Local Improvement Program (LIP) as well as any program that requires extensive data acquisition to establish "warrants" or implementation priority.

TRAFFIC CALMING: A DISCUSSION PAPER (Cont.)

3.3 Operating Costs

Operating costs for individual schemes would appear to be marginal but on aggregate will generate an increasing demand on the budget. Hard items such as curb work should require little maintenance but items such as landscaping and road marking paint will require annual attention. Signs and thermoplastic road markings in residential areas can be expected to last 5 to 10 years before requiring renewal unless damaged in the interim. However, the current rate of accumulation of "stock" is already stressing the operational and administrative resources of the City.

3.4 Externalities

Traffic calming and neighbourhood protection schemes will also have a cumulative impact on emergency services response rates particularly the Fire Department and ambulance service and will undoubtedly hasten the acceleration of road congestion and pollution. Snow plowing would be impracticable with traffic calming devices such as pavement undulations, traffic circles, etc. However, this would not necessarily be a hardship as, in most instances, the local residential streets where the measures would be implemented are low in priority for plowing.

Presumably these external costs will be offset by the tangible and intangible benefits that accrue to the residents. There is also a question of liability exposure but we note that traffic calming measures such as the ones discussed have been implemented elsewhere. Obviously the design and signing must be appropriate.

4.0 FUNDING

Unless the traffic calming program supplants an existing service, it will be an additional draw on the tax dollar. The tax impact could be somewhat mitigated if alternate funding were employed for at least some of the "front-end" costs. A logical source of funding is the benefitting group (ie. the neighbourhood residents).

4.1 Willingness to Pay

Arguably there are two related advantages to this "user pay" concept. First, if neighbourhood traffic improvements were offered as a free good, then potentially every neighbourhood would want to be included, and the list of waiting neighbourhoods would be a lengthy one. The City would inevitably have to "ration" schemes and this would require establishment of a program of data acquisition and assessment to ensure that the most "needed" schemes were done

TRAFFIC CALMING: A DISCUSSION PAPER (Cont.)

first. Second, the impact of traffic is as much perceptual as it is actual. The willingness to pay criterion in essence recognizes this better than measured objective criteria.

However, it can also be argued that this approach is regressive to the extent that well to do neighbourhoods can more readily fund improvements whereas the older neighbourhoods where residents are least able to pay have potentially the greatest problems.

4.2 LIP

Spreading the costs of improvements over a wider area such as a neighbourhood, rather one street would tend to minimize the monetary impact of traffic calming measures.

Part 16 of the Municipal Act details how residents can participate in local improvements. The City currently and periodically has local improvement programs for completing streets (including curb, gutters, sidewalks, street lights, etc.) whereby adjacent benefitting owners pay a portion of the costs. The Act also permits Council to carry out local improvements for specified areas and charge back the entire cost of the work to the owners of real property within the area. While the process for carrying out an LIP is administratively cumbersome it requires proper resident input and is equitable in cost distribution. Because LIP is a cumbersome process, there may well be some scale advantage to using it to concurrently fund other neighbourhood initiatives and amenities, eg. park/trail links, playgrounds, tree planting, etc. in addition to traffic measures.

4.3 Self Assessment

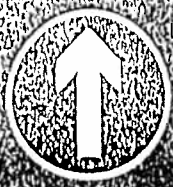
With self assessed resident initiatives such as the existing rear lane speed bump program, the funding is collected by the beneficiaries themselves. This obviates the need for any extensive bureaucratic intervention by City staff and allows the residents to determine an internally appropriate if not equitable distribution of funding.

5.0 DISCUSSION/CONCLUSIONS

This review of traffic calming measures has stressed the matter costs and program funding because of the current economic climate. The requirement for fiscal restraint leads to a number of conclusions.

TRAFFIC CALMING: A DISCUSSION PAPER (Cont.)

- 5.1 The comprehensive neighbourhood plan approach to traffic is most appropriate to the major restructuring of neighbourhood travel patterns.
- 5.2 However the comprehensive neighbourhood plan approach requires extensive staff resources both for data acquisition and public participation.
- 5.3 The comprehensive neighbourhood plan approach may be suited to participative control and funding via Area Specific LIP.
- 5.4 The use of traffic circles should be reserved for conventional residential intersections, not used in relative isolation, but rather on a comprehensive basis.
- 5.5 Replacement of courtesy corners by stop control intersections in residential areas appears to be a cost effective and popular measure, the merits and implications of which should be further evaluated.
- 5.6 Pavement undulations and road humps are clearly effective in curtailing speeding on local residential streets and there may well be an opportunity to fund them on a local initiative basis in a program similar to that used for rear lane speed bumps.
- 5.7 There is the opportunity for other measures such as roadway constrictions to be evaluated on a case by case basis to determine their utility in future comprehensive schemes.
- 5.8 A special concern is speeding on collector streets where more draconian traffic calming measures are not recommended in order to maintain accessibility. However, there is an opportunity for using road markings to better channel traffic while providing greater protection to cyclists.



