

REFERENCE



CONTROLLING BELMONT'S TRAFFIC

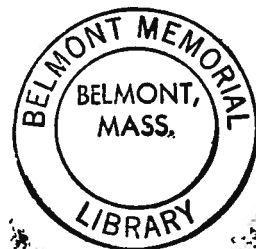
STUDY AND CITIZENS' TRAFFIC PLAN

PREPARED FOR THE SELECTMEN, TOWN OF BELMONT

By The
Traffic Advisory Committee
Town of Belmont

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EXECUTIVE SUMMARY

In July, 1986, the Selectmen of the Town of Belmont organized and charged the Traffic Advisory Committee with the task of developing "an overall town-wide" strategy for managing traffic and enhancing the safety of pedestrians and cyclists."

The Traffic Advisory Committee (TAC) adopted as the objectives for its work the following:

1. Maximize pedestrian, cyclist, and driver safety on Belmont's streets.
2. Insure that traffic moves at reasonable speeds inside the town limits.
3. Encourage the use of alternate (non-Belmont) routes by commuters and truck drivers who have other viable alternatives for travel from one side of the town to another.

Subsequently, the TAC has met regularly; reviewed previous research on traffic matters; sought information from Belmont's Traffic Bureau, and planners of neighboring communities; conducted citizens' hearings in the town's eight precincts; and otherwise collected information concerning Belmont's traffic and ways of managing it.

As a result of it's work, the TAC has found among other things, that:

1. The TAMS report, commissioned by the Town in 1984 and completed in 1985, is highly misleading regarding both traffic volume trends and traffic origin. It provided no new information on the impact on Belmont of new development at Alewife.
2. Traffic is increasing at a significant rate on certain of the Town's streets; on certain streets it already exceeds the volume forecasted in the TAMS report for the year 2000.
3. The volume of traffic is so large at times that it is perceived by the Town's residents to be: (1) restricting access to commercial establishments and (2) spilling over into neighborhood streets, threatening the quality of life of the Town's residents.
4. Many citizens also perceive recent increases in the volume of truck traffic in the Town.
5. The rate of traffic citations per police officer in Belmont is significantly higher than in surrounding communities.

6. About three-fourths of moving traffic violation citations in Belmont are issued to non-Belmont residents.
7. Excessive speed (accounting for half of all moving violations), high volumes of traffic, and the unnecessary use of the Town's streets by heavy vehicles are the primary threats to safety in Belmont; in particular, accidents involving pedestrians and bicyclists are increasing rapidly.
8. There is an increasing concern among residents about the safety of school students.
9. Belmont is a victim of its location adjacent to a "New Town" at Alewife, that is expected to bring 20,000 additional cars each day into the vicinity of Belmont. The state-sponsored environmental impact study barely mentions the effect of this development on the Town of Belmont and proposes no mitigating measures to provide relief to the Town from commuter traffic caused by the "New Town."
10. Experiences of citizens of neighboring communities suggest that Belmont residents can expect little support from agencies outside the community; they must take the initiative to solve their own problems; professional management is needed and can pay for itself in the long-run.

Given the nature of the problem, a number of possible responses have been suggested to the Committee. They range all the way from closing Belmont's streets to non-residents to measures that would make the Town's thoroughfares more accessible and free-flowing for commuters. Our proposals recognize that neither of these extremes are either advisable or realistic, that our community's traffic problems are in part a result of its central location between heavily populated outlying suburbs and one of the most rapidly developing core commercial areas in the nation. They do, however, seek to preserve the quality of life that has made Belmont attractive to its residents and visitors.

The TAC recommends that the Selectmen adopt the Citizens' Traffic Plan (CTP) proposed below as opposed to the funding of projects on a piecemeal, largely uncoordinated basis. The CTP is divided into three phases. The first can be accomplished in a short period of time with a minimum of resources by actions that are within the authority of the Board of Selectmen. It includes the following recommendations:

Phase I

1. Adopt a clear policy on traffic control, with priorities on safety and the limitation of speed and a focus on critical streets and intersections.
2. Post and enforce 30-mile-per-hour signs on all major east-west and north-south Town streets.
3. Identify excessively wide residential streets (several of which are cited later in the report) and paint lane lines on approximately six miles of Town streets to discourage unsafe use of curb or parking lanes by moving traffic.
4. Post conspicuous welcome to Belmont speed enforcement warning signs on all major access roads to the Town.
5. Post 20-mile-per-hour signs and paint pedestrian crossing lines at all public and private schools.
6. Improve school bus unloading facilities, with priority given to the Wellington School.
7. Repaint and sign conspicuously all pedestrian crossings in the Town.
8. Organize a "Drive 25" campaign with the help of the schools to encourage a citizens' slow-down of fast-moving traffic in the community.
9. Systematically assign available police officers to certain high visibility points at critical times, continuing current non-regular patterns of coverage for other points and times.
10. Augment traffic law enforcement with the hiring of two additional police officers to be assigned to traffic duty in addition to those currently assigned.
11. Assign an existing member of Town government to the part-time position of traffic ombudsman to receive, coordinate, and properly route citizens' questions and complaints about traffic and pedestrian safety.
12. Encourage pedestrian safety by, among other things, educating motorists regarding pedestrians' right-of-way when in crosswalks as well as by discouraging jay-walking and by creating a by-law requiring residents and businesses to keep sidewalks clear of snow in winter.

13. Enroll the Town in the Commonwealth program that allows records of traffic violators to be "flagged" for fines not paid, encouraging the collection of outstanding fines.
14. Raise minimum fines for parking violations to discourage illegal parking and help defray the cost of added traffic police personnel and enforcement.
15. Support proposals by Belmont's Traffic Consultant to improve the flow of traffic through the Route 2 and Alewife Brook parkway intersection.
16. Oppose as strenuously as possible massive new developments at Alewife unless and until acceptable new road plans for Route 2 are finalized and funded. Begin now to take steps to facilitate legal action should it prove necessary.
17. Address certain specific citizens' complaints received during the TAC's hearing process, listed in Appendix B to this report.

Given the recently-disclosed plans for the Alewife "New Town," it is important that the Town of Belmont do what it can both to act defensively in controlling traffic within its borders and to be proactive in assuring its citizens that the development that occurs at the "New Town" will respect and provide for the demands that it will inevitably place on neighboring communities, especially Belmont. Phase I recommendations only provide us with a start in that direction.

Phase II

Phase II concerns those matters that can be initiated by the Town but will require more time, cost, and, in some cases, approval by outside authorities. The recommendations are:

1. Hire a town planner with traffic planning capabilities.
2. Form a standing traffic committee to review development, funding and other plans with a clear impact on the Town's traffic; assign the committee to the evaluation of citizens' suggestions on an ongoing basis.
3. Collect additional data through an origin-destination traffic survey, possibly organized and conducted by high school students and other citizens to provide back-up data to support recommendations requiring

approval of the Department of Public Works or other agencies.

4. Form a high-level group (including Selectmen, the Police Chief, and State legislators) to meet with representatives of the DPW in order to begin the process of implementing an integrated program of action to:
 - 4.1 Post signs, alter timing of lights, and use other methods to encourage the use of viable alternative routes (such as Route 2) by motorists who currently use Belmont streets as a by-pass.
 - 4.2 Regulate speed at rates less than 30 miles-per-hour in selected areas.
 - 4.3 Prohibit or otherwise regulate through-travel of trucks exceeding a given weight limit.
5. Systematically redesign and curb approximately three miles of major thoroughfares, with priority on Concord Avenue; Brighton, Pleasant, and Cross Streets; and Blanchard Road, to better control and discourage unsafe use of curb and parking lanes by drivers. (The walk on Pleasant Street should be part of the major redesign of Route 60 proposed for Phase III.)
6. Review plans to redesign additional major intersections without disturbing the funding process; criteria to be used in this review should place priority on pedestrian safety and traffic control.

Phase III

Phase III deals with those matters requiring considerable time and effort as well as the cooperation of government agencies and town planning groups outside of Belmont. The recommendations are:

1. Form local and regional coalitions to coordinate traffic planning in the commuting corridor to the west of Boston.
2. Initiate legal action, if necessary, to slow or halt development, at the Alewife "New Town" until adequate provision is made for traffic access and parking. The aid of Representative Gibson and other political representatives should be enlisted in dealing with the MDC and other State agencies concerning this matter.

3. Implement a coordinated plan for rebuilding Route 60 (Pleasant Street) through the Town.
4. Curb certain streets or roads which now have either no curbs or rounded asphalt shoulders, such as Sycamore, School, Oakley and Payson. (The listing of citizens' concerns in Appendix B contains further suggestions warranting review.)
5. Take steps necessary to prepare applications for State and Federal grants in support of projects, particularly those recommended in Phase II and III.

Phase I of the Citizens' Traffic Plan is estimated to require six months to implement. It will require an investment of approximately \$45,000 and annual revenue increases of \$75,000. Thus, the first year of Phase I should produce a positive cash flow to the Town of \$35,000 and each successive year cost the Town \$70,000.

Phase II of the plan will require approximately twenty-four months to implement, an investment of about \$1.5 million, and an annual increase in cost of approximately \$40,000.

Phase III of the plan will require approximately three years to implement and an investment of \$1 million to \$2 million. Experiences of other communities suggest that most or all of these capital costs can be funded through State and Federal highway programs.

If implemented, these proposals will provide greater safety for all those using Belmont's streets and sidewalks. Further, they will communicate to those living in neighboring communities the Town's intent to provide such protection through improved design of streets and intersections, more effective traffic control, and fair but extensive enforcement of traffic rules. Most important, they will improve the Town of Belmont as a place to live, representing an investment with large dividends.

BACKGROUND AND CHARGE TO THE COMMITTEE

Belmont, a town of 4.6 square miles, is located immediately West of Cambridge and Boston. The Town, 7 miles from Boston, maintains approximately 83 miles of streets, 91 percent being public ways. One state numbered "highway", Route 60, (Pleasant Street) passes through the Town in a northeast to southwest direction. Route 2, a major east-west highway, is located along the town's northeast border. Two MBTA surface bus routes connect the town to Boston, one from Belmont Center and the other from Waverly Square. The MBTA commuter rail (Fitchburg Mainline) bisects the Town approximately east to west, with two stations, Belmont Center and Waverly Square.

Belmont, "A Town of Homes," is primarily a bedroom community of Boston having little or no industry and few commercial enterprises. The Town and McLean Hospital are the largest employers, having a combined total of less than 2,000 employees.

The location of the town and its proximity to Boston is desirable for its residents, but recently has become a liability because the streets of the Town provide a viable short-cut or by-pass to commuters living to the north and west. The state, since its moratorium on major highway construction inside of Route 128, instituted in the late 1960's, has not addressed the traffic problems on a regional basis. This has left the Town and other surrounding communities to solve traffic problems themselves, resulting in a piecemeal approach.

In the late 1970's the development of Boston intensified and the planning for a major MBTA extension to Alewife, immediately east of Belmont, started. With these changes, the Town realized that an increase in traffic was occurring and steps to control and understand the traffic impact had to be undertaken. In 1981 a traffic study for the Town of Belmont was conducted by Norman A. Abend to evaluate the impact of the MBTA Alewife station and garage. The conclusion of this report was that the MBTA expansion would not significantly increase traffic in the Town, but would be the impetus for an area wide development that would significantly increase traffic in Belmont. The report indicated that traffic on residential streets was on the increase, especially on through- or cross-town streets.

Numerous neighborhood groups began to discuss the increase in traffic volumes and the resulting decrease in pedestrian concerns. The Town, with funding from the MBTA, undertook a traffic study in 1984. This study, conducted by TAMS, was completed in late 1985. The conclusion of the report was that many cars heading east do not use Route 2 but enter Belmont, utilizing the Town's streets as a by-pass around Alewife or a cut-through to Waltham, Watertown, and Cambridge. The report

includes a discussion of seven intersections that will be improved in 1987 and identifies seven additional intersections that should be improved. Preliminary designs for these intersections were included in the report.

In summary, past reports indicate that traffic volumes have increased to a point considered unacceptable for residential streets. In addition, public concern for pedestrian and auto safety has become a major issue.

CHARGE TO THE COMMITTEE

Recognizing a serious problem with traffic in Belmont, the Town's Selectmen appointed a Traffic Advisory Committee (TAC) in July, 1986.

The Committee was asked to respond to the following charge:

1. Educate yourselves as to the situation-- the traffic control and safety projects that are in the works, the areas that appear to have severe impacts from the Route 2 work, the areas that expect to have severe impact from other causes, and the remedies that are possible from the practical, legal and financial standpoints. The Committee may request the advice and help of town officials.

2. Meet with residents at public meetings in various areas of the town (Winn Brook, Waverley, etc.) to get the neighborhood input. This item can be part of #1 above. A Committee member should attend any Selectmen's meeting at which a traffic issue is on the Agenda (not necessarily the same person).

3. Establish the criteria on which to base charge #4.

4. Develop an overall town-wide strategy for managing traffic and enhancing the safety of pedestrians and cyclists based on two objectives: (1) to discourage traffic from cutting through Belmont to save time or distance or hassle and (2) to deal with those drivers who live and drive in Belmont but who flout the traffic rules and regulations. Both short-term and long-term strategies should be recommended. Creative solutions should be developed, keeping in mind the fiscal constraints placed on the Town.

5. Present an interim report to the Selectmen very early in January, 1987 and a final report by March 1. These dates can be extended at the Committee's request.

Members appointed to the TAC were Marilyn Adams, Thomas Callaghan, Joel P. Douglas, Lucia E. Gates, Mark Haley, Daniel

J. Healey, James L. Heskett, Raymond S. Jackendorf, Stephen Kaiser, Samuel R. Maloof, Albert L. Murphy, and Linda N. Oates. The committee selected as its chairman Mr. Heskett and asked that a representative from the Belmont Police Department be named to attend its meetings. As a result, John Miceli regularly attended Committee meetings in that capacity.

WORK OF THE COMMITTEE

The TAC met regularly from September, 1986 though January, 1987, organizing itself to carry out the following work and review of its progress. Its work included:

Review of Previous Work

The TAC familiarized itself with several previous efforts to plan Belmont's traffic. The most recent and significant of these was the TAMS "Traffic Input Study, Route 2/Alewife Development," presented in December, 1985. Of specific interest in this report were the conclusions concerning the impact of Route 2 and Alewife development on Belmont's traffic and recommendations concerning the redesign of seven major intersections in the Town.

Consultation

The Committee spent several meetings availing itself of advice provided by several individuals familiar with previous traffic planning efforts in and around Belmont. These included Lt. Daniel Pergamo, Traffic Bureau; Mr. Timothy McCarthy, Municipal Signals; and Mr. Alan McClennon, Arlington Town Planner and a Belmont resident. In addition, Mr. Stephen Kaiser, Traffic Consultant to the Town of Belmont, offered his counsel as a Committee member.

Hearings

Open hearings with town residents were conducted by TAC members for each of the town's eight precincts. In total, these hearings were attended by about a hundred residents. The agenda for each hearing was divided into discussions with residents about the nature of traffic problems confronting the town and their proposed responses. In addition, the Committee solicited written responses from hearing participants and others requesting a questionnaire prepared for the purpose (shown in Appendix 1).

Data Collection and Analysis

In addition to data collected through the hearing process, the TAC made numerous requests for information from the town's Traffic Department (surveys of traffic volumes, numbers and types of moving violations), Police Department (staffing levels, assignment patterns, shift schedules, overtime policies, and personnel costs), the Traffic Consultant (procedures for making changes in the regulation of traffic, costs of improvements, and specific design suggestions). Members of the Committee carried out much of the analysis presented in the report.

FINDINGS

Information for this study was obtained from meetings with the Town's citizens; our own study for available data, including that produced by previous studies; and consultation with officials of Belmont and Neighboring communities

Citizens' Concerns

During October, 1986 the TAC held a series of public hearings in each of the Town's eight precincts to solicit citizens' traffic concerns and suggestions. Notices were sent to all Town Meeting members and were placed in both newspapers. The hearings were held in public buildings in each precinct. At both the hearings and by mail we received responses on the forms reproduced in Appendix A. Minutes were taken at all of the hearings and a complete summary included in Appendix B of this report.

Predominant among citizens' perceptions were concerns about:

1. Speeding
2. Increasing volumes of both auto and truck traffic
3. Pedestrian and cyclist safety, particularly among school children and senior citizens

The most-often mentioned responses to these problems were an increased police presence and professional town management.

All of the perceptions listed above were substantiated by analyses of available data which members of the TAC carried out.

What we heard from our neighbors throughout the Town influenced this document greatly, leading us to title the document a "Citizens' Traffic Plan."

RESULTS OF DATA ANALYSIS

The traffic problem in Belmont can be discussed in terms of three different dimensions (1) the volume of traffic, (2) the observation and enforcement of traffic regulations, and (3) the nature of the traffic. Although these three dimensions can be considered separately for purposes of analysis, it is critical to recognize that, functionally, they are not independent. To the contrary, problems on each of these dimensions compound the seriousness of the problems on the others.

Volume of Traffic

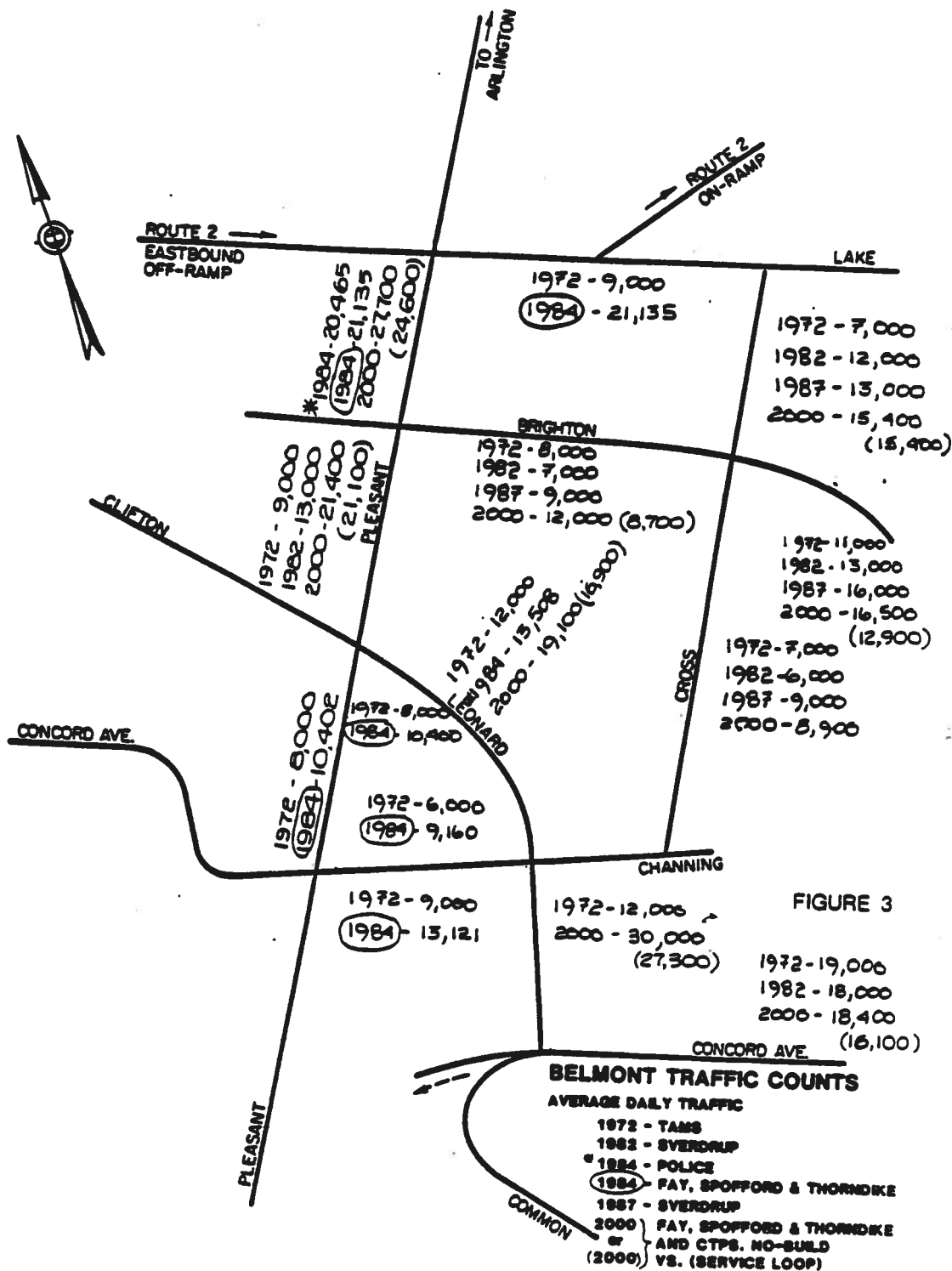
In our precinct hearings, the most strongly and consistently voiced concern of Belmont residents pertained to the volume of traffic on Belmont streets and its seemingly unabated increase over time. How real is this concern?

Figure 1, taken from the TAMS (1985) report, presents a chronological view of traffic volumes on several major town roads. The statistics presented on this figure include actual traffic counts taken in 1972, 1982, and 1984 as well as two projected counts for the year 2000. The lower set of projections for the Year 2000, which are given in parentheses, assumes the construction of a "service loop" on Route 2 at Alewife and commensurate relief to congestion in Belmont. In discussing this figure and its statistics, the TAMS authors conclude,

"A comparison of past, existing and forecast volumes shows modest, if any, growth in most of this area.

FIGURE I

REPORT PROJECTION OF TRAFFIC
GROWTH, BELMONT



Increases on Brighton, Leonard, and Cross Streets are approximately two percent. On Concord Avenue east of Common Street there is actually a slight decrease from 1972. On Pleasant Street the increase is eleven percent north of Brighton Street. However, most of Pleasant Street exhibits a total growth rate of three to four percent in the last 12 years." (p. 10)

The majority of the growth estimates range from 2% to 4% per year. They are founded upon actual empirical counts. The tone of the TAMS report is that the expected growth in traffic volume is negligible and can safely be ignored.

In accepting this suggestion, however, one is faced with a paradox: How is it that the conclusions of the TAMS report can conflict so strongly with the perceptions of the people who live in this town? Toward resolving this paradox, we may scrutinize the conclusions of the TAMS report as well as the computation of the growth statistics, the representativeness of the counts, and the validity of the Year 2000 projections on which its conclusion is based. Under scrutiny, the TAMS report is found to be misleading in each of these aspects.

First, consider the growth statistics reported in the paragraph quoted above: 2% for Brighton, Leonard, and Cross Streets, 3-4% for Pleasant street south of Brighton Street, and 11% for Pleasant Street North of Brighton Street. To assess the accuracy of these statistics, we need to identify which of the counts were used as anchor points in their derivation. To understand the meaning of statistics, we must determine the time periods over which they extend, i.e., 2-11% per what unit of time?

Because neither the derivation nor the signification of TAMS' percentages is made clear in their text, we tried to discover them by performing computations on the raw data given in Figure 1. Of the three computation intervals offered by the data, i.e., 1972-1982/84, 1982/84-2000 and 1972-2000, no single one yields percentages that are entirely consistent with those quoted by the TAMS authors, making it unclear whether the percentages given are rough, erroneous, or were derived by switching arbitrarily between intervals. The order of magnitude of TAMS' reported percentages nevertheless confirms that they are estimates of the expected increase in traffic per year.

With concern towards the carrying capacity of our streets, it is not the per annum increase that is of primary interest, but the total increase in traffic volume across the relevant period of time. That being the case, it must be borne in mind that per annum increases compound (in the same manner as the interest on a bank account), such that relatively "small" per annum rates can result in relatively large increase in the principal or base count over years. Specifically, across 28

years, a per annum increase of 2% results in a final traffic volume equal to 174% of the base count; a per annum increase of 4% results in a volume equal to 300% of the base count; a per annum increase of 11% results in a volume equal to 3021% of the base count.

Next, consider the representativeness of the actual traffic counts. The Town of Belmont has only recently acquired the capability of performing its own automated traffic counts. Thus, with the exception of those 1984 counts that are marked with an asterisk in Figure 1, all of the volume estimates were generated through commissioned studies by outside contractors. The problem lies not with the credibility of the contractors' counts, but with the circumstances under which they were commissioned.

An accurate picture of the historical growth of traffic on a street would compare the normal, average daily traffic across years. Yet the comparison counts from which the growth rate is estimated were not undertaken under normal traffic situations.

The 1972 counts lend particular distortion to the growth picture because they are used as the baseline for the annual percent growth computations. The 1972 counts were provoked by the "dead-ending" of Route 2 in Belmont and the concern over the consequent off-loading of commuter traffic onto Belmont streets. Thus, whereas TAMS' per annum growth figures invite the interpretation that the volume of traffic in Belmont in the Year 2000 will have increased at only 2%-11% per years since the early 1970's, their more accurate interpretation is that the volume of traffic in Belmont will have increased at a rate equivalent to 2-11% per year over and above the relatively high load suffered by the town in 1972. Again bear in mind that, with compounding, this is equivalent to an increase of 174% to 3021% over that 1972 crisis load.

Relative to the 1982 or 1984 counts, as available, TAMS' Year 2000 projections translate into a total increase in traffic volume as shown below:

- 31%-Pleasant St. north of Brighton
- 65%-Pleasant St. between Brighton and Clifton
- 42%-Leonard St.
- 71%-Brighton St. between Pleasant and Cross
- 27%-Brighton St. between Cross and Concord
- 28%-Cross St. between Brighton and Lake
- 48%-Cross St. between Channing and Brighton
- 2%-Concord Ave. west of Brighton

Adjusted for the differences in traffic volume between these street legs, TAMS' Year 2000 estimates project an average increase of 35% in volume on these streets between the years 1982 or 1984 and 2000.

Contrary to the TAMS' description, we would argue that these levels of growth cannot be termed "modest, if any."

The TAMS authors have unfortunately omitted description of the information upon which their Year 2000 projections are based. Nevertheless, several oversights are immediately apparent. First, in deriving the projections, the TAMS authors may have dismissed upper Concord Avenue as a source of commuting traffic from the north and west. Upper Concord Avenue is, in fact, a popular Route 2 alternate/bypass. Second, it is unclear whether the projections include factors to estimate the impact of "reverse" commuting on traffic volumes in Belmont (indeed, in other sections of the report, the TAMS authors fallaciously use counts that must include "reverse" commuters to diminish their estimates of the proportion of town traffic that is due to commuters); to the extent that "reverse" commuters are using Belmont Streets to avoid Alewife/Route 2 congestions, this represents an additional oversight. Third, the projections do not include adjustments for impact that might be expected from major developments outside the Alewife Triangle, such as the growing or imminent commercial developments in Waltham, Harvard Square, Kendall Square, and Lechmere Square.

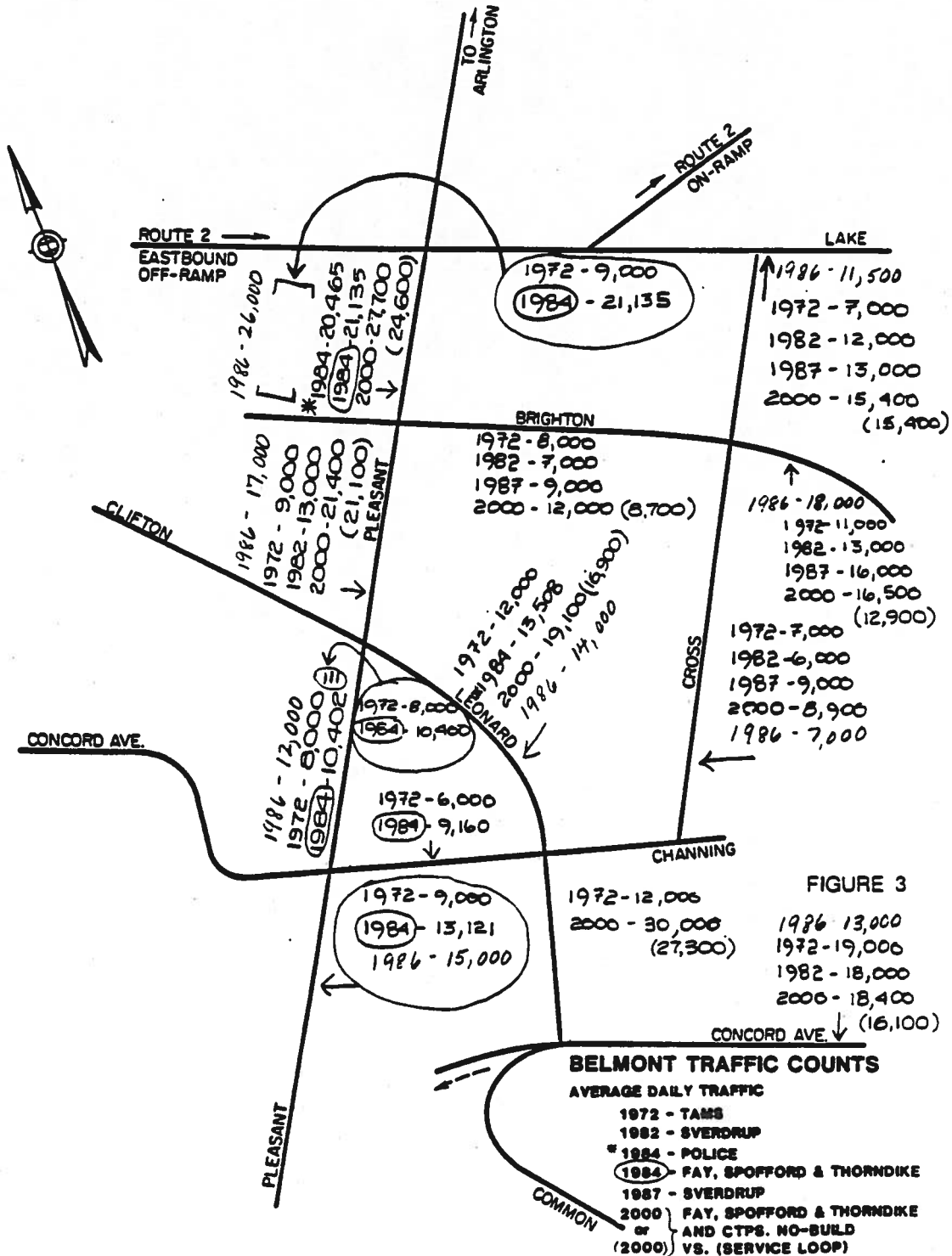
Full logical assessment of TAMS' Year 2000 estimates is impossible without access to the assumptions under which they were generated. However, we can assess them empirically by comparing them against actual traffic growth in the last two years. In Figure 2, we have reproduced the TAMS figure, adding estimates of average daily traffic based on traffic counts taken by the Belmont Police Department in 1986.¹

Bar graphs of the growth histories for several of the relevant street legs, including the 1986 counts, are depicted in Figures 3 through 9. Ignoring the 1972 counts as unrepresentative, it is clear that most of the TAMS Year 2000

¹ Before proceeding, we note that these internal counts must lack a certain degree of reliability inasmuch as (1) each represents a single daily count and (2) the days on which the various counts were taken were distributed around the calendar year. Because a street's traffic volume on any given day may vary considerably due to unpredictable and unaccountable factors (such as accidents or roadwork upstream), reliable estimates of the street's normal volume depend upon obtaining multiple daily counts. Because of the large university populations in the Cambridge/Boston area, there are considerable seasonal differences in area traffic volume such that it may be inappropriate to impose similar interpretations on traffic counts made in, for example, April versus June. As a pertinent example, the 1986 count for lower Concord Avenue, which seems surprisingly and inconsistently low, was taken in June.

FIGURE 3

TAMS' REPORT PROJECTIONS OF TRAFFIC
GROWTH BELMONT, SUPPLEMENTS BY RECENT POLICE COUNTS



projections are conservative. Indeed, on several of the relevant streets, TAMS' Year 2000 projections were met or exceeded in 1986--14 years short of the target date. Further, in view of the expectation that commercial development in the Alewife area will produce a dramatic increase in Belmont's traffic volume, TAMS' underestimation of Year 2000 volumes must be much, much more serious than indicated by these Figures, all of which assume no further extension of Route 2 will take place beyond Alewife Brook Parkway.