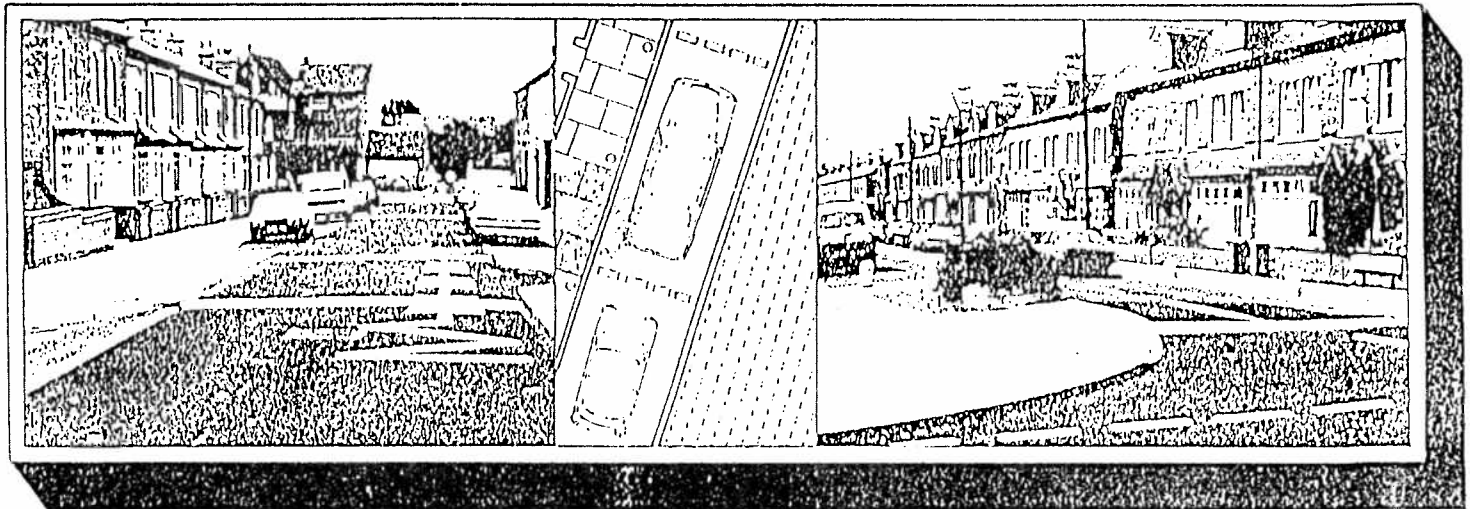
Department of Transport

TRAFFIC ADVISORY UNIT LEAFLET 1/87

MEASURES TO CONTROL TRAFFIC FOR THE BENEFIT OF RESIDENTS, PEDESTRIANS AND CYCLISTS

Object of Leaflet - A wide range of measures is available to local authorities for controlling traffic movement in local streets and giving safer and more pleasant conditions for residents. This leaflet illustrates some techniques that can be used. There will be others.

The Department proposes to publish further leaflets in this series where it would be helpful. The object is to draw attention to readily available and effective low cost ways of handling traffic safety in residential areas and giving greater emphasis to the needs of residents.



Scope - Most of the published advice on the design of residential areas has been concentrated on new developments. Similar principles can be applied to existing areas but the scope for implementation is usually much less. This leaflet concentrates on a range of traffic control measures that are available to local authorities for implementation either alongside major refurbishment of housing stock or independently. In the right

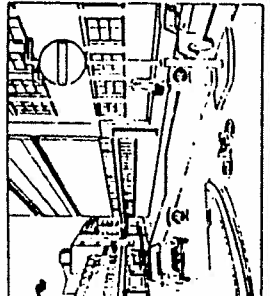
circumstances they can offer safety gains to vulnerable road users and environmental gains to residents. They can be particularly useful in developing safe routes to school and shops and in reducing traffic volume and speeds in sensitive areas. Care should be taken to safeguard the interests of local businesses so far as possible. Complementary measures will generally be required on through routes to handle traffic displaced from residential roads.

A Safer Environment - The Department proposes to sustain and apply the messages of European Road Safety Year 1986 by highlighting techniques for traffic handling that have been identified

as useful and effective in this country and abroad. European Year of the Environment provides an added focus for measures which can also contribute to the quality of life in urban areas.

"PLUG" NO-ENTRY (WITH CYCLE SLIP)

One-way streets can be used to break up rat runs and thus discourage through traffic. Their disadvantages include a tendency to increase traffic speeds unless other measures are taken to counter this and the imposition of disproportionate penalties on cyclists. A technique which can be used to overcome this problem is the "plug" no-entry with a cycle slip. The road remains two-way, but entry at the plugged end is permitted only to cyclists.

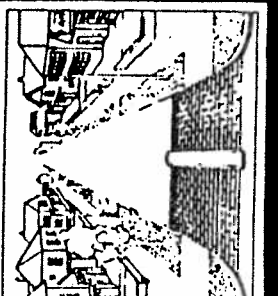


FOOTWAY WIDENING

This technique can be helpful in discouraging parking close to junctions and make it easier and safer for pedestrians to cross.

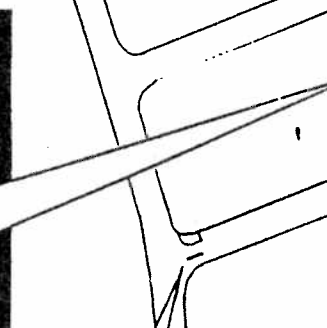
ENTRY TREATMENT

This method using granite sets or other textured surface treatments may have fewer local problems than treatments across junctions. But they also be less effective in reducing through traffic. The aim is to provide an entry or "gateway" message, reducing speed by both physical and psychological means.



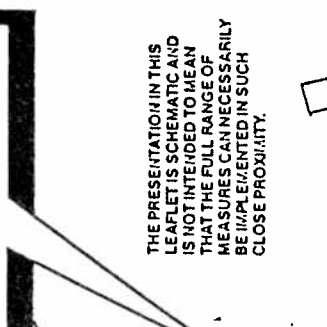
ROAD HUMPS

The new regulations (published in 1986) should make it easier to find suitable sites and use this technique more widely.



RUMBLE STRIPS

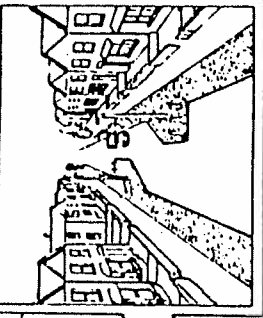
A line of granite sets at intervals, though not speed control devices in themselves, can act as a warning or reminder to drivers that they are in a residential street and should limit their speed.



THE PRESENTATION IN THIS LEAFLET IS SCHEMATIC AND IS NOT INTENDED TO MEAN THAT THE FULL RANGE OF MEASURES CAN NECESSARILY BE IMPLEMENTED IN SUCH CLOSE PROXIMITY.

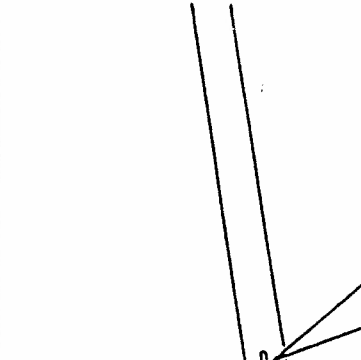
CHICANES

While the closure of speed humps are undesirable or impracticable, chicanes may offer a means of reducing traffic speeds or capacity. Many different layouts are possible and the effect can even be produced by parking provision supported on alternate sides of the road.



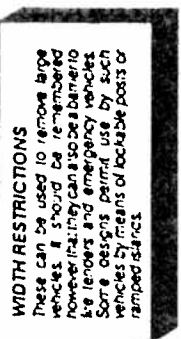
WIDTH RESTRICTIONS

These can be used to remove large vehicles. It should be remembered however that they can also be barriers to tenders and emergency vehicles. Some designs permit use by such vehicles by means of lockable posts or ramped stands.



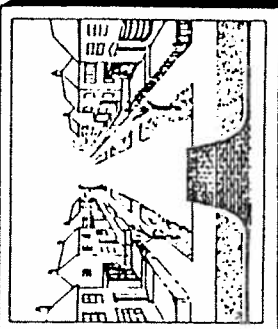
ENVIRONMENTAL ROAD CLOSURES

Environmental road closures should always include cycle lanes and wherever possible these should be designed to reduce the risk of obstruction by parked vehicles. Road closures should be used with care - they can cause turning and weaving problems and like any measure which forces change in traffic patterns can sometimes redistribute traffic to an unacceptable degree. It should also be borne in mind that "through" parking can block passage barriers intended for emergency vehicles.



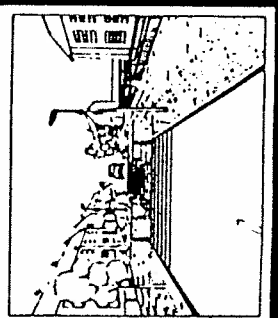
TREATMENT ACROSS JUNCTIONS

This can reduce vehicle entry speeds and improve pedestrian safety but more experimental schemes are needed to investigate alternative methods and try for possible confusion over pedestrian and vehicular priority.