FIGURE 3

PAST AND PROJECTED TRAFFIC VOLUMES,
PLEASANT STREET BETWEEN BRIGHTON & CLIFTON STREET

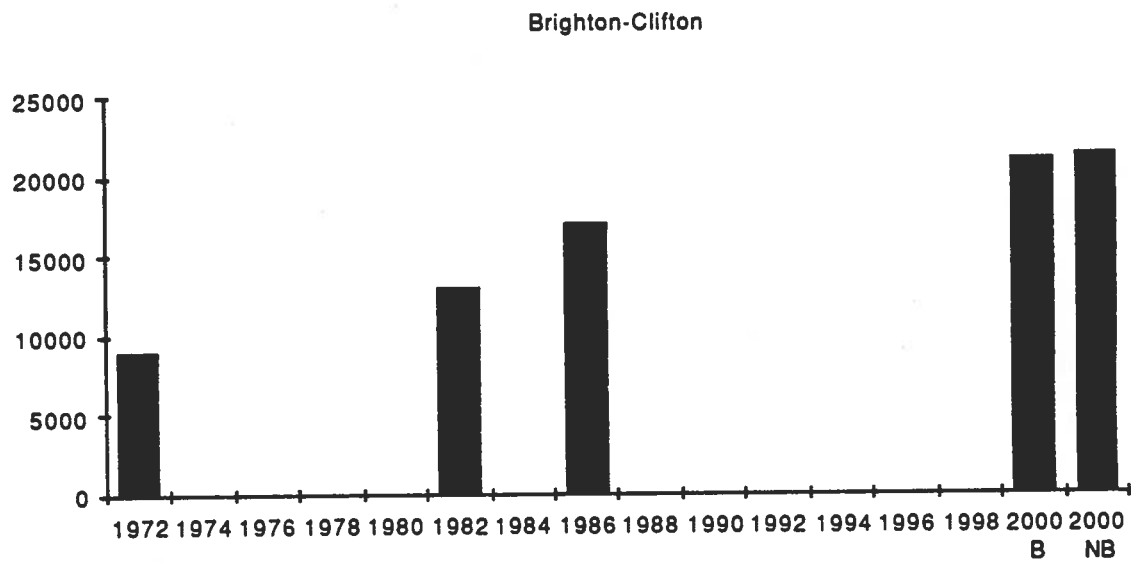


FIGURE 4

PAST AND PROJECTED TRAFFIC VOLUMES,
PLEASANT STREET BETWEEN RT. 2 AND BRIGHTON STREET

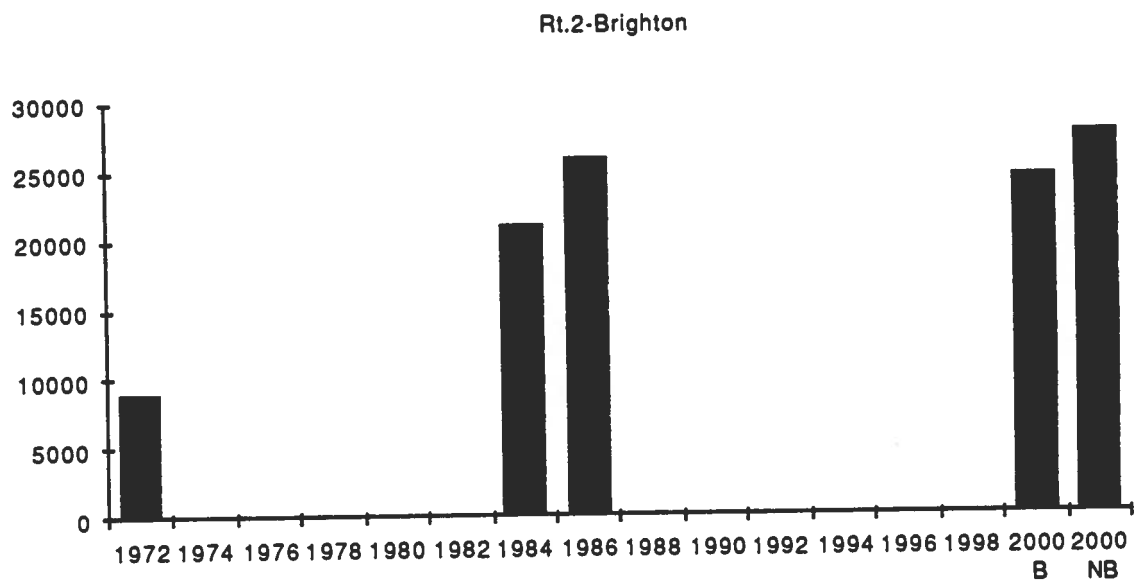


FIGURE 5

PAST AND PROJECTED TRAFFIC VOLUME,
PLEASANT STREET BETWEEN CONCORD AVENUE & TRAPELO ROAD

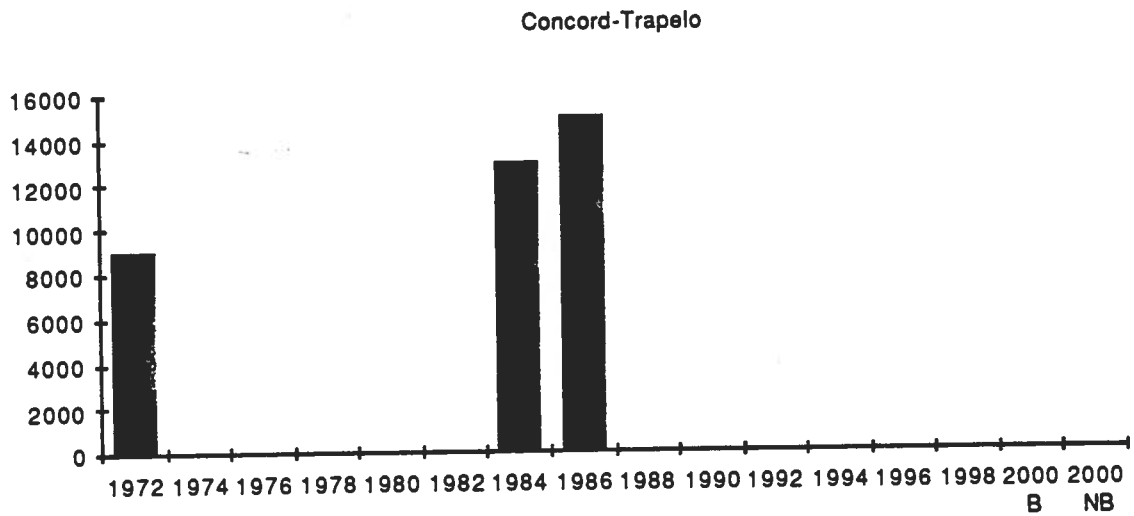


FIGURE 6

PAST AND PROJECTED TRAFFIC VOLUMES,
PLEASANT STREET BETWEEN CLIFTON STREET & CONCORD AVENUE

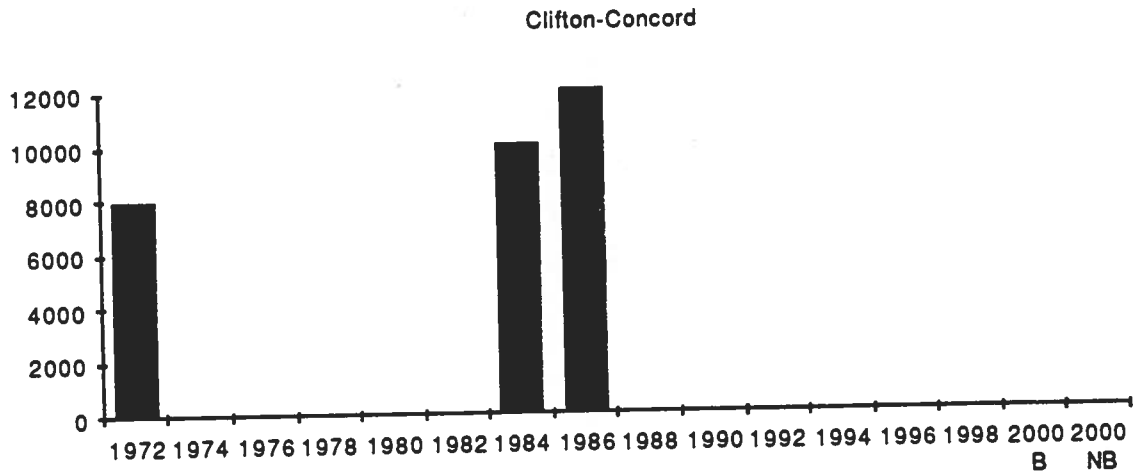


FIGURE 7

PAST AND PROJECTED TRAFFIC VOLUMES BRIGHTON STREET
BETWEEN PLEASANT AND CROSS STREETS

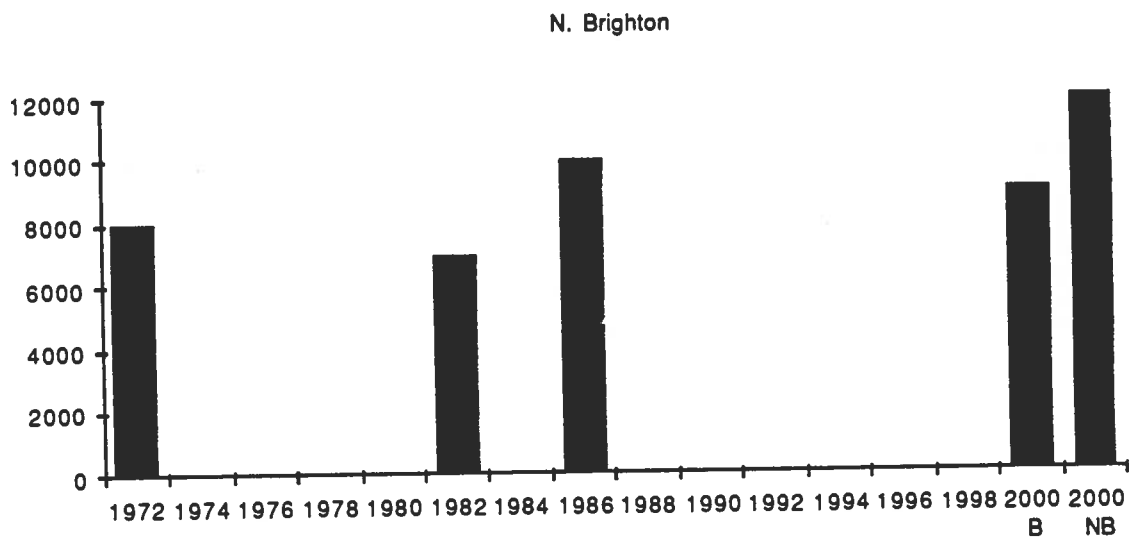


FIGURE 8

PAST AND PROJECTED TRAFFIC VOLUMES BRIGHTON STREET
BETWEEN CROSS STREET AND CONCORD AVENUE

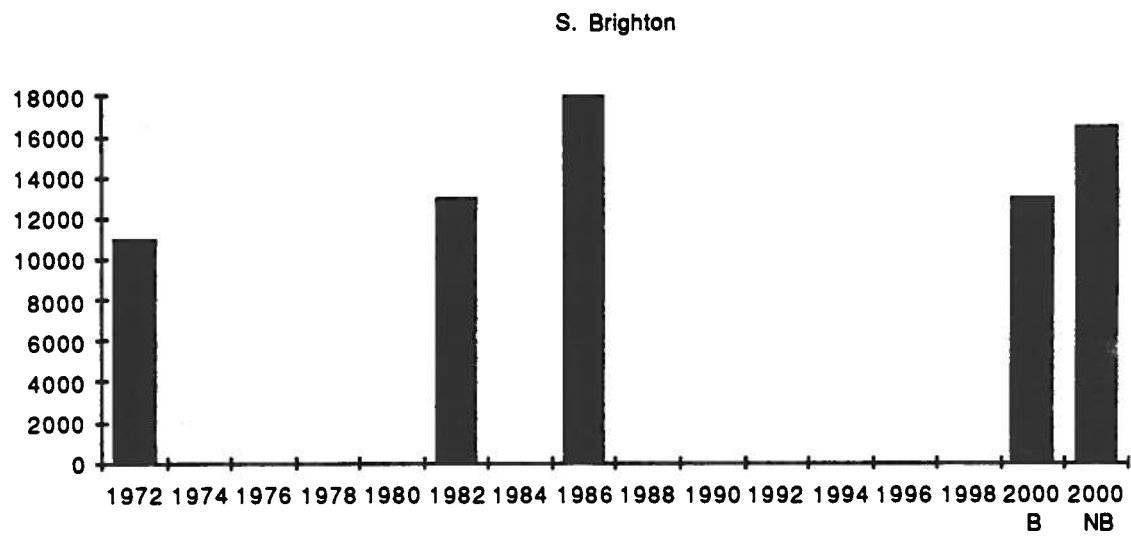
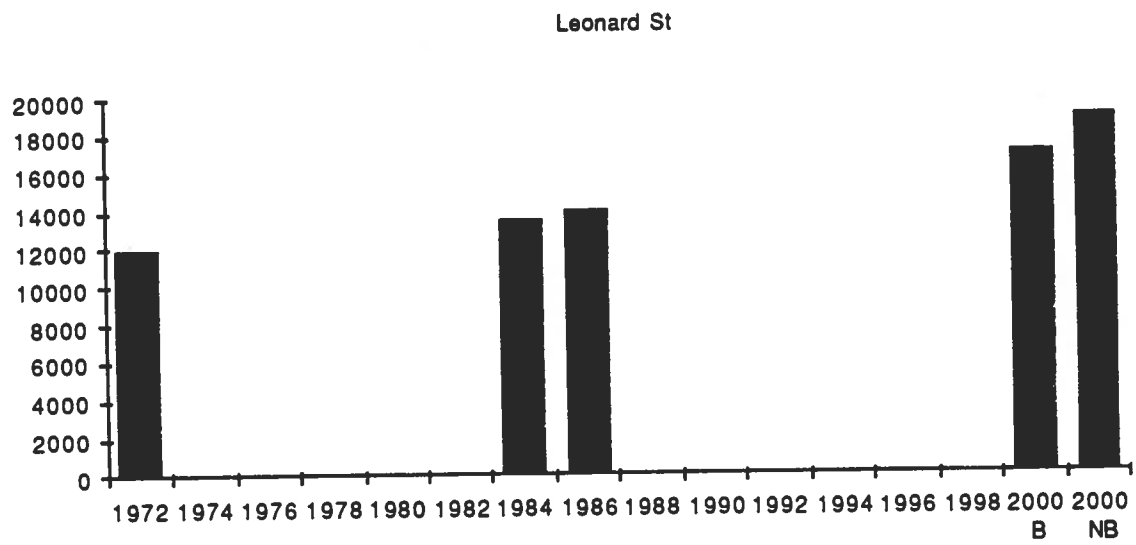


FIGURE 9

PAST AND PROJECTED TRAFFIC VOLUMES, LEONARD STREET



What then, is the correct estimate of the growth in traffic volume that Belmont should expect between now and the year 2000? Judging from Figures 2 through 9, it will clearly be much more than 35%.

However, all of these projections assume an unconstrained road capacity. Once the capacity has been reached, further growth in traffic on those streets will be restricted but alternative routes will then become adversely impacted. Although we cannot say exactly how much more growth there will be, we must ask how much more growth our streets can tolerate. At what point will the residential character of the town be irrevocably lost? At what point will the growth result in irresistible pressure to widen our "streets" into "highways"? It seems inevitable that these points will be reached in the relatively near future unless effective steps are taken, and taken immediately to control this growth.

Observation and Enforcement of Traffic Regulations

Among the most frequent complaints heard at our precinct hearings within this category were complaints about illegal passing, illegal laning, failures to observe crosswalks, street guards and school zone signs, failures to lend consideration to resident vehicles entering and exiting from driveways and side streets, and -- most of all -- speeding. Coupled with each of these categories of complaints was the sense that they reflected inadequate traffic enforcement in Belmont and questions about the diligence of the Belmont Police Department.

In an effort to gain an overview of changes in the orderliness of traffic, we have graphed histories of the annual frequency of reported accidents and of citations for moving violations and parking violations, as shown in Figures 10 through 12. These confirm that increased traffic means more traffic accidents and more moving violations.

FIGURE 10

TRAFFIC ACCIDENTS REPORTED PER YEAR

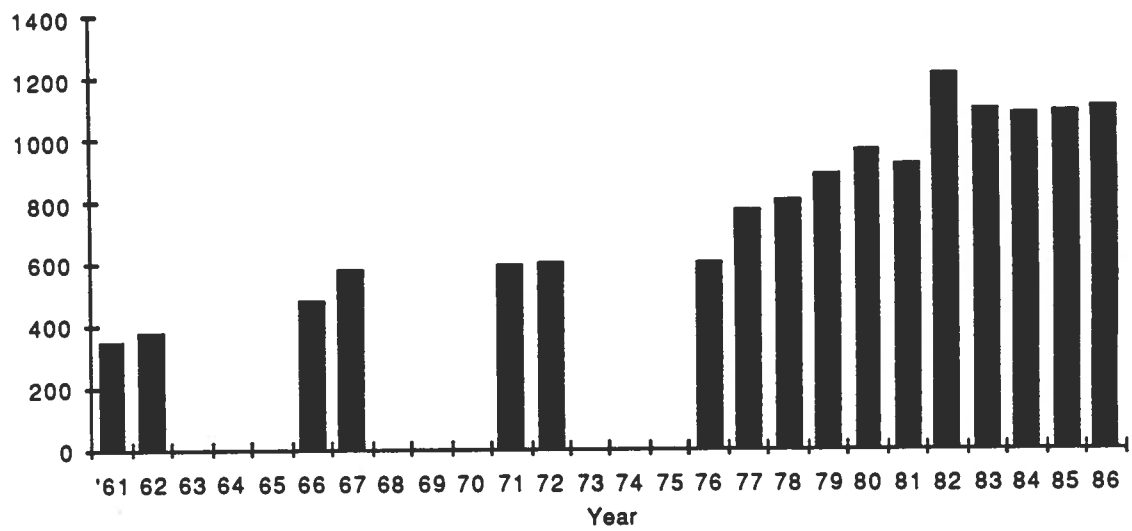
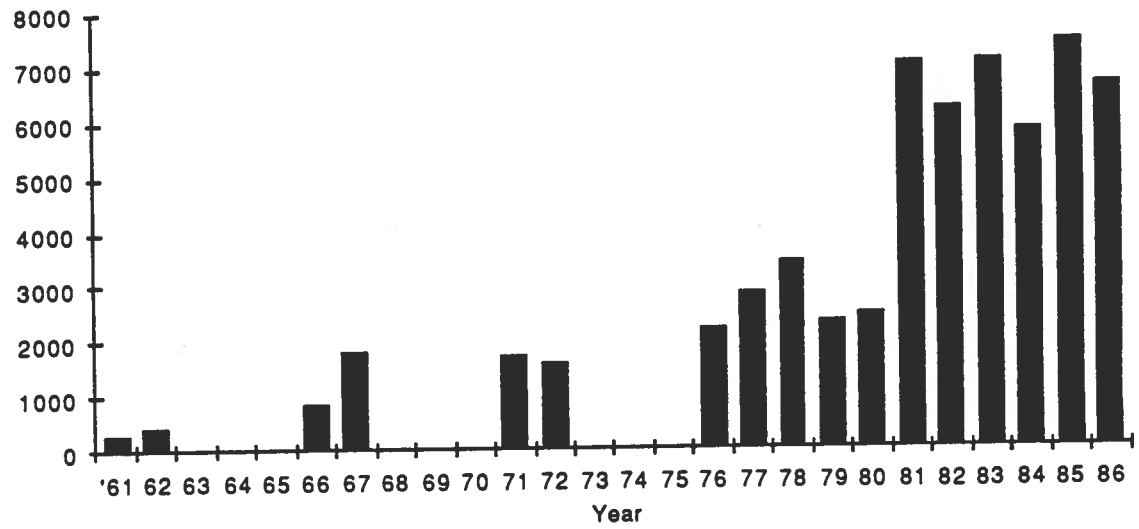
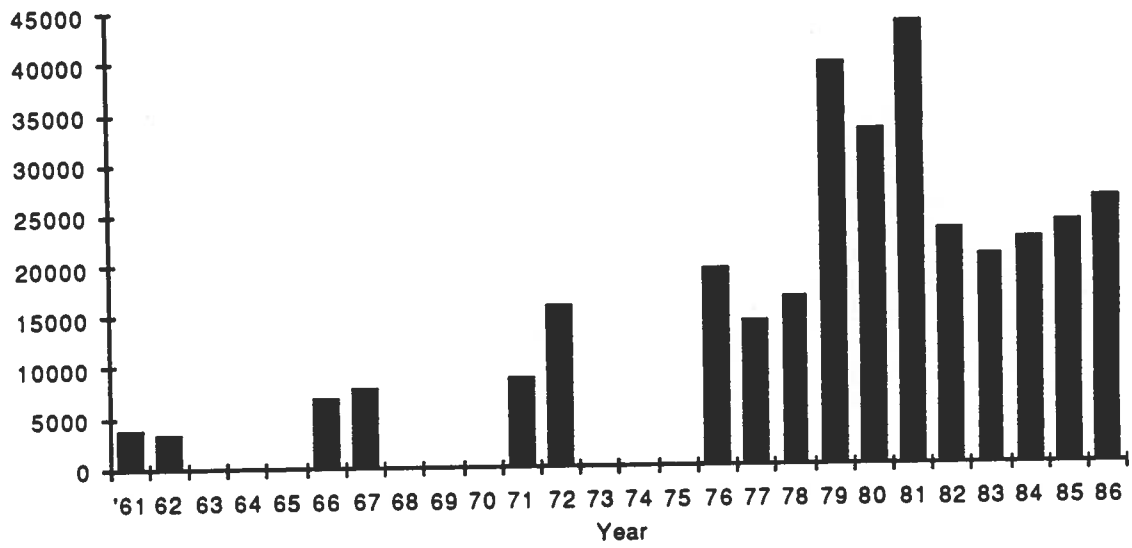


FIGURE 11

MOVING VIOLATIONS PER YEAR



PARKING CITATIONS PER YEAR



Reported Accidents. Of these three sets of statistics, those on the annual frequency of reported accidents are surely the most grim and telling. As shown in Figure 10, the annual frequency of reported accidents has ranged between 1,000 and 1,200 in each of the last five calendar years. To make this number more real, consider that this accident rate is equivalent to more than 3 accidents every day of the year. If the accidents were evenly distributed across all of Belmont, it would amount to roughly 15 accidents per year for every mile of road. Given that the accidents certainly are not evenly distributed either across days of the week, hours of the day, or miles of street in Belmont, the undeniable implications is that there are at least certain times during which certain streets and intersections in town are unsafe.

Over the same period of time, the number of citations which Belmont Police have issued for moving violations has leveled at about 6,000 to 7,000 per year while the number issued for parking violations has ranged between 20,000 and 26,000. It is quite possible that the number of citations grossly underestimates the frequency of violations. An argument can be made that the growth in number of citations across these years almost certainly misrepresents the growth in the frequency of violations occurring in Belmont.

Speed Control. Among the complaints the TAC encountered from residents were that safe speeds in Belmont were too rarely posted, regularly exceeded, and inadequately enforced. We address the first two issues in this section and the third of them in the section on "Law Enforcement."

The issues of excessive speed and speed limit posting would seem to be simply and directly linked. More specifically, the reasonable solution to both of these problems would seem to be to determine the "safe" speed limit for each of the streets with problems and then to post it.

As it turns out, these two issues are indeed interdependent but, due to state regulations and practices, in a seemingly perverse manner. Because virtually all Belmont streets are, by state definition, "thickly settled," it may be inferred that the default speed limit--excepting school zones, etc.--is 30 miles per hour by State law (Chapter 90, Section 17). Minimally, then, we might ask why Belmont streets are not regularly posted with 30 mph speed limit signs. Thirty miles per hour might be faster than we believe to be safe on many streets, but it is also slower than we believe is the actual norm on many streets.

The answer is that official speed postings can be undertaken only with the approval of the State Department of Public Works (DPW), pursuant to Chapter 90, Section 18. Wherever the Town of Belmont wishes to post speed limits, at the default limit or otherwise, it must petition the DPW for sanction. The catch is that the DPW's standard response to requests for speed limit posing is one of "clocking" the

traffic on the street in question. On the basis of these radar measurements, the DPW determines the speed which is not exceed by 85% of the traffic observed. It then recommends that this "85%" speed, rounded up to the nearest 5 mph, be the posted speed for the road. Thus, where ever traffic is generally exceeding the unposted, default limit so that speed limit posting seems particularly desirable, the process of obtaining permission to post the default speed must result in (a) an increase in the speed limit that will be approved for that road by the state or (b) no speed sign posting at all. Needless to say, efforts to post speed limits that are less than the default may produce the same counterproductive response from the DPW.

Thirty miles per hour is not too slow on any Belmont street. Indeed, it might rationally be argued that--due to the density and nature of the traffic, the width of the streets, the nature of the residential and commercial areas*they pass through, and the frequency of driveways and side streets--a limit of 30 miles per hour on many if not most of our streets is too fast for safety. Yet, before we can petition state overseers for official speed limit signs and expect them to return permission for what we deem reasonable speed limit signs, we must ensure that the 85% speed of traffic, as they clock it, will fall within a safe range. Regardless of what we deem this safe range to be, it is clear that, at this point in time, the ambient traffic on major streets in Belmont generally exceeds the default limit of 30 mph.

With this background in mind, it becomes fortunate rather than unfortunate that, unless and until the state explicitly recommends or approves a change in the speed limit for any given street, the legal limit for that street is officially fixed at the default. Therefore, while we may not post the default speed limits with official speed limit signs, we can legally enforce them. Further, it seems that while we may not post official speed limit signs, we may post unofficial speed limit or, more precisely, speed information signs. Such signs would read "30 MPH," for example. Both of these measures should help to reduce the 85% speed of Belmont traffic.

In summary, whether we wish to have the default speed or some lower speed limit officially posted in Belmont, it is imperative that we take immediate and effective steps to post and enforce 30-mile-per-hour maximum speeds.

Origins of Violators. In order to obtain a better idea of the nature of current moving violations and the origin of those apprehended for committing them, the TAC asked the Traffic Department of the Belmont Police to tabulate all moving violations for a two-week period in October, 1986. The results presented in Table 1 indicate that during the survey period: (1) about half of the moving violations were for speeding and (2) or more than three out of four violators were not Belmont residents.

TABLE 2
NATURE AND ORIGIN OF MOVING VIOLATORS,
TWO-WEEK SURVEY PERIOD, OCTOBER, 1986, BELMONT

<u>Violator's License Address</u>	<u>Speeding</u>	<u>Lack of Registration or Inspection</u>	<u>Red Light</u>	<u>Illegal Turn</u>	<u>Other</u>	<u>Total</u>
Belmont	11.4%	5.1%	2.8%	2.0%	2.8%	24.0%
Communities Contiguous to Belmont	16.5%	7.1%	5.5%	3.5%	3.5%	36.2%
Other Communities	<u>21.3%</u>	<u>6.3%</u>	<u>6.3%</u>	<u>3.1%</u>	<u>2.8%</u>	<u>39.8%</u>
Total, %	49.2%	18.5%	14.6%	8.7%	9.0%	100.0%
Total, Number	125	47	37	22	23	254

Pedestrian and Bicyclist Safety

Annual frequencies of pedestrian and cyclist accidents and injuries are presented in Table 2. Across the five-year period between 1982 and 1986, accidents involving pedestrians increased 72%, with pedestrian injuries increasing by 40%. The only two pedestrians killed during this time were killed in 1986. Similarly, accidents involving cyclists rose by 160% from 1982 to 1986, with the number of bicyclists injured in 1986 reaching a level five times that of 1982.

TABLE 2

<u>Events</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>Percentage Increase</u> <u>1982-1986</u>
Pedestrian						
Accidents---	13	13	20	17	22	+72%
Injured-----	13	13	14	12	18	+40%
Fatalities--	1	0	0	0	2	
Bicycle						
Accidents---	9	10	15	20	23	+160%
Injured-----	3	10	7	12	15	+500%
Fatalities--	0	0	0	0	0	
Total, Pedestrian and Bicycle Accidents	22	23	35	37	45	

Clearly, there is an increasing safety problem for cyclists and pedestrians on Belmont streets. While it seems plausible that this problem is related to the increase in the numbers or the perceived aggressiveness of the drivers in Belmont, it also must be recognized that the layout of some of Belmont's streets neither warns nor controls auto traffic in ways that might help to protect, pedestrians or cyclists. This was a factor in the most recent fatality.

School Safety. In early Fall, 1986, the Traffic Advisory was contacted by various Belmont residents in regard to safety issues around the Burbank and Wellington Schools and in front of the High School on Concord Avenue. It seemed a natural progression to ask the principal of each of the town's schools to advise the TAC about each school's particular needs and issues.

All of the Belmont schools' principals were involved in the process and in the case of the Butler and Winn Brook schools, the PTA's were questioned by the respective principals. Recurring themes included concern over speed and/or volume of traffic, concern over parents who do not cooperate in the safe dropping off and picking up of children, and the widespread feeling that some official presence (e.g., Belmont police officer) is of major benefit around the schools in terms of increasing traffic safety.

It should be added that, while school renovations are in the planning stage, Belmont should undertake a careful survey of the different busing and walking patterns that will occur when children are assigned to new and unfamiliar schools. The new and different patterns may entail relocating crossing guards or hiring additional ones, and the argument for a Wellington School bus turnaround becomes even stronger with the prospect of more busing.

Concerns of principals and, in some cases, PTA's are detailed in Appendix C.

Law Enforcement. Frustration over the apparent inadequacy of traffic law enforcement was a frequent complaint at our precinct hearings for residents. In response to this frustration we must ask what's the matter with our police force? Why aren't they doing a better job? A major component of the answer to this question is revealed in Table 3. Here, we have summarized the total number of police officers along with the total number of citations issued for moving violations and parking in Belmont and in each of the towns abutting Belmont except Cambridge for calendar year 1984. It shows that the Belmont Police were second only to Arlington in the number of parking citations issued. Moreover, they issued more citations for moving violations than any of the other towns. At the same time, the Belmont Police force was substantially smaller than any of the comparison towns. In

particular, our police force was fully 30% smaller than that of Arlington, the town which suffers traffic problems most similar to our own.

TABLE 3
RESULTS OF POLICE/TRAFFIC ENFORCEMENT SURVEY
(BASED ON CALENDAR YEAR 1984)

<u>Town</u>	<u>Number of Police Officers</u>	<u>Number of Citations Issued for</u>	
		<u>Moving Violations</u>	<u>Parking Violations</u>
Arlington	85	4,811	25,642
Belmont	60	5,844	22,218
Lexington	75	3,857	6,099
Medford	100	2,903	unknown
Waltham	130	5,202	9,950
Watertown	70	5,382	17,754

From this information we conclude that the per-officer traffic enforcement efforts of Belmont's police substantially exceed those of any other force in the area. If their presence seems inadequate, they cannot be faulted for lack of effort. Part of the problem, we surmise, is that Belmont's traffic volume and consequent requirements for traffic enforcement are greater than those of surrounding towns. Part of the problem, we are convinced, is that the Belmont Police Department is understaffed relative to the magnitude of its task and the level of performance we require of it.

Belmont's traffic problems began to mushroom in the early 1970's. Yet, as Table 4 shows, the size of Belmont's Police Department has not grown in pace with that problem. It has, to the contrary, shrunk: from 64 officers in 1970 to a current low of 56 with significantly more attrition expected by the force this year. Since 1982, the number of officers in Belmont's Police Department has diminished by 10%. In contrast, the volume of traffic in Belmont has grown by 25% during this time. Thus, while Figures 11 and 12 might seem to indicate that the number of traffic violations in Belmont has leveled in recent years, an alternate and very plausible explanation for their stability is that the capacity of the Belmont police force to issue citations has peaked out.

TABLE 4
NUMBER OF OFFICERS IN THE BELMONT POLICE DEPARTMENT BY YEAR

<u>Year</u>	<u>Number of Officers</u>
1960	41
1965	47
1970	64
1980	64
1981	63
1982	62
1983	60
1984	58
1985	58
1986	56
1987	56*

* As of January, 1987; does not reflect retirements scheduled within the year.

Increases in traffic volume will naturally result in increases in traffic violations. A strong police presence may be the only effective means of mitigating this trend. An increase in penalties for violations may be another.

Although Belmont does not control fines for moving violations, it is responsible for setting parking fines. Information in Table 5 shows that fines for parking violations are, at present and in general, considerably lower in Belmont than in neighboring towns.

TABLE 5
DOLLAR AMOUNTS OF FINES FOR PARKING VIOLATIONS IN BELMONT
AND NEIGHBORING TOWNS

<u>Violation</u>	<u>Belmont</u>	<u>Cambridge</u>	<u>Watertown</u>	<u>Lexington</u>	<u>Arlington</u>
Meter	2	5	5	3	5
Meter Feeding	5	5	5	--	5
Overtime					
Parking	5	5	5	--	5
Not within					
Designated Area	5	5	5	--	5
Wheels over 12"					
from Curb	5	5	5	10	5
Wrong Direction	5	10	5	--	5
Improper Angle	5	--	--	10	5

All Night					
Parking	5	--	5	15	5
Sidewalk	5	15	5	10	5
Restricted Area	5	10	10	10	5
Double Psrking	5	15	10	--	5
Within 20' of					
Intersection	5	15	10	10	5
Crosswalk	5	15	10	10	5
Bus Stop	5	15	10	10	5
Taxi Stand	5	15	---	10	5
Hydrant	10	15	10	10	10
Obstructing					
Driveway	10	15	10	10	10
Obstructing					
Private Way	10	--	10	10	10
Failing to					
Leave 10' Lane					
for Traffic	10	15	10	10	10
Excavation					
Obstruction	10	15	10	--	10
Obstructing					
Snow Removal	15	15	10	15	15
Illicit Use of					
Handicap					
Spaces	--	25	15	15	--

Three other facts stand out in our findings concerning enforcement. The Town of Belmont currently has 50,000 traffic citations outstanding and uncollected. They approximate \$350,000 in fines. And in its collection procedures, the Town does not participate in the Commonwealth of Massachusetts' statewide program to encourage compliance in payment of fines by denying renewal of driver's license and registration to those having a small number of unpaid citations.

Nature of Traffic

The dangers and discomfort owed to the speed and volume of traffic in Belmont Streets are both caused and compounded by the nature of the traffic. There are, in particular, two categories of traffic about which residents expressed special concern. The first category includes heavy truck traffic. The second includes commuter and other through traffic.

Truck Traffic. A significant proportion of the vehicles traveling Belmont's major roads consists of very large, heavy trucks. These trucks are exceptionally dirty, noisy, and destructive of private property and public pavement. Stories residents told about heavy vibrations and cracked windows were frequent at our hearings. The toll taken by heavy trucks on pavement life is well known and cannot be overlooked in view of

the fact that Belmont currently affords repavement of less than one mile of street per year.

Where pavement flaws already exist, residents' complaints about trucks were especially acute. Flaws which, though barely noticeable when cars pass over them, produce thunderous booms when heavy trucks pass over them. The extra destruction to the pavement signalled by such "thunderous booms," is easily surmised.

The most critical problem presented by such trucks, however, relates to the nature of the streets they traverse. Leonard Street runs through a shopping center such that the frequency of parking, stopping, and standing cars, of boarding and unboarding passengers from cars, and of crossing pedestrians is exceptionally high. The majority of the other streets are residential, fronted with homes and sidewalks and dotted with residential driveways and sidestreets. Because the majority of these streets are flat and through, unlike most in Belmont, they are moreover favorite routes of joggers, pedestrians, and cyclists (including the very young).

Safety is the most critical problem presented by these trucks. They are too large and too heavy to slow down, stop, or maneuver as quickly as might be required on any of the streets in question. And the danger of their inertia is greatly compounded by the prevailing speed and density of traffic on these streets. The Town of Belmont does not have current statistics on the number or tonnage of heavy trucks traversing its streets.

Commuter and Other Through Traffic. When attention is turned to means for controlling the growth of traffic volume in Belmont, the question inevitably arises as to how we know that the increase in traffic is due to commuters or other cross-town traffic rather than normal within town activity. This is the issue to be addressed in this subsection.

The authors of the TAMS report, in order to estimate the proportion of the traffic volume that might be attributed to commuters, computed the "peak hour percent" or "K Factor" for each of several street segments in Belmont. The "K Factor" is simply the ratio of the peak hour volume on a street to the total amount of traffic per day on that street:

$$K \text{ Factor} = \frac{\text{Number of cars during peak hour}}{\text{Total number of cars per day}}$$

In Table 6 of this report, we have reproduced Table 1 from the TAMS report which summarizes their "K Factor" computations.

The capacity of TAMS' "K Factor" to accurately reflect the volume of cross-town traffic can be questioned immediately. First, the "K Factor" measures the proportion of through traffic that occurs during rush hours only; the "K Factor" is not indifferent to, but effectively and misleadingly diluted to whatever extent that Belmont streets are used as a Route 2 bypass during other hours of the day. Second, within TAMS' formula, morning and evening rush hours last, by definition, for exactly one hour each; yet, it is clear that, in actuality, morning and

evening rush periods are not so tightly constrained. Again and to the extent that the actual duration of heavy morning and evening commuter traffic lasts for more than one hour, TAMS' "K Factor" is not only underestimated but diluted. Third, given that TAMS defined the peak periods as lasting exactly one hour each, it would be useful to know exactly which hours they used. This is nowhere stated in their report. In TAMS' Figures 4 and 5 (pp. 14-15) in which they present an historical view of peak hour traffic volumes, the morning and evening "peak hours" are respectively cited as "7:30-8:30 or 7:45-8:45 AM" and "4:45-5:45 or 5:00-6:00 PM." Fourth, there is some reason to question the origin and accuracy of the traffic counts on which TAMS' "K Factors" were based. The peak and daily traffic volumes cited in Table 6 of this report do not match the statistics on any of the traffic count Figures that TAMS has provided. In addition, we note that while the

TABLE 6
PEAK HOUR PERCENT AT SELECTED LOCATIONS IN BELMONT

Location	AM				PM			
	Inbound		Outbound		Inbound		Outbound	
	No.	%	No.	%	No.	%	No.	%
#1 Concord Ave. SE Mill St.	385/2,000	19	101/2,000	5	181/2,000	9	310/2,000	16
#1A Concord Ave. W of Pleasant	400/2,058	15	220/2,483	9	210/2,058	2	295/2,423	12
#2 Clifton N of Pleasant	541/4,195	13	289/4,188	6	341/4,195	8	548/4,188	13
#3 Brighton NW Cross	562/4,000	14	195/4,000	5	269/4,000	7	529/4,000	13
#4 Pleasant S of Rte. 2	1,085/10,659	10	669/10,476	6	815/10,659	8	1,034/10,476	10
#5 Park Ave. N of Rutledge	603/4,589	13	305/4,875	6	415/4,589	9	739/4,875	15
#6 Concord Ave. S of Pleasant	481/4,935	10	321/4,226	8	364/4,935	7	300/4,226	9
#7 Beech St. N of Trapelo	108/1,500	7	41/1,500	3	142/1,500	9	91/1,500	9
#8 Common Street S of Concord	337/5,000	7	447/5,000	9	243/5,000	5	691/5,000	14
#9 School Street N of Belmont	211/1,500	14	57/1,500	4	121/1,500	8	197/1,500	13
#10 Cushing Street N of Trapelo	-		21/600	4	-		51/600	8
#11 Leonard Street S of Pleasant	837/4,708	12	398/6,228	6	539/6,708	8	688/6,228	11
#12 Pleasant Street S of Concord	620/5,699	11	495/7,422	7	370/5,699	6	700/7,422	9
#13 Pleasant Street N of Rte. 2	1,262/10,596	12	502/11,473	4	701/10,596	7	1,261/11,473	11
#14 Pleasant Street S of Clifton	567/5,329	11	312/5,073	6	392/5,329	7	532/5,073	10
#15 Mill Street at Regent	1,190/10,460	11	633/7,475	8	1,022/10,460	10	799/7,475	11
#16 Belmont Street E of Trapelo	1,358/14,246	10	894/13,855	6	1,038/14,246	7	1,366/13,855	10
#17 Belmont Street	827/8,621	10	555/6,735	8	743/8,621	9	636/6,753	9

Source Table 1, TAMS' Report, 1985

TABLE 7
PEAK HOUR PERCENT AT SELECTED LOCATIONS IN BELMONT

Location	AM				PM				1.0 hr. rush		1.5 hr. rush	
	Inbound		Outbound		Inbound		Outbound		A		B	
	No.	%	No.	%	No.	%	No.	%	%	% increase	%	% of increase
#1 Concord Ave. SE Mill St.	385/2,000	19	101/2,000	5	181/2,000	9	310/2,000	16	24	718	37	1233
#1A Concord Ave. W of Pleasant	400/2,058	15	220/2,483	9	210/2,058	2	295/2,423	12	25	735	38	1267
#2 Clifton N of Pleasant	541/4,195	13	289/4,188	6	341/4,195	8	548/4,188	13	21	583	32	1000
#3 Brighton NW Cross	562/4,000	14	195/4,000	5	269/4,000	7	529/4,000	13	19	514	29	853
#4 Pleasant S of Rte. 2	1,085/10,659	10	669/10,476	6	815/10,659	8	1,034/10,476	10	17	447	26	743
#5 Park Ave. N of Rutledge	603/4,589	13	305/4,875	6	415/4,589	9	739/4,875	15	22	629	33	1031
#6 Concord Ave. S of Pleasant	481/4,935	10	321/4,226	8	364/4,935	7	300/4,226	9	16	421	24	667
#7 Beech St. N of Trapelo	108/1,500	7	41/1,500	3	142/1,500	9	91/1,500	9	13	325	20	526
#8 Common Street S of Concord	337/5,000	7	447/5,000	9	243/5,000	5	691/5,000	14	17	447	26	743
#9 School Street N of Belmont	211/1,500	14	57/1,500	4	121/1,500	8	197/1,500	13	20	556	30	909
#10 Cushing Street N of Trapelo	-	-	21/600	4	-	-	51/600	8	-	-	-	-
#11 Leonard Street S of Pleasant	837/4,708	12	398/6,228	6	539/6,708	8	688/6,228	11	23	657	35	1130
#12 Pleasant Street S of Concord	620/5,699	11	495/7,422	7	370/5,699	6	700/7,422	9	17	447	26	743
#13 Pleasant Street N of Rte. 2	1,262/10,596	12	502/11,473	4	701/10,596	7	1,261/11,473	11	17	447	26	743
#14 Pleasant Street S of Clifton	567/5,329	11	312/5,073	6	392/5,329	7	532/5,073	10	17	447	26	743
#15 Mill Street at Regent	1,190/10,460	11	633/7,475	8	1,022/10,460	10	799/7,475	11	20	556	30	909
#16 Belmont Street E of Trapelo	1,358/14,246	10	894/13,855	6	1,038/14,246	7	1,366/13,855	10	17	447	26	743
#17 Belmont Street	827/8,621	10	555/6,735	8	743/8,621	9	636/6,753	9	18	486	27	771

A. The percent increase of rush period over non rush period traffic assuming the duration of each rush period to be 1.0 hours.

B. The percent increase of rush period over non rush period traffic assuming the duration of each rush period to be 1.5 hours.

Sources: Table 1, TAMS' Report, 1985 plus TAC Computations

daily counts for some of the streets are reported to the nearest car, the daily counts for others appear to be rounded to the nearest 500th or 1000th car; the latter counts are surely estimates, but on what were they based? Could it have been on an hour's worth of off-peak counting? If so, which hour? Although no small set of "off-peak" hours could yield an accurate estimate of the total daily volume, we are especially hopeful that the TAMS traffic counters did not simply hang around and use a period of time adjacent to the "peak" hour to generate them. Finally, given the way that the TAMS authors have split their "K Factor" computations across inbound and outbound traffic and morning and evening "peak hours," it is difficult to translate the numbers into an image of the actual rush period increase in traffic.

Table 7 is provided in an effort to clarify the latter. In Table 7, we have again reproduced Table 1 from the TAMS report but added four additional columns. The first column that we have added was derived by recomputing the "K Factor" across both morning and evening "peak hours" and inbound and outbound traffic. The values in this first additional column thus reflect the total percentage of traffic on each street that occurs during the particular morning and evening hours during which the TAMS "peak hour" counts were taken. These values range from 13% for Beech Street to 25% for Concord Avenue west of Pleasant Street. For the second additional column, we have used these percentages to compute the "peak hour" increase in traffic, assuming equal distribution across the remaining 22 hours. The values in this second added column indicate that "peak hour" traffic, as computed by TAMS, represents an increase of 325% on Beech Street to 735% on Concord Avenue west of Pleasant relative to the average flow during other hours of the day. Even if we assume that absolutely no traffic flows down these streets between the hours of midnight and 6:00 AM, the rush period volume would represent an increase of 241% to 534% over the average flow for each of the other 16 hours of the day.

In the third additional column, the total percentage of rush period traffic has been adjusted on the more plausible assumption that the morning and evening rush periods in Belmont actually last for one and one half hours each. Under this assumption, the percentages of traffic flow during rush hour rises, ranging from 20% for Beech Street to 38% for Concord Avenue west of Pleasant. Given this assumption, the ratio of off-hour to rush period traffic, shown in the fourth added column, is seen to range between 526% and 1267%. Averaging down the fourth new column, we see more generally that the typical Belmont resident or store owner on these streets suffers an increase in traffic past her or his home or business of about 820% during rush periods. Again, if we were to assume that absolutely no traffic flows down these streets between the hours of midnight and 6:00 AM, the rush period volume would represent an increase of 377% to 927% over what

the average flow would be for any of the remaining 15 hours of the day.

Tables 6 and 7 thus confirm that much of Belmont's traffic does indeed occur during the morning and evening rush periods. Yet, they do not address the issue of the extent to which this increase is attributable to Belmont residents commuting to and from town versus nonresidents commuting through town.

The best way to answer this question would be to undertake origin and destination surveys of commuters at major "gateways," or exists from and entrances to town, during rush periods. In the absence of such "gateway" data, however, we can examine existing traffic counts for a hint at the resolution of this issue.

An estimate, albeit an underestimate, of the traffic flowing into and out of Belmont from the north and west can be generated by summing the 1986 traffic counts across incompatible entry- and exit-ways in the north and west:

TABLE 8

	<u>Inbound</u>	<u>Outbound</u>	<u>Total</u>
Pleasant St at Rte 2	12550	13376	25926
Cross St (NW of Brighton)	6573	4913	11486
Park Ave at Rte 2	5381	5834	11215
Upper Concord Ave	3038	3359	6397
Mill St	7413	9130	16543
Total	34955	36612	71567

The important figures here are the totals: 34,955 vehicles driving into Belmont every day from the north and west and 36,612 vehicles driving out of Belmont every day toward the north and west.

We can similarly estimate of the number of vehicles driving to and from Cambridge from Belmont streets every day:

TABLE 9

	<u>Inbound</u>	<u>Outbound</u>	<u>Total</u>
Lower Concord Ave	6122	6755	12877
S. Brighton St	8804	9039	17843
Belmont St	14896	15285	30181
Grove St	8840	9585	18425
Total	38662	40664	79326

Again, it is the totals that are most important: 38,662 vehicles drive into Cambridge from Belmont every day; 40,664 drive out of Cambridge into Belmont every day. Notably, the Belmont-Cambridge traffic from Grove Street is overestimated in proportion to the number of vehicles that continue from Grove Street into or through Belmont.

How many of these vehicles are traveling to or from Belmont as opposed to through Belmont? We cannot know for certain, but we can bound the answer in several ways. Our estimates of the number of vehicles entering and exiting Belmont in the north and west and at the Cambridge line are quite similar. However, it can be argued that relatively few vehicles entering and exiting from the north and west continue to Grove Street or vice versa. Subtracting the Grove Street estimate from the Belmont-Cambridge total leaves approximately 30,000 vehicles that might be traveling to and from Cambridge from the north and west of Belmont. Comparing that figure to the 35,000 vehicles that enter and exit Belmont in the north and west, we find a difference of 5000 vehicles. For purposes of present approximations, we may assume that these 5000 cars belong to Belmont residents who commute the north and west or to people employed in Belmont who commute from the north and west.

Yet there must in addition be a number of people who work or live in Belmont who drive to and from places not in the north and west every day. This number can be estimated in at least two different ways from the traffic counts.

For our first estimate, we have summed the inbound and outbound traffic on major, incompatible "through" routes in Belmont; these major routes include Belmont Street plus all of the major entry and exit routes to the north and west that are cited in Table 8 above except Mill Street. (Mill Street is excluded because it is deemed likely that a large percentage of its traffic continues onto Trapelo Road and then Belmont Street.) The total volume of traffic in Belmont every day on these incompatible "through" routes equals 42,000 inbound and 42,800 outbound. If we subtract 30,000 from either of these totals to account for the vehicles that were earlier decided to be commuting through Belmont (as opposed to to-and-from Belmont) from the north and west, we are left with approximately 12,500 vehicles driving to, from, or strictly within Belmont itself each day versus 30,000 vehicles driving through Belmont each day with neither origins nor destinations within the town. To each of these totals, we must still add an estimate of the Belmont and non-Belmont based traffic that enters and exists from the South but continues neither down Belmont Street nor to Arlington or Lexington (non-Belmont based traffic in this category would include, for example, all vehicles cutting through Belmont to Cambridge from Newton, Waltham, Watertown, and the Mass Pike); as a proxy for this estimate, we can use the Grove Street counts. Adding the Grove Street counts to our earlier inbound and outbound

subtotals of 42,500 and 42,800 our estimate of the grand volume of traffic within Belmont each day becomes 51,4000 on inbound routes and 52,400 on outbound routes. We will assume that a like proportion ($12,5000/30,000 = 0.42$) of the Grove Street traffic is indeed Belmont based. Given this assumption, the total volume of Belmont based traffic, including Grove Street, sums to 16,300 while the total volume of non-Belmont based traffic sums to 35,300.

For our second estimate, we will assume that the ratio of vehicles that do have origins or destinations in Belmont to those that do not, is comparable across entry and exit points. For vehicles entering and exiting from the north and west, we have already determined this ratio to be approximately 5,000 to 35,000 or, equivalently, 1 to 7. Assuming that the ratio is similar for the vehicles entering and exiting Cambridge, we divide 30,000 by seven to estimate that the Belmont-Cambridge volume includes an additional 4,300 vehicles with origins or destinations inside Belmont. Subtracting both of these numbers from our estimate of the total one-way traffic volume within Belmont each day, we get $52,000 - (5,000 + 4,300) = 42,700$. Assuming again that one seventh of this volume represents activity internal to Belmont, we can reduce it, too, by one seventh or 6,100 vehicles. This leaves a total of 36,600 vehicles each day which are only passing through Belmont. In contrast, the sum of the estimates for traffic driving to, from, or within Belmont is 15,500.

Although the results of these two estimates of Belmont-based versus through traffic are impressively similar, we admit that their derivation is somewhat tenuous. For this reason, it behooves us to check their plausibility through some independent approach.

To this end, we resort to demographics. The total population of Belmont is 26,541. Of that, 4,507 residents are over the age of 65; the majority of these individuals are presumably retired and do not regularly commute in and out of town. An additional 5,688 residents are less than 20 years old; of these individuals, the majority who are old enough to drive are either in local schools all day or are elsewhere attending college. That leaves 16,346 Belmont residents between the ages of 21 and 65 who might regularly contribute to traffic in Belmont each day. Even if everyone of these 16,346 adults got into a separate car and drove around Belmont every day, we would still be left with a minimum daily count of 35,700 nonresident vehicles in the town each day.

As one more approach, the Bureau of Employment Security of the Commonwealth of Massachusetts reports that, as of November, 1986, a total of 14,303 Belmont residents were employed. Assuming that each of these individuals works every day and that each of them drives a separate, private car to work (i.e., no carpooling, no part-time jobs, no public transportation, and no walking to work), we would still be left with a minimum unaccounted vehicle volume of 37,700

driving through Belmont daily in each direction.

In summary, then, the statistics we have in hand, while far less than ideal for the end to which they have been applied, make irrefutable the conclusions that a very large proportion of Belmont's traffic volume is indeed owed to cross-town commuters and other vehicles with origins and destinations outside of town. Our examination of TAMS' "K Factor" computations indicates that morning and evening rush periods bring with them an eightfold increase, on average, on major Belmont streets. Moreover, even our conservative estimates indicate that the proportion of daily traffic traveling through Belmont--that is, traffic that has no business whatsoever in being in Belmont--is at least twice that which is attributable to within-town origins and destinations: while our estimates of the number of vehicles that properly belong in Belmont each day range from 14,300 to 16,400, our estimates of the number of vehicles that are simply driving through Belmont range from 35,400 to 37,700.

All of this is consistent with our survey of moving violations offenders, reported earlier, that showed that during the survey period, three out of four offenders gave non-Belmont addresses.

The extent to which the deluge of through traffic that passes through Belmont each day subtracts and increasingly will subtract from the safety, convenience, and quality of life in our town cannot be overlooked. Yet, any failure to recognize and control this traffic and its cause must also incur certain more measurable costs on our economy. The extra costs of street maintenance and adequate traffic enforcement are obvious; the pernicious aspect of these costs is that even while they are not incurred by residents, they must be paid for by residents and at the same time diminish the tax-base from which those payments can be extracted. Local realtors estimate that the value of homes on Pleasant Street, solely because of the volume of traffic on that street, must this year be discounted by 15% or roughly \$45,000 per home. What will the devaluation be in fifteen years? By what gradient does it and will it spread to homes adjacent to such major routes?

Most importantly, it is clear that the traffic problems that Belmont is now and, by all projections, will increasingly be suffering are not local but regional problems, and herein lies the most serious consequence of postponing or refraining from some immediate and aggressive response. Specifically, for as long as and to the extent that Belmont continues to absorb commuting and other through traffic on its streets, it not only masks the true magnitude of the regional problem but effectively works against the implementation of any adequate regional solution.

We rightfully should not be supporting the direct and indirect costs of traffic commuting from Arlington, Lexington, Bedford, and Winchester to Cambridge and Boston.

We hope that Route 2 will be redesigned to accommodate this commuter load. Yet, how can we expect this to happen? Appropriate redesign of Route 2 would be very expensive. It would require state and federal funding. It is unlikely to be undertaken without pressure from a quorum of communities. But where is the motivation to initiate such pressure? Just like Belmont, our neighboring towns have many issues on their agendas. As long as their residents and employees are getting to and from work with reasonable efficiency, the redesign of Route 2 cannot, from their points of view, be a top priority item. If we want Route 2 to be redesigned in the near future, then we must do whatever we can to allow its "undercapacity" to become apparent to the communities that must be our partners in forcing this effort. We must, in other words, do whatever we can to discourage such traffic through Belmont.

Of equal importance to when Route 2 is redesigned is how it is redesigned. Belmont cannot afford--on any dimension, fiscal or otherwise--to continue to support the current, much less the projected, levels of Route 2 offload. Contemplated improvements to Route 2 at Alewife, as reviewed in the TAMS report, are directed toward increasing the road's capacity so as to allow (1) reasonable passage of its current load plus (2) increases directly attributed to future developments in the immediate Alewife area. In contrast, it is our goal that Route 2 at Alewife be redesigned to accommodate both of these classes of vehicles but additionally (3) its current undercapacity, i.e., the through traffic that is currently diverted through Belmont, and (4) all future increases in regional through traffic. With this in mind, it is useful to devote several paragraphs to the special problems associated with development at Alewife Brook Parkway and Route 2.

Alewife "New Town" Development

Much of Belmont's traffic crisis can be traced to the development of a "new town" at Route 2 and Alewife Brook Parkway without adequate planning. Traffic slowdowns here cause motorists to use Belmont local streets as bypass routes.

For 12 years, State planners have been attempting to release a traffic tangle that was created in the '60's and '70's and worsened in the '80's at Alewife.

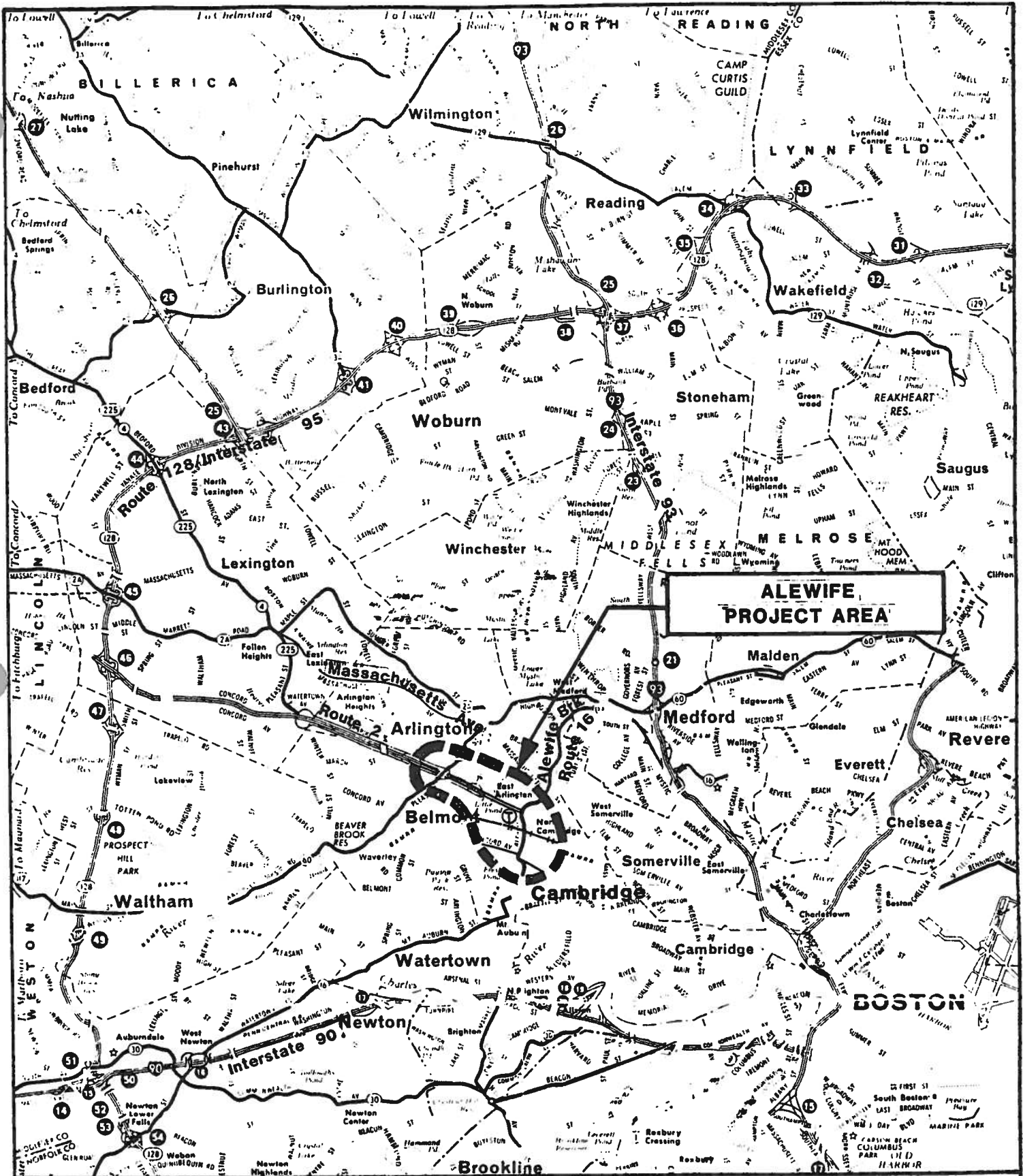
In 1968, Route 2 was constructed as a 6- and 8-lane expressway from Route 128 to Lake Street, Belmont. In 1972, this expressway assumed a deadend quality when the State discontinued plans to construct Route 2 beyond Alewife Brook Parkway and connect with the Cambridge section of the Inner Belt. The traffic tangle was worsened in the '80's when development near the Alewife MBTA station added thousands of cars a day to the problem.

The Alewife development has been forecast as reaching 10 million square feet. If it does, it will be the equivalent of five Prudential Towers. Conservatively, parking could total

20,000 spaces.

Unfortunately, no clear and comprehensive analysis of Alewife's impact on Belmont's traffic has been presented by the State. No origin-and-destination study of Belmont's bypass commuter traffic has been conducted. Nor has the future impact been assessed. A basic question is: "What percentage of Belmont's traffic problem is due to east-west (Alewife impacted) traffic and what percentage is due to growth in north-south, crosstown traffic?".

Alewife may be inducing augmented traffic flows in both directions. As shown on the map in Figure 13, Belmont is on one side of a huge traffic circle around a new town at Alewife. The circle is formed by Brighton Street, Blanchard Road, Concord Avenue, Alewife Brook Parkway and Route 2.



Route 2/Alewife Brook Parkway Project EIS/EIR

Vicinity Map

Figure 1

However, the unplanned traffic circle and the "defacto inner Belt" through Belmont are not only increasing traffic in the east section of the town but influencing the diversion of commuters over most major streets including Winter Street, Park Avenue, Pleasant Street, upper Concord Avenue, Prospect Street, Clifton Street, Leonard Street, and Trapelo Road.

Other States faced with the subregional impact of suburban development nodes have begun assessing impact fees on developers to pay for new infrastructure, such as roads. However, traffic impacts over several square miles are not apt to be mitigated by bandaids fees. A better approach may be that of Belmont's State Representative who has demanded that the Governor institute measures to control growth at Alewife.

Other controls are being established in other parts of the country under the Transportation Systems Management process. These include car pools, subsidy of public transit fares, staggered hours of employment. Little has been done at Alewife by Cambridge or the State to influence developers to require these measures.

In Pleasanton, California, 30 miles east of San Francisco, every employer with 10 or more workers must participate in TSM for a proposed development. The goal is a 45 percent reduction in commuting trips with no nearby intersections falling below Level of Service "D" during peak hours. In contrast, no current proposal at Alewife promises nearby intersection levels better than LOS "E" or "F", despite planned expenditures of \$40 million to \$50 million. Even under the most extensive of the Route 2 redensing alternatives currently under consideration by the State, prospects for substantial traffic improvements at Alewife are dim.

The recently-released Preliminary Environmental Impact Statement for the "New Town" at Alewife makes little mention of the effect of the "New Town" on Belmont. Nor does it propose any measures to help the Town of Belmont cope with the additional 20,000 vehicles that the "New Town" is expected to attract to the area each day.

The long-awaited State EIS fails to mention Section 771.105 of Title 23 of the Code of Federal Regulations, which states:

"It is the policy of the Federal administration that (a) To the fullest extent possible, all environmental investigations, reviews, and consultations be coordinated into a single process, and compliance with all applicable environmental requirements be reflected in the appropriate environmental documents required by this administration...

(d) Measures necessary to mitigate adverse impacts be incorporated into the proposed action. Measures necessary to mitigate impacts are eligible for Federal funding..."

The EIS virtually ignores such proposed mitigation as the closing of Route 2 ramps into Belmont between 7 and 9 am.

Yet, it introduces the possibility of 25-foot sound barriers on the Belmont side of Route 2. This mysteriously-sponsored mitigation, at a cost of almost \$1 million, was not proposed by Belmont officials.

The distribution to the Alewife Committee of the "Preliminary" EIS came as a surprise after continuing, unsuccessful demands had been made by Belmont for a review of the Draft EIS that had been submitted to the Federal Highway Administration. Later, it was learned that an attempt was made to seek the endorsement of the Federal Environmental Protection, Corps of Engineers, and Federal Fish and Wildlife. Only the latter agreed.

Federal officials may not be anxious to face a court challenge from Belmont, along with another already filed by the Mystic River Watershed Association. One indication of a gingerly approach to the final stages of EIS approval is the lack of decisiveness at present. The EIS mentions "major issues and controversial areas" raised during the study, but says that several issues are beyond the scope of the proposed action.

Under a heading of "Significant Unresolved Issues," the State comments that detailed mitigation will be considered following the selection of a preferred alternative from among the traffic facility options at Alewife. There is no mention of regional planning proposals by Chairman William P. Monahan of the Belmont Selectmen and advocated in similar situations by the Metropolitan Area Planning Council.

The engineering world works by formulas: projected levels of future through traffic can only be derived by extrapolating from current levels of through traffic. The fiscal world works by necessary constraints: it will provide the least costly solution to that fragment of the problem that it cannot deny. The political world is reactive: in general, it earnestly seeks a solution only after a problem has already become painfully and disruptively apparent. If we want Route 2 at Alewife to be redesigned in the near future and if we want it to be redesigned so as to accommodate the present and future regional requirements for traffic throughput, it is incumbent upon us to force its current spill-off out of Belmont and back onto it, so that its desired carrying capacity can and will be realistically appraised.

Experiences of Neighboring Communities

Representatives of two neighboring communities thought to have made significant progress in planning and controlling traffic, Arlington and Lexington, were consulted by the TAC to learn of their experiences. Both were employed full-time by their respective towns to, among other things, provide planning capability. The official from Lexington declined to provide assistance to what he perceived as "one more volunteer effort by a community known for its unwillingness to pay for

professional management." This, in itself, provided the Committee with at least one data point.

This perception was echoed, in milder form, by Mr. Alan McClennon, Manager, Planning for Arlington, who nevertheless unsparingly spent an evening with the Committee describing Arlington's efforts to control its traffic. As a result of this conversation and a review of a number of experiences of Belmont's citizens and town employees, related by members of the Committee, a pattern emerges with at least the following outlines:

1. Professional town management can attract funds, increasingly at the State level, with which to defray costs of improved management of traffic patterns.
2. Arlington's town management organization is, in part, a reflection of the community's significantly larger size and greater ability to defray the cost of professionals.
3. Many significant improvements in managing traffic have been made, however, on a small budget and a limited amount of funding from outside the community.
4. Dependence on outside agencies for funding or even approval of certain programs or actions has proven to involve major delays in implementing even the most superficial changes.
5. Unless such actions are part of an overall plan, they can be ineffective in achieving desired changes.
6. Support of elected representatives has been decisive in both Arlington's and Lexington's experiences.

Need for Professional Management. No set of proposals, however straightforward, for planning and controlling traffic within our neighboring communities would have been possible without professional town management. The implementation of a program such as that developed for Arlington has involved: (1) the establishment of basic objectives for managing traffic, (2) the identification and selection of the most important alternatives for achieving them, (3) the development of a coordinated plan for use in raising funds to support work as well as guiding the projects undertaken, (4) the identification of priority streets, intersections, and projects around which a traffic management program is to be focused,

(5) continuous follow-up in obtaining both approval and funding for projects from federal and state agencies, and
(6) actual supervision of the work undertaken to insure its conformance with plan.

Importance of Focused Effort. The results achieved on a relatively small budget in Arlington suggest the importance of a comprehensive but focused plan of attack. Basic elements of the Arlington effort included:

1. Identifying the nature of the problem, in this case peak hour traffic congestion and excessive congestion and excessive through truck traffic.
2. Identifying the locus of these problems, mainly three north-south and three east-west thoroughfares and major intersections that they cross.
3. Determining that large numbers of non-Arlington auto and truck-drivers were using these thoroughfares, particularly during peak traffic periods.
4. Developing a set of proposals to reduce, by painting lane line limits, installing curbing and median strips, and introducing new traffic signals, the capacity of these streets to levels and in ways that would help regularize traffic. Included in this proposal, for example, was work to reduce Pleasant Street to one lane of traffic in each direction by confining lane widths with both painted lines and, at certain places, new curbing to a maximum of eleven feet.
5. The proposals, constituting a master plan, were agreed to by the Selectmen and Town Manager and used to argue repeatedly and consistently for support from the DPW for authorization and state funding.

Funding. The Arlington program centered around six major thoroughfares required approximately \$120,000 in consulting engineering fees and \$880,000 for construction. Arlington paid for consulting work; the remainder was covered by state funding. This suggests that a great deal can be achieved on a limited budget with a carefully-focused set of proposals.

Prior to the installation of professional management in 1974, Arlington appropriated roughly \$130,000 per year for all planning and traffic management. Since 1974, the town has been able to raise from \$1.0 million to \$1.5 million annually from non-Arlington sources to support its projects. In part, this success has been explained by the fact that, in view of its population of more than 50,000, Arlington was able to qualify for federal funds when they were available.

Results. Significant year-to-year increases in traffic on major thoroughfares in Arlington, with the possible exception of Lake Street, have ended. Congestion at peak hours has been stabilized and, in some cases, reduced. Truck traffic has been restrained and alternative routes prescribed. To the extent that commuting volumes and truck traffic into Boston and Cambridge from the west continue to increase, commuters and truck drivers apparently are finding routes other than those through Arlington.

The underlying rationale for work carried out in Arlington in recent years was expressed succinctly by Mr. McClennon in the following terms:

1. The life blood of a community is the desire of people to live there.
 2. Good street improvements and effective traffic control improve a community as a place to live.
- We can think of no better rationale to justify implementation of proposals for the control of Belmont's traffic. It represents an investment that will return large dividends not only in improved property values but much more importantly in improvements in safety and the general quality of life in this community.

ALTERNATIVE RESPONSES CONSIDERED

In light of the findings of the Committee, a number of possible responses come to mind or were suggested to the TAC. They ranged from closing Belmont's streets to non-residents at certain critical commuting hours at the one extreme to measures that would make the Town's thoroughfares less congested and more accessible to commuters. While Committee members agreed that neither of these extremes were either advisable or realistic, there were differences of opinion concerning the basic philosophy with which TAC should approach the task of forming recommendations.

At the risk of oversimplification, a majority view developed which is characterized by the recommendations in the next section. In general, they favor restricting traffic flow within Belmont with strict enforcement of existing or new laws to reduce both vehicle speeds and volumes.

A minority view, advocated by one member of the TAC, is presented in Appendix D. It may be characterized generally as favoring a safe free flow of traffic through Belmont, again with strict enforcement primarily of existing speed laws. It too represents careful thought and should be considered by the Selectmen.

RECOMMENDATIONS

The TAC recommends that the Selectmen adopt the Citizens' Traffic Plan (CTP) proposed below as opposed to the funding of projects on a piecemeal, largely uncoordinated basis. The CTP is divided into three phases. The first can be accomplished in a period of six months with a minimum of resources by actions that are within the authority of the Board of Selectmen. Phase II addresses matters that can be initiated by the Town but will require more time, perhaps 24 months, more cost than Phase I and, in some cases, approval by outside agencies. Phase III deals with those matters requiring considerable time and effort as well as the cooperation of government agencies and town planning groups outside of Belmont.

Phase I

1. Adopt a clear policy on traffic control, with priorities on safety and the limitation of speed and a focus on critical streets and intersections.
2. Post and enforce 30-mile-per-hour speed information signs on all major east-west and north-south Town streets. While the TAC realizes that these signs are controversial among some State officials, the speed indicated is the one that State law prescribes for thickly-settled areas. Having discussed the issue at length, the TAC concedes that it would, in general, be unwise to post signs that specify speeds lower than the prevailing general State law. The 30-mile-per-hour signs may be viewed as a source of information and warning for drivers, with their purpose to maintain speeds at or below those posted. They should, however, be used as the basis for traffic speed enforcement by Belmont's police.
3. Identify excessively wide residential streets and paint lane lines on approximately six miles of Town streets to discourage unsafe use of curb or parking lanes by moving traffic. In the interest of both encouraging slower driving and discouraging dangerous passing, we recommend that the driving lanes on all major through routes in Belmont be narrowed to a maximum of 12 feet. The highest priorities for this work should be assigned to Brighton and Pleasant Streets, Concord Avenue, and Blanchard Road.
4. Post conspicuous welcome to Belmont speed enforcement warning signs on all major access roads to the Town.
5. Post 20-mile-per-hour signs and paint pedestrian crossing lines at all public and private schools.

6. Improve school bus unloading facilities, with priority given to the Wellington School. A complete list of suggestions for improving safety at Belmont's public schools is contained in Appendix C.

7. Repaint and sign conspicuously all pedestrian crossing in the Town. Where practical, consider additional locations where pedestrian crossing signs on plastic cones might be placed at crossings, similar to those in use on Leonard Street.

8. Organize a "Drive 25" campaign with the help of the schools to encourage a citizens' slow-down of fast-moving traffic in the community. This might involve signs, bumper stickers, or other kinds of support for the concept. Its basic purpose would be to build community spirit around an issue of importance for all residents.

9. Systematically assign available police to certain high-visibility points at critical times, continuing current non-regular patterns of coverage for other points and times. The TAC realizes that this may require reopening the discussion of work rules with the organization representing the police to permit some flexibility in the designation of shift times that currently end and begin at times when the volume of traffic is at its peak in Belmont.

10. Augment traffic law enforcement with the hiring of two additional police officers to be assigned to traffic duty in addition to those currently assigned.

11. Assign an existing member of Town government to the part-time position of traffic ombudsman to receive, coordinate, and properly route citizens' questions and complaints about traffic and pedestrian safety. The ombudsman's telephone number should be publicized widely to the Town's residents.

12. Encourage pedestrian safety by, among other things, educating motorists regarding the pedestrians' right-of-way when in crosswalks as well as by discouraging jay-walking and by creating a by-law requiring residents to keep sidewalks clear of snow in winter.

13. Enroll the Town in the Commonwealth program that allows records of traffic violators to be "flagged" and warned of possible nonrenewal of license or registration. We recommend that the Town of Belmont request that a "mark transaction" be entered in an individual's record for as many as two unpaid citations from the town. It is estimated conservatively that this would result in immediate revenue to the Town in excess of \$150,000 from past due obligations as

well as a per annum increase in revenues from more prompt payment of outstanding fines in the future.

14. Raise minimum fines for parking violations to discourage illegal parking and help defray the cost of added traffic police personnel and enforcement. More specifically, we recommend that the fines for each of the violations on the list in Table 5 be increased to a level equal to that of Cambridge with the following exceptions: fines for meter violations, sidewalk parking, and overnight parking should be increased to \$10. (The difference between the \$15 fine for sidewalk parking in Cambridge and the recommended \$10 fine in Belmont is deemed reasonable until such point as Belmont has installed curbing so that drivers can unambiguously decide whether or not they are on a sidewalk as opposed to a shoulder.) The recommended levels of parking fines would result in a revenue increase of \$5 to \$10 per citation. Even if citations were to decline by 20% as a result of the increase, this would produce an increase in town revenues of more than \$100,000, per year.

15. Support proposals by Belmont's Traffic Consultant to improve the flow of traffic through the Route 2 and Alewife Brook Parkway intersection.

16. Oppose as strenuously as possible massive new developments at Alewife unless and until new road plans for Route 2 are finalized and funded. Among other things, in a legal suit forcing responsible development there.

17. Address certain specific citizens' complaints received during the TAC's hearing process, listed in Appendix B to this report.

Phase II

1. Hire a town planner with traffic planning capabilities. Among the tasks of this person would be the implementation of certain of the recommendations in this report, the further development of a master traffic plan for the town, and the preparation of requests for funding of such projects from State and Federal sources. The experience of neighboring communities such as Arlington suggests that most or all of the costs of improved planning can be defrayed by increased outside funding. While the TAC recognizes that the relatively small size of Belmont's population limits its ability to develop and support professional management and currently precludes it from qualifying for certain sources of outside funding, this recommendation should be considered as part of an overall effort to introduce more professional management into the Town's organization.

2. Form a standing traffic committee to review development, funding and other plans with a clear impact on the Town's traffic; assign the committee to the evaluation of citizens' suggestions on an ongoing basis.

3. Collect additional data through a traffic survey possibly organized and conducted by high school students and other citizens to provide back-up data to support recommendations requiring approval of the Department of Public Works or other agencies. In addition, redesign the current efforts by the Belmont police to collect information on an annual basis. Suggestions for ways of implementing these recommendations are contained in Appendix F to this report.

4. Form a high-level group (including Selectmen, the Police Chief, and State legislators) to meet with representatives of the DPW in order to begin the process of implementation of an integrated program of action to:

- 4.1 Post signs, alter timing of lights, and use other methods to encourage the use of viable alternative routes (such as Route 2) by motorists who currently use Belmont streets as a by-pass.
- 4.2 Alter traffic signals and post signs at other points, as suggested in Appendix E to this report.
- 4.3 Regulate speed at rates less than 30-miles-per-hour in selected areas.
- 4.4 Prohibit or otherwise regulate through-travel of trucks exceeding a given weight limit. We recognize that, in order to do this, the Town must establish acceptable alternative routes and we recommend that such statistics be collected at least for purposes of repavement projections. In addition, we recommend that the identification and correction of pavement flaws on the more highly travelled roads in Belmont be carried out as soon as possible.

Until the Alewife Bridge is reconstructed, the route through Belmont is almost certainly the most convenient for trucks travelling to or from Cambridge. However, the routes through Belmont are not the only possible routes available to them. As an example, the Mabardy sand and gravel trucks, originating from Smith Place in Cambridge, could alternatively travel east on Concord Avenue to Huron Avenue and continue through Cambridge. The consideration that

the Town of Belmont has shown to commercial interests in granting cross-town permits is seen as misguided; it stands as a disproportionate lack of consideration to the residents of Belmont and to their streets and private property.

5. Systematically redesign and curb approximately three miles of major thoroughfares, with priority on Concord Avenue; Brighton, Pleasant (as part of the redesign of Route 60 proposed in Phase III), and Cross Streets; and Blanchard Road. This should better control and discourage unsafe use of curb and parking lanes by drivers. More specific suggestions for this work are presented in Appendix E to this report.

6. Review plans to redesign additional major intersections without disrupting the funding process currently underway; criteria to be used in this review should place priority on pedestrian safety and traffic control.

Phase III

1. Form local and regional coalitions to coordinate traffic planning in the commuting corridor west of Boston. Possible joint efforts that could be initiated by the Town of Belmont are discussed in Appendix G to this report.

2. Initiate legal action, if necessary, to slow or halt development at the Alewife "New Town" until adequate provision is made for traffic access and parking. The aid of Representative Gibson and other political representatives should be enlisted in dealing with the MDC and other State agencies concerning this matter.

In regard to defenses against likely traffic increases into the Alewife "New Town," Belmont's best immediate course of action is to control the flood of traffic through Belmont streets with a stronger police presence, improved timing of intersection traffic lights, striping of lanes, and consideration of legal initiatives.

One possibility for court action is under Section 771.105 of Title 23 of the Code of Federal Regulations which reads:

"It is the policy of the Administration (Federal) that: (a) To the fullest extent possible, all environmental investigations, reviews, and consultations be coordinated into a single process, and compliance with all applicable environmental requirements be reflected in the appropriate environmental document required by this regulation... (d) measures necessary to mitigate adverse impacts be incorporated into proposed action. Measures necessary to mitigate adverse impacts are eligible for Federal funding..."

In this effort, we should bear in mind that appeals to the Federal government were instrumental in the canceling of the Inner Belt through Boston and Cambridge.

3. Implement a coordinated plan for rebuilding Route 60 (Pleasant Street) through the Town. In this regard, the TAC recommends close consultation with the town management of Arlington.

4. Curb certain streets or roads which now have either no curbs or rounded asphalt shoulders, such as Sycamore, School, Oakley, and Payson. (The listing of citizen's concerns in Appendix B contains further suggestions warranting review.)

5. Take steps necessary to prepare applications for State and Federal grants in support of projects, particularly those recommended in Phase II and III.

BUDGET

Phase I of the Citizens' Traffic Plan is estimated to require six months to implement. It will require an investment of approximately \$45,000 and an increase in annual expenditures of about \$145,000. But it should return to the Town, through increased collections of speeding and parking fines a one-time revenue gain of \$150,000 and annual revenue increases of \$75,000. Thus, the first year of Phase I should produce a positive cash flow to the Town of \$35,000 with each successive year costing the Town \$70,000. Cost and revenue estimates for Phase I are contained in Table 9.

Phase II of the plan will require approximately twenty-four months to implement, an investment of \$1.5 million, and an annual increase of expenditures of about \$40,000. Cost estimates for Phase II are presented in Table 10.

Phase III of the plan will require approximately three years to implement, an investment of \$1.0 million to \$2.0 million for the reconstruction of Route 60, Pleasant Street. The estimate provides for reduced pavement width, protected parking, curbing, and drainage. Actual cost would depend on the extent of pavement reconstruction. Experiences of other communities suggest that most or all of the investments associated with Phases II and III can be defrayed through added State or Federal grants.

CONCLUDING COMMENT

If implemented, the proposals contained in this report will provide greater safety for all those using Belmont's streets and sidewalks. Further, they will communicate to those living in neighboring communities the Town's intent to provide such protection through improved design of streets and intersections, more effective traffic control, and fair but extensive enforcement of traffic laws. Most important, they will improve the Town of Belmont as a place to live, representing an investment with large dividends.

TABLE 9
ESTIMATES OF REVENUE AND COSTS FOR PHASE I

One-Time Revenue Gains

Enrollment of the Town in the Commonwealth program	\$150,000
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Annual Revenue Increases

Raising parking ticket fines to a minimum of \$10, yielding an average increase in fines of \$5 to \$10. Assuming a 40% reduction in the number of tickets issued (from the current level of 25,000 per year), this would still yield an estimate increase in revenue of	\$ 75,000
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One-Time Costs

Posting of speed and pedestrian crossing signs	\$ 20,000
Construction of bus unloading area at the Wellington School	<u>\$ 25,000</u>
Total	\$ 45,000

Annual Cost Increases

Two additional traffic police officers, salaries and fringes	\$120,000
Painting and maintenance of pavement markings	\$ 15,000
Contingency allowance	<u>\$ 10,000</u>
Total	\$145,000

TABLE 10
ESTIMATES OF COSTS FOR PHASE II

One-Time Costs

Curbing, drainage, sidewalk modifications (minimal full-depth reconstruction)	\$1,500,000
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Annual Cost Increases

Full-time Town Planner and support (with 50% of total attributed to traffic)	\$ 35,000
Operating budget for Standing Traffic Committee and consulting support	<u>\$ 5,000</u>
Total	\$ 40,000

APPENDIX A FORMS USED TO SOLICIT CITIZENS' RESPONSES

Belmont Traffic Advisory Committee Hearing
October, 1986

Traffic Survey

Precinct _____

Please circle the response most accurately reflecting
your feelings about each of the following statements.

In my view, an important traffic problem confronting Belmont
is:

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
1	2	3	4	5	Pedestrian safety
1	2	3	4	5	Speeding vehicles
1	2	3	4	5	Traffic Congestion
1	2	3	4	5	Failures to Observe Posted Signs
1	2	3	4	5	Use of Belmont's streets by com- muting and other through traffic.

Other Major Concerns:

1	2	3	4	5	More posting of speed limits
1	2	3	4	5	Added Signing of crosswalks
1	2	3	4	5	Adjustment to traffic light timing to encourage use of alternate routes
1	2	3	4	5	Increasing traffic enforcement by police
1	2	3	4	5	Raising the amount of fines for traffic violators
1	2	3	4	5	Painting street markings
1	2	3	4	5	Installing curbing
1	2	3	4	5	Installing sidewalks
1	2	3	4	5	Installing more stop signs

Belmont Traffic Advisory Committee Hearing
October, 1986

<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Neutral</u>	<u>Agree</u>	<u>Strongly Agree</u>	
1	2	3	4	5	Installing new traffic signals
1	2	3	4	5	Moving existing traffic signals
1	2	3	4	5	Posting welcome/ warning signs at Belmont's border

Other Recommended Actions:

Please send additional comments, suggestions, or concerns to:

Traffic Advisory Committee
c/o Selectmen's Office
Town of Belmont
Belmont, Massachusetts 02178

Comments

Precinct_____

APPENDIX B

CONCERNS EXPRESSED AT OPEN HEARINGS

Citizen concerns listed below are divided into four major categories, as follows: (1) concrete problems which can be corrected within the Town's current budget and jurisdiction, (2) intermediate-term problems which may require Town and State efforts (not necessarily supported by the TAC), (3) longer-term concrete proposals, and (4) general policy recommendations, many of which are included in the body of the report.

Category I: Concrete Problems
(Within Town's Jurisdiction to correct)

<u>Precinct Number</u>	<u>Location of Concern</u>	<u>Problems</u>	<u>Suggested Solutions</u>
4	Beech St	narrow road	better snow and leaf removal
4	Beech/Maple	school children	crossing guards on duty be out of their cars
4	Beech/White	running red lights	more police presence
	"	cars u-turning in drive-way	have police talk to newspaper office

Category I: Concrete Problems
(Within Town's Jurisdiction to Correct)

<u>Precinct Number</u>	<u>Location of Concern</u>	<u>Problems</u>	<u>Suggested Solutions</u>
4	Beech/Maple	"No Parking" sign obstructs stop sign	move signs
4	"	intersection unclear	paint crosslines
4	Clark Bridge	visibility	trim shrubbery
4	Bartlett/White	broken street sign	fix sign
4	Bartlett/Trapelo	broken bus stop sign	fix sign
4	Lexington/Beech	visibility	trim shrubbery

Category I: Concrete Problems
(Within Town's Jurisdiction to Correct)

<u>Precinct Number</u>	<u>Location of Concern</u>	<u>Problems</u>	<u>Suggested Solutions</u>
4	Belmont St	too dark	improve lights
4	Trapelo/White	van parking at corner	police action
4	Trapelo/Agassiz St	"	"
4	White/Beech	dip in road	fix road
4	"	poles obstruct view	move poles
4	Lexington/Beech	"	"

Category I: Concrete Problems
(Within Town's Jurisdiction to Correct)

<u>Precinct Number</u>	<u>Location of Concern</u>	<u>Problems</u>	<u>Suggested Solutions</u>
6	Payson/Oakley	obstructed view	trim hedges
6	Phillip/School	"	"
1	School/Washington	dip in road	fix road
6	Payson/Fairview	running stop	better sign placement
6,4,3	Andros Diner	congestion; illegal police parking	enforce parking bans
6	Cushing Square	double parking	enforcement
8	Hittinger/Baker	cars reversing to make right turn	enforce "no left turn"
6	Payson/Oakley	obstructed view	trim hedges
6	Phillip/School	"	"
8	Belmont Ctr	crosswalk safety	police presence
3	Common/Orchard	safety	"school zone" light out of order; better crossing guard enforcement
3	School/Common	safety	do not take away crossing guard
1	Goden	"	better police enforcement

Category II: Immediate Problems
(May Require Town and State Efforts)

<u>Precinct Number</u>	<u>Location of Concern</u>	<u>Problems</u>	<u>Suggested Solutions</u>
4	Concord near Mill	curve creates blind spot	straighten road; flashing light
4	Sycamore/White	accidents	4-way stop signs
	Lexington/White	"	"
	Beech/Maple	"	"
4	Beech, south Trapelo	extreme congestion	restrict all day parking; make Beech 1-way for 1 block; curbstones
4	Sycamore/Maple	1-way status blocks traffic	
4	Everywhere	pedestrian buttons hard to push	new buttons
4	Mill St	elderly housing hard to exit	no turn on red at Trapelo; move entrance
3,4	Clark Bridge	poor visibility	lower bridge sides
4	Lexington, White	long straightways encourage speeding	more police presence, cross lights
4,6	Shaw's Supermarket	pedestrian safety	pedestrian controlled light
1	Goden St	safety	curbs, square off intersection
6	Pine/Trapelo	safety	square of inter-
6	Oakley	accidents	section, stop sign needed
	Old Middlesex Spruce		
6	Cushing Sq	parking	reorganize; involve Chamber of Commerce; use service roads
8	Cross/Brighton	traffic avoiding Alewife	no left Cross to 7-9 AM
8	Cross/Dean	speeding	pedestrian light
8	Pleasant St	truck exhaust and	no trucks before 7 AM
2	Prospect -	speed and volume of traffic	post speed signs; retime lights to encourage use of Route 2
2	"	trucks	ban trucks
2	Lower Prospect	speeding	lower speed limits/post
2	Common	trucks	ban trucks

Category II: Intermediate Problems
(May Require Town and State Efforts)

<u>Precinct Number</u>	<u>Location of Concerns</u>	<u>Problem</u>	<u>Suggested Solutions</u>
2 3	Alewife Common/ Orchard	traffic volume safety	limit bridge weights pedestrian cross light; post speed limit; flashing red lights; big stop signs for guards
3 1,5	Belmont Ctr School/	pedestrian safety poor traffic pattern	pedestrian light remove "no turn on red"
1,3,5	Clark Bridge		
1,5	Shaw's Lake/Cross/ Brighton	traffic safety with trucks traffic volume	widen Pleasant St no left Lake to Cross 6-9AM; no right Brighton to Cross 3-7PM

Category III: Long Term Proposals

<u>Precinct Number</u>	<u>Location of Concern</u>	<u>Problem</u>	<u>Suggested Solutions</u>
4,6	Belmont/ Trapelo	redesign	don't put in light as it will bottleneck side streets
1,4,5,8	Belmont Ctr Bridge	redesign for	lights need both sides bridge
6,4	Trapelo from Pleasant to Lexington		remove filling station
6	Washington/ School	obscured vision	redesign
6	Payson/ Fairview	intersection too wide	"
6	Andros Diner	congestion	take McLean land to create parking
6	Route 60	traffic	redesign with State help
8	Route 2	traffic	don't allow cycling plant
8	Sherman	obstructed view from driveways	redesign

Category IV: General Policy Recommendations

1. Speeding

- serious police enforcement
- emphasize trouble spots
- Board of Selectman to act to lower speed limits
- more pedestrian lights
- reduce street widths
- make our streets harder to use
- post speed limits
- more traffic lights
- better town management
- aggressive town action
- post signs on policy at town entrances
- police motorcycles
- better police assignment schedules
- list violators in the paper
- use more median strips
- get citizens more involved
- Town Meeting to spend money on improvements
- hire a full time traffic engineer or planner
- local safe driving education program
- curbing (but not to obstruct bicycle safety)

Category IV: General Policy Recommendations

2. Alewife

- have Board of Selectmen work to form regional lobby
- Sue the State over impact on Belmont
- place demands on Town Meeting for better town planning
- involve our State representatives
- press town traffic consultant to work with DPW and MBTA
- work to reroute traffic back to Route 2
- get Town counsel involved to get Belmont more traffic autonomy

3. General traffic concerns

- get more bus routes, especially a north/south town route
- promote more citizen awareness
- better communication with DPW
- stress pedestrian safety as a town priority, especially elderly and children
- discourage outside traffic cutting through Belmont
- better town management with full time traffic engineer and a town planner

APPENDIX C
SPECIFIC CONCERNS ABOUT TRAFFIC SAFETY AT SCHOOLS
(PREPARED BY SCHOOL PRINCIPALS)

Concerns of individual school principles (and in some cases PTA's) are as follow:

1. Mary Lee Burbank:

A. Sharp Road:

This is the area where the Mecto bus stops and where many parents unload and load children into cars, especially in inclement weather. The chief concern is that the traffic flows in both directions and children are at risk in the process of crossing the street to get to cars. Our suggestion is that parking/stopping be allowed only on the school side of Sharp Road to minimize the danger. An attempt at one-way status during school opening and closing times would be the second step. The last step would be to make Sharp Road one-way all the time.

B. School Street:

1. It is difficult to see on-coming cars because of the curve in the road in front of the school. Some additional police presence before the point of the bend would help to slow cars down as they approach the school crossing area.
2. Curbing would be beneficial as it would help to define the road and lessen the chance of a car straying up toward a sidewalk or a child down toward the roadway.

2. Daniel Butler:

A. School parking lot:

1. Orange cones placed across the driveway to limit traffic when students are walking, work moderately well. Recently parents have requested two concrete posts with a chain between them as a more effective barrier, to be used from 8:35-8:55 AM and 2:45-2:55 PM.
2. Neighbors who park in the school lot at night fail to leave before the children get to school and some of the drivers exit fast without looking to see if children are nearby. The lot should be cleared by 8:00 AM.
3. Election Day congestion has been a concern. During the recent election, a policeman was stationed outside the school; this should be a matter of course.

- B. Parking and stopping around the school:
1. Parents have been requested repeatedly not to park in the school bus area or have their children cross the street from their cars. They have been urged to use safer alternatives for discharging and picking up children. The police and safety crossing guards remind parents of these issues; continued police assistance at periodic intervals would be beneficial.
 2. Parents persist in parking along the yellow-painted curb on the school side of the driveway right by the entrance to the driveway. A "No Parking" sign at that point would be helpful. On the far side of the driveway there is an old "No Parking" sign but the curb has not been painted yellow which should be done.
- C. Snow removal:
1. There is a designated list of sidewalks which are to be plowed after every snowstorm but some of those streets are missed frequently, especially around the Agassiz Avenue area. Consistent plowing of those sidewalks is necessary for childrens' safety.
 2. There needs to be continued police assistance with the problem of non-school cars left in the parking lot, thereby impeding plowing. Without effective plowing, the lot becomes more congested, icy and more dangerous in general. Cars have been towed in the past under these circumstances and continued police assistance with this problem is needed.
- D. Problems in areas away from the school:
1. Parents have suggested signs designating school bus stops be placed at the stops to encourage drivers to go slower when in these areas. Posting of such signs would be appropriate town-wide.
 2. There is no stop light on Trapelo Road at a location really helpful to the school children. The children tend to cross Trapelo at a corner; a pedestrian walk light at either the Sycamore-Trapelo or White-Trapelo intersection would assist the children in safely crossing Trapelo Road.

3. Roger Wellington:

A. Orchard Street:

This is both the site of the bus stop and a 2-way street where parents have often disregarded the No Parking signs and have created dangerous situations parking across from the school in order to drop off or pick up their children. The end result, especially on days with inclement weather, has been a situation where children are crossing back and forth with buses pulling up and traffic moving in two directions. Recently the Police Department has attempted to mitigate this situation by making Orchard Street one-way (entering from Goden) during morning drop-off and afternoon pick-up periods. We feel this should be permanent.

B. Bus turn-around area:

The principal has discussed a bus zone change in the past and again states that a bus turnaround area, utilizing the School Street end of the playground, would improve pupil safety. A driveway could be created from School Street at the present pedestrian walkway adjacent to St. Joseph's parking lot as well as widening the present driveway entrance from School Street. An example of one type of plan was provided to the TAC by Lt. Pergamo of the Belmont Police Department. (See attached diagram.)

This change is especially relevant with the prospect of relocating pupils if school renovations become a reality. There will be more cars and people in the area and the situation will only become more acute.

C. Additional traffic supervisors:

The optimum would be an additional traffic supervisor from 8:15-8:45 AM and 2:15-2:45 PM to help control parental traffic on Orchard Street. If this cannot be done on a full-time basis, the next alternative would be to provide such assistance on inclement days. Both the principal and Sgt. Micelli of the Police Department and the TAC agree that the presence of a traffic supervisor during the opening and closing of the school day has been very successful when the Belmont Police Department has provided such assistance.

D. Additional signing of the area:

We feel that additional warning signs and speed limit postings are appropriate in areas like the Orchard Street-Goden Street intersection and along School Street which are heavily utilized by

drivers and are streets that children cross at some points without the assistance of crossing guards.

4. Winn Brook:

- A. School crossing areas:
Winn Brook parents expressed support of the use of warning cones in the crossings, especially on Cross Street where speed of traffic is a concern.
- B. Police activity in the area:
There should be continuing or possibly increased surveillance by the Belmont Police Department to assure speed limits and school bus passing laws are observed.
- C. Proposed renovation plans:
We have noticed that the proposed renovation plans contained diagrams for three driveways. We suggest that in the final plans the number of driveways be minimized to decrease potential hazards. The additional use of cones in driveways might be examined.

5. Chenery Middle School:

Mr. Shapiro, the principal, wrote to say he held no major concerns in regard to these issues at this time. However, there are places at which the sidewalk is ill-defined and should be curbed.

6. Belmont High School:

- A. Concord Avenue:
The crossing light on Concord Avenue near the school driveway exit is difficult for morning east-bound drivers to see because of the sun shining in their faces. The presence of a full cycle traffic light would help to slow down drivers who view Concord Avenue as a speedway but morning light would minimize its effect. A ringing bell similar to the ones used in Watertown Square would increase motorist awareness greatly, even if it were only used during peak student crossing periods.
- B. Brighton Street:
The issue here is of snow removal/clearing of sidewalks. Sometimes the sidewalks are not cleared in time for the students walking to school; at other times the plowing done for businesses ends up blocking the newly plowed sidewalks. The Police Department should cite offenders for blocking a public way.

- C. The Hittinger Street area:
The absence of proper sidewalks forces students to walk in the streets on snowy days. The addition of sidewalks and curbing would increase pedestrian safety in this area.
- D. Crossing the tracks:
This old and persistent problem could be mitigated by a walkway being built with lights to indicate a train approaching and signal arms that raise and lower as appropriate.
- E. Students leaving school in cars:
The presence of police at the point where the High School driveway exits onto Concord Avenue would help to slow down those teenagers who tend to drive too fast when leaving the school grounds.

APPENDIX D
A MINORITY VIEW OF CONCLUSIONS AND RECOMMENDATIONS
TO BE DRAWN FROM THE FINDINGS

While the TAC members all agreed that the ultimate goal of its recommendations must be the overall safety of both motorists and pedestrians, the committee was not unanimous in its selection of the available alternatives to meet this goal.

Every traffic management decision will have positive as well as negative impacts, depending on one's viewpoint. With regard to each of Belmont's major traffic problems to be discussed below, there were different viewpoints among the committee members as to which alternative solution would provide more of a positive rather than a negative impact.

1. Excessive traffic volume; Route 2 bypass traffic:

The TAC unanimously agreed that every effort must be made through the political process to improve the attractiveness and capacity of Route 2 in Cambridge as well as to constrain future development at Alewife. Unfortunately neither of these are likely to occur in the near future, and Belmont residents are seeking immediate answers to this particular problem. Solutions discussed by the committee ranged all the way from closing certain of the exit ramps from Route 2 into Belmont during peak hours to creating major "deterrence" situations such as "no left turn" signs from Pleasant Street onto Brighton Street or timing all traffic signals to deliberately increase congestion and thereby decrease the attraction and usage of Belmont streets by commuters. More moderate solutions involved narrowing certain streets by relining or recurbing, and redesigning intersections to force cars to stop, again to supposedly discourage their use.

Basically, the key philosophical question which remains unresolved amongst the committee is, "Should pockets of traffic congestion be purposely created to slow and discourage through traffic?" The alternative, VIZ., to free and enhance the flow of traffic by synchronizing successive traffic signals or by removing "No Turn on Red" restrictions, etc., is a viable option which would certainly be favored by regular users of Belmont's streets.

Rather than debate at length the pros and cons of these two divergent traffic management techniques, the TAC listened to Arlington town planner, Alan McLennen, who was partially responsible for the reconstruction of Pleasant Street. With the attitude, "we don't care at all about commuters who have to go through Arlington to reach their destinations", Pleasant Street was purposely narrowed so much that there is not even room to maneuver around a left turning car. Thus during peak hours the entire length of Pleasant Street from Massachusetts Avenue to Route 2 is often in a gridlock situation. Mr. McLennen believes that the congestion has kept commuters out of

Arlington. However, if one studies the overall effect of the Pleasant Street roadblock there is very strong evidence that many more cars are now using the Lake Street, Jason Street, and Park Avenue bypass routes to cut through Arlington. The latter route, in particular, represents a large portion of the traffic now seen on Clifton/Prospect/Park Avenue in Belmont. In addition, with more vehicles now using residential streets to bypass Pleasant Street, the top two accident locations in Arlington are now Jason and Gray Streets and Park Avenue and Summer Street.

The lesson to be learned from Arlington's decision to create congestion on Pleasant Street is that motorists would rather find alternative routes, albeit longer in distance, than be stymied by roadway and traffic light congestion. This is proof of the adage that traffic flows like water, seeking the path of least resistance. It is also the best argument against a philosophy of blocking off access to Belmont's streets to commuters, particularly when in an east-west direction, the only close alternative to Pleasant Street is Cross Street, the site of a large school and playground.

On the other hand, the committee certainly agrees with the TAMS warning that Belmont has no obligation to encourage commuter traffic. In particular, residential streets and neighborhoods should all be protected as much as possible from the impact of excessive bypass traffic. To this end, traffic flow on the major arteries, which must include Pleasant Street, Brighton Avenue, Concord Avenue, Common Street, and Trapelo Road, should be kept freely flowing at safe, controlled speeds at all times, with the motorist fully aware that strict police enforcement of traffic regulations is a major priority of Belmont's residents.

2. Excessive speeding, particularly on residential streets near school zones:

While the TAC was quite impressed by the police department's record of enforcing the speed limits, the members were not unanimous in the methods to be used for posting speed limit signs. Most members felt that, state law to the contrary, the town should simply post 25 or 30 m.p.h. speed limit signs throughout the town, even though such postings were not legally enforceable by police. A minority of the committee preferred to: 1) avoid a plethora of signs which would tend to be ignored and, 2) abide by state DPW regulations which set speed zones according to the 85 percentile rule.

3. Pedestrian safety:

Although Belmont has had an exemplary record to date regarding pedestrian safety, the increased traffic volume in town prompted many residents at the hearings to place pedestrian safety as their first priority for the TAC to address. Most were disappointed that the TAMS report failed to make specific recommendations in this area. Again there are different alternatives, with pros and cons for each, to deal with this issue.

Some residents and committee members urged that pedestrian signals or full traffic lights be placed on Concord Avenue at both sides of the railroad underpass. Other locations suggested for pedestrian lights were: 1) opposite the Hill Estates on Blanchard Road, 2) on Pleasant Street at Munroe Street and 3) on Concord Avenue at Bright Road, and, 4) on Trapelo Road at the Belmont Street intersection. The TAC, before formally recommending these lights, suggests that actual pedestrian counts be undertaken at these sites to see if the expenditures are warranted.

Other suggestions for improving pedestrian safety included rebuilding of sidewalks and installation of curbing, with the latter employed as well to reduce road widths. The TAC was mostly in agreement with this strategy although one member warned that reducing the lane width might pose safety problems for motorists when a parked car (and snow bank) effectively forces the driver across the yellow center line. A specific example of a presently non-curbed, high pedestrian, high traffic site, where curbing may do more harm than good, is in front of the Concord Avenue Post Office. Here the roadway width must accommodate two lanes of traffic, one for Concord Avenue traffic under the overpass and another for Common Street - Royal Road traffic. At present, cars parked in front of the Post Office, even though they are partly on the sidewalk, do not interfere with traffic flow. The installation of curbing as suggested by some TAC members would reduce the road width to one lane and worsen the PM congestion at this already severely congested location. The alternative possibility, removing the center island on Concord Avenue, is not to be considered since this island makes pedestrian crossing of Concord Avenue quite safe and simple.

4. Parking in business areas:

The TAC did not have time to discuss the issue of adequate parking for shoppers and both employers and employees in the business districts. It does appear to some of us that the Selectmen were forced into a non-compromising position by residents living on side streets adjacent to business districts to post two-hour parking limits on these streets. Perhaps a more sensitive approach would allow employees to park on designated painted parking spaces on residential streets, so long as there is no obstruction of driveways or traffic flow. Otherwise at present employees are forced to park illegally, either at meters which should be reserved for shoppers, or in the two hour zones all day.

Summary:

Reporter Ellen Goodman, in her New Year's Day column in the Boston Globe entitled, "Missing from the New Year resolutions list: Be kind to strangers," deplored the self-centered and selfish attitude increasingly prevalent in city living. She admonished her readers to turn away from their anti-social behavior (citing the Sony Walkman as the epitome of isolationism), and to fight instead the spread of "urban

rudeness and creeping hostility."

Perhaps this same thought could be applied to communities as well. Rather than adopt the self-centered approaches to traffic management that pervade the Arlington and Cambridge town planners' decisions, a portion of the TAC Committee would prefer to embrace a philosophy which allows equal access to our community by non-residents as well as residents, many of whom must come to Belmont to work, shop, or visit. I believe that a balance must be reached where on the one hand our friends and neighbors from adjoining suburban towns find our streets safe and accessible to use while on the other hand will also find a very strict enforcement of speed limits and traffic laws. To this end a sign should be placed at every entrance to Belmont which says, "Welcome to Belmont - Please be courteous - Obey our Traffic Laws."

The thinking set forth above could be reflected, for example, in revised plans for redesigning the second set of intersections identified in the TAMS report as follows:

The TAMS Report recommends safety improvements at seven locations, four of which are along Route 2 bypass routes and three are other town intersections. None of these are included in the original seven intersections now under contract for 1987 construction. It should be noted that these road improvements are mainly for improved safety based on current accident history and future volume predictions.

1. Leonard Street / Concord Avenue / Channing Road

The TAMS recommends a signalized intersection and changing the location of the traffic islands, as well as restriping the traffic lanes. I do not concur with this recommendation. Traffic lights would cause massive peak hour backups in all directions. Since many movements at this particularly complex intersection are turning movements rather than straight through movements, there would have to be too many cycles on the lights to accommodate all the turning vehicles. As a result, cars going into the underpass from Common Street would block the outbound release of cars from the center. The backups would also interfere with emergency vehicles which use this intersection frequently.

Rather than signalization, I recommend that traffic control officers be present at both this intersection as well as the adjoining intersections at Concord Avenue/Common Street during peak hours to direct traffic if and when necessary to prevent gridlock. In addition, such officers would be able to stop all traffic for pedestrian crossings.

Restriping the traffic lanes into four lanes under the overpass is also not advisable since by necessity many cars, particularly those staying on Concord Avenue must change lanes. A "yield" sign should be posted at the underpass exit at Common

Street/Royal Road.

2. Concord Avenue / Royal Road / Common Street

The report recommends the installation of "finger islands" on the Common Street and Concord Avenue approaches to "provide movement definition". I believe such islands are not indicated and may even be hazardous, particularly as they narrow the lanes and interfere with snow removal. TAMS also draws a "stop sign" on the Common Street approach to the Leonard Street underpass, when actually this traffic has the right of way over the traffic exiting from Leonard Street. I believe that this intersection is particularly hazardous to pedestrians, particularly during peak hours. Full traffic signals here are not indicated since the red phase for traffic exiting the center would quickly back up and create a gridlock situation at the Channing Road/Concord Avenue/Leonard Street intersection. Again, the presence of a traffic control officer would be helpful for pedestrians as well as traffic flow. Better directional signs and more visible street signs on all the approaches to this intersection would aid motorists unfamiliar with Belmont to be in the proper traffic lane as they enter the intersection. For example, the "Left Lane for Left Turn" sign on the Common Street approach should also include a sign "To Belmont Center" affixed to it. The barely visible "<---Concord Ave : Common St --->" sign opposite the exit of the underpass should be modernized.

3. Prospect Street from Park Avenue to Clifton Street

I see no justification for the TAMS report proposal to spend an estimated \$230,000 simply to improve "curb reveals" and "paved edgelines" along this route. Such "improvements" can do nothing to moderate the heavy traffic flow on this Route 2 bypass from Arlington Heights through Belmont Center. As with all the bypass traffic, Belmont's approach must be to encourage any measures which would make Route 2 as accessible, attractive, and free flowing as possible. Accessibility would be improved if the left turns from Arlington onto the Route 2 ramps at both Park Avenue and Pleasant Street were not always backed up. Allowing a left turn on red after yielding to oncoming traffic is a conceivable though probably illegal approach; another would be to change the signals to do away with the left turn arrows, thereby allowing a turn anytime the straight through traffic has a green cycle.

The Prospect Street bypass route, where morning backups of 40-50 cars up Clifton Street at the Pleasant Street lights are not uncommon, will probably be less attractive and more congested with the new

signal installation. At present 12 cars can cross Pleasant Street every two minutes, but the future signals will include an extra cycle for cars turning left from Pleasant Street to Leonard Street while opposing Pleasant Street traffic is stopped. I question the need for this extra cycle since a left turn against oncoming traffic is a relatively safe maneuver and is not the cause of most of the accidents at this intersection.

4. Concord Avenue / Mill Street

I fully agree with the TAMS recommendation for a redesign of this intersection to place a stop sign on Concord Avenue to channelize turning movements. We understand that engineers' drawings are now in process and urge the Town to implement these changes as soon as practical.

5. Grove Street / Blanchard Road / Washington Street / Bright Road

TAMS recommends the construction of two traffic islands to guide vehicles safely through this rather wide open intersection. I believe that the low accident record here and the good visibility to motorists entering the intersection would place the expenditure of \$145,000 for these islands at a low priority level.

6. Trapelo Road / Pleasant Street

This particular intersection is currently being redesigned as a part of the plans for the Shaw's Supermarket and parking lot construction. I assume the TAC will review these plans when available.

7. Trapelo Road / Belmont Street

TAMS recommends significant narrowing and channelizing of this intersection with three large traffic islands on Trapelo Road. The major intent is to force westbound Belmont Street vehicles to stay in a left turn only lane in preparation for making a sharp left at Brigham's to continue on Belmont Street. Another island would accomplish the same purpose for Belmont Street cars turning left up to the Oakely Country Club.

I agree that at present there are a number of hazardous movements at this intersection. One is the eastbound unrestricted convergence of both Trapelo Road and Belmont Street traffic. Another is the fairly large number of left turning eastbound Belmont Street vehicles, which now must turn against the Trapelo Road cars moving at 30-35 mph. New traffic islands would certainly assist the turning vehicles and improve safety to some extent. Certainly there should at least be a yield sign (TAMS recommends a stop sign but this is not necessary) at the point where eastbound Belmont Street intersects with Trapelo Road so that cars on the latter street know they have the right of way.

However large traffic islands would raise a number of problems. One island would narrow Trapelo Road even further right at the location of the bus stop adjacent to Brigham's so that stopped buses would impede the two lane traffic flow (the present island could be reduced in size to create a bus lane). Another problem which might arise is that if the left turning Belmont Street cars got backed up waiting to turn at the island, they will: 1) start blocking the through traffic on the narrowed Trapelo Road, and 2) divert other oncoming Belmont Street cars up Trapelo Road to Cushing Square to turn left at Common Street, where the new lights will have left turn arrows from Trapelo Road to Common Street. Unfortunately these new lights at Cushing Square will have many additional cycles than at present so that the overall capacity at the lights will be significantly reduced.

Therefore in light of all these considerations I would be reluctant to approve major changes at this intersection, particularly since the Trapelo Road - Belmont Street traffic flow is the major East - West artery through Belmont and every effort must be made to keep it free flowing, so that motorists are not tempted to use parallel routes such as Fairview Avenue/Payson Road. However, strong consideration should be given to installing a pedestrian-activated walk light across Trapelo Road at the location of the present bus stop or at Brigham's. The little-used walk light now in place in front of the church might conceivably be moved to this site.

APPENDIX D
A MINORITY VIEW OF CONCLUSIONS AND RECOMMENDATIONS
TO BE DRAWN FROM THE FINDINGS

While the TAC members all agreed that the ultimate goal of its recommendations must be the overall safety of both motorists and pedestrians, the committee was not unanimous in its selection of the available alternatives to meet this goal.

Every traffic management decision will have positive as well as negative impacts, depending on one's viewpoint. With regard to each of Belmont's major traffic problems to be discussed below, there were different viewpoints among the committee members as to which alternative solution would provide more of a positive rather than a negative impact.

1. Excessive traffic volume; Route 2 bypass traffic:

The TAC unanimously agreed that every effort must be through the political process to improve the attractiveness and capacity of Route 2 in Cambridge as well as to constrain future development at Alewife. Unfortunately neither of these are likely to occur in the near future, and Belmont residents are seeking immediate answers to this particular problem. Solutions discussed by the committee ranged all the way from closing certain of the exit ramps from Route 2 into Belmont during peak hours to creating major "deterrence" situations such as "no left turn" signs from Pleasant Street onto Brighton Street or timing all traffic signals to deliberately increase congestion and thereby decrease the attraction and usage of Belmont Streets by commuters. More moderate solutions involved narrowing certain streets by relining or recurbing intersections to force cars to stop, again to supposedly discourage their use.

Basically, the key philosophical question which remains unresolved amongst the committee is, "should pockets of traffic congestion be purposely created to slow and discourage through traffic?" The alternative, VIZ., to free and enhance the flow of traffic by synchronizing successive traffic signals or by removing "No Turn on Red" restrictions, etc., is a viable option which would certainly be favored by regular users of Belmont's streets.

Rather than debate at length the pros and cons of these two divergent traffic management techniques, the TAC listened to Arlington town planner Alan McLennen, who was partially responsible for the reconstruction of Pleasant Street. With the attitude, "we don't care at all about commuters who have to go through Arlington to reach their destinations," Pleasant Street was purposely narrowed so much that there is not even room to maneuver around a left turning car. Thus during peak hours the entire length of Pleasant Street from Massachusetts Avenue to Route 2 is

often in a gridlock situation. Mr. McLennen believes that the congestion has kept commuters out of Arlington. However, if one studies the overall effect of the Pleasant Street roadblock, there is very strong evidence that many more cars are now using the Lake Street, Jason Street, and Park Avenue bypass routes to cut through Arlington. The latter route, in particular, represents a large portion of the traffic now seen on Clifton / Prospect / Park Avenue in Belmont. In addition, with more vehicles now using residential streets to bypass Pleasant Street, the top two accident locations in Arlington are now Jason and Gray Streets and Park Avenue and Summer Street.

The lesson to be learned from Arlington's decision to create congestion on Pleasant Street is that motorists would rather find alternative routes, albeit longer in distance, than be stymied by roadway and traffic light congestion. This is proof of the adage that traffic flows like water, seeking the path of least resistance. It is also the best argument against a philosophy of blocking off access to Belmont's streets to commuters, particularly when in an East-West direction, the only close alternative to Pleasant Street is Cross Street, the site of a large school and playground.

On the other hand the committee certainly agrees with the TAMS warning that Belmont has no obligation to encourage commuter traffic. In particular, residential streets and neighborhoods should all be protected as much as possible from the impact of excessive bypass traffic. To this end, traffic flow on the major arteries, which must include Pleasant Street, Brighton Avenue, Concord Avenue, Common Street, and Trapelo Road, should be kept freely flowing at safe, controlled speeds at all times, with the motorist fully aware that strict police enforcement of traffic regulations is a major priority of Belmont's residents.

2. Excessive speeding, particularly on residential streets and near school zones:

While the TAC was quite impressed by the police department's record of enforcing the speed limits, the members were not unanimous in the methods to be used for posting speed limit signs. Most members felt that, state law to the contrary, the town should simply post 25 or 30 m.p.h. speed limit signs throughout the town, even though such postings were not legally enforceable by police. A minority of the committee preferred to 1) avoid a plethora of signs which would tend to be ignored and, 2) abide by state DPW regulations which set speed zones according to the 85 percentile rule.

3. Pedestrian safety:

Although Belmont has had an exemplary record to date regarding pedestrian safety, the increased traffic volume in town prompted many residents at the hearings to place

pedestrian safety as their first priority for the TAC to address. Most were disappointed that the TAMS report failed to make specific recommendations in this area. Again, there are different alternatives, with pros and cons for each, to deal with this issue.

Some residents and committee members urged that pedestrian signals or full traffic lights be placed on Concord Avenue at both sides of the railroad underpass. Other locations suggested for pedestrian lights were, 1) opposite the Hill Estates on Blanchard Road, 2) on Pleasant Street at Munroe Street and 3) on Concord Avenue at Bright Road, and 4) on Trapelo Road at the Belmont Street intersection. The TAC, before formally recommending these lights, suggests that actual pedestrian counts be undertaken at these sites to see if the expenditures are warranted.

Other suggestions for improving pedestrian safety included rebuilding of sidewalks and installation of curbing, with the latter employed as well to reduce road widths. The TAC was mostly in agreement with this strategy although one member warned that reducing the lane width might pose safety problems for motorists when a parked car (and snow bank) effectively forces the driver across the yellow center line. A specific example of a presently non-curbed, high pedestrian, high traffic site, where curbing may do more harm than good, it is in front of the Concord Avenue Post Office. Here the roadway width must accommodate two lanes of traffic, one for Concord Avenue traffic under the overpass and another for Common Street - Royal Road traffic. At present, cars parked in front of the Post Office, even though they are partly on the sidewalk, do not interfere with traffic flow. The installation of curbing as suggested by some TAC members would reduce the road width to one lane and worsen the p.m. congestion at this already severely congested location. The alternative possibility, removing the center island on Concord Avenue, is not to be considered since this island makes pedestrian crossing of Concord Avenue quite safe and simple.

Parking in business areas:

The TAC did not have time to discuss the issue of adequate parking for shoppers and both employers and employees in the business districts. It does appear to some of us that the Selectmen were forced into a non-compromising position by residents living on side streets adjacent to business districts to post two-hour parking limits on these streets. Perhaps a more sensitive approach would allow employees to park on designated painted parking spaces on residential streets, so long as there is no obstruction of driveways or traffic flow. Otherwise at present employees are forced to park illegally, either at meters which should be reserved for shoppers, or in the two hour zones all day.

Summary:

Reporter Ellen Goodman, in her New Year's Day column in the Boston Globe entitled, "Missing from the New Year resolutions list: Be kind to strangers," deplored the self-centered and selfish attitude increasingly prevalent in city living. She admonished her readers to turn away from their anti-social behavior (citing the Sony Walkman as the epitome of isolationism), and to fight instead the spread of "urban rudeness and creeping hostility."

perhaps this same thought could be applied to communities as well. Rather than adopt the self-centered approaches to traffic management that pervade the Arlington and Cambridge own planners' decisions, a portion of the TAC Committee would prefer to embrace a philosophy which allows equal access to our community by non-residents as well as residents, many of whom must come to Belmont to work, shop, or visit. I believe that a balance must be reached where on the one hand our friends and neighbors from adjoining suburban towns find our streets safe and accessible to use while on the other hand will also find a very strict enforcement of speed limits and traffic laws. To this end a sign should be placed at every entrance to Belmont which says, "Welcome to Belmont - Please be courteous - Obey our Traffic Laws."

The thinking set forth above could be reflected, for example, in revised plans for redesigning the second set of intersections identified in the TAMS report as follows:

The TAMS Report recommends safety improvements at seven locations, four of which are along Route 2 bypass routes and three are other town intersections. None of these are included in the original seven intersections now under contract for 1987 construction. It should be noted that these road improvements are mainly for improved safety based on current accident history and future volume predictions.

1. Leonard Street / Concord Avenue / Channing Road

TAMS recommends a signalized intersection and changing the location of the traffic islands, as well as restriping the traffic lanes. I do not concur with this recommendation. Traffic lights would cause massive peak hour backups in all directions. Since many movements at this particularly complex intersection are turning movements rather than straight through movements, there would have to be too many cycles on the lights to accommodate all the turning vehicles. As a result, cars going into the underpass from Common Street would block the outbound release of cars from the center. The backups would also interfere with emergency vehicles which use this intersection frequently.

Rather than signalization, the committee recommends that traffic control officers be present at both this intersection as well as the adjoining intersection at Concord Avenue/Common Street during peak

hours to direct traffic if and when necessary to prevent gridlock. In addition, such officers would be able to stop all traffic for pedestrian crossings.

Restriping the traffic lanes into four lanes under the overpass is also not advisable since by necessity many cars, particularly those staying on Concord Avenue must change lanes. A "yield" sign should be posted at the underpass exit at Common Street/Royal Road.

2. Concord Avenue / Royal Road / Common Street

The report recommends the installation of "finger islands" on the Common Street and Concord Avenue approaches to "provide movement definition." I believe such islands are not indicated and may even be hazardous, particularly as they narrow the lanes and interfere with snow removal. TAMS also draws a "stop sign" on the Common Street approach to the Leonard Street underpass, when actually this traffic has the right of way over the traffic exiting from Leonard Street. I believe that this intersection is particularly hazardous to pedestrians, particularly during peak hours. Full traffic signals here are not indicated since the red phase for traffic exiting the center would quickly back up and create a gridlock situation at the Channing Road/Concord Avenue/Leonard Street intersection. Again, the presence of a traffic control officer would be helpful for pedestrians as well as traffic flow. Better directional signs and more visible street signs on all the approaches to this intersection would aid motorists unfamiliar with Belmont to be in the proper traffic lane as they enter the intersection. For example, the "Left Lane for Left Turn" sign on the Common Street approach should also include a sign "To Belmont Center" affixed to it. The barely visible "<---Concord Ave : Common St--->" sign opposite the exit of the underpass should be modernized.

3. Prospect Street from Park Avenue to Clifton to Pleasant Street

I see no justification for the TAMS report proposal to spend an estimated \$230,000 simply to improve "curb reveals" and "paved edgelines" along this route. Such "improvements" can do nothing to moderate the heavy traffic flow on this Route 2 bypass from Arlington Heights through Belmont Center. As with all the bypass traffic, Belmont's approach must be to encourage any measures which would make Route 2 as accessible, attractive, and free flowing as possible. Accessibility would be improved if the left turns from Arlington onto the Route 2 ramps at both Park Avenue and Pleasant Street were not always backed up. Allowing a left turn on red after yielding to oncoming

traffic is a conceivable though probably illegal approach; another would be to change the signals to do away with the left turn arrows, thereby allowing a turn anytime the straight through traffic has a green cycle.

The Prospect Street bypass route, where morning backups of 40-50 cars up Clifton Street at the Pleasant Street lights are not uncommon, will probably be less attractive and more congested with the new signal installation. At present 12 cars can cross Pleasant Street every two minutes, but the future signals will include an extra cycle for cars turning left from Pleasant Street to Leonard Street while opposing Pleasant Street traffic is stopped. I question the need for this extra cycle since a left turn against oncoming traffic is a relatively safe maneuver and is not the cause of most of the accidents at this intersection.

4. Concord Avenue / Mill Street

I fully agree with the TAMS recommendation for redesign of this intersection to place a stop sign on Concord Avenue and to channelize turning movements. We understand that engineers' drawings are now in process and urge the town to implement these changes as soon as practical.

5. Grove Street / Blanchard Road / Washington Street / Bright Road

TAMS recommends the construction of two traffic islands to guide vehicles safely through this rather wide open intersection. I believe that the low accident record here and the good visibility available to motorists entering the intersection would place the expenditure of \$145,000 for these islands at a low priority level.

6. Trapelo Road / Pleasant Street

This particular intersection is currently being redesigned as a part of the plans for the Shaw's Supermarket and parking lot construction. I assume the TAC will review these plans when available.

7. Trapelo Road / Pleasant Street

TAMS recommends significant narrowing and channelizing of this intersection with three large traffic islands on Trapelo Road. The major intent is to force westbound Belmont Street vehicles to stay in a left turn only lane in preparation for making a sharp left at Brigham's to continue on