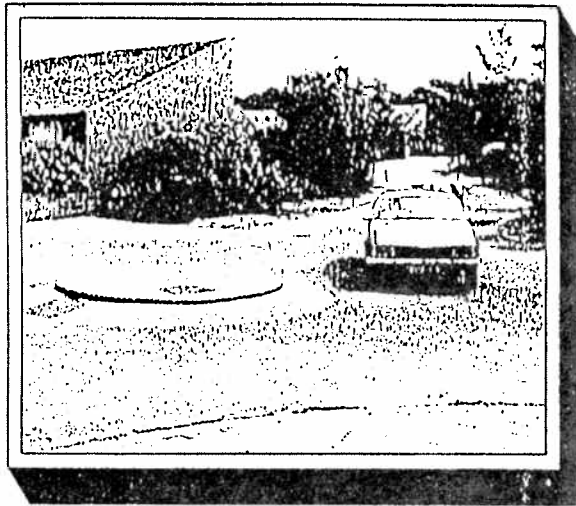
TRAFFIC THROTTLE

Could be used to control traffic capacity and speed and focus pedestrian crossing movements.

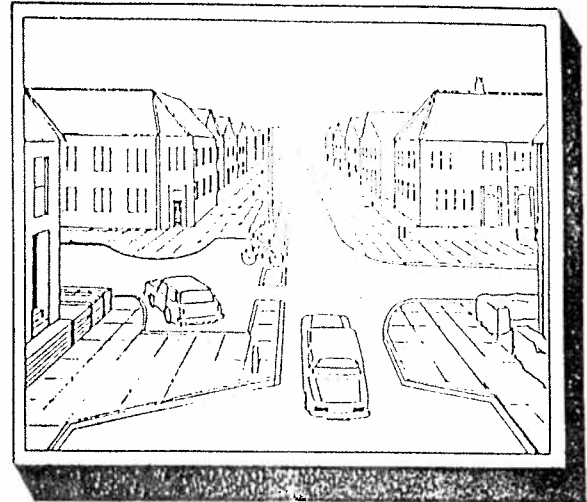


FURTHER POSSIBLE TECHNIQUES

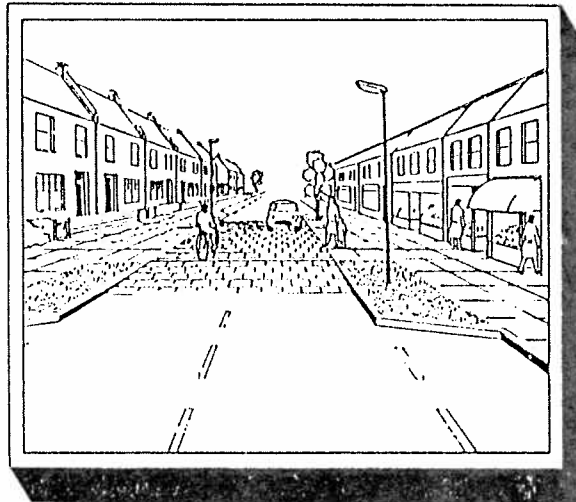
SPEED CONTROL ISLAND



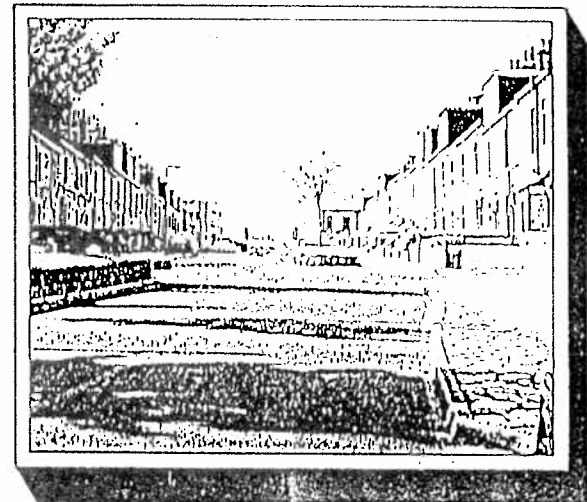
ROAD CLOSURE/TURNING AREA



WIDE AREA CROSSING



STAGGERED JUNCTION TREATMENT



Consultation Process – Traffic measures need to take account of their impact on local access, especially to commercial premises, on parking, and on through traffic movements. The views of the police and emergency services must be given full weight. Full consultation is essential and in cases where orders are required under the Road Traffic Regulation Act 1984 there will be statutory consultation processes that local authorities are required to undertake.

Feedback – Comments on the techniques illustrated in this leaflet, and information on other techniques are invited from local authorities, interested bodies and individuals. Contributions should be sent to:

The Traffic Advisory Unit
Room C10/19A
Department of Transport
2 Marsham Street
London SW1P 3ED

There is no final date for contributions, but 31 May 1987 would assist in planning the next stages of work in this area.

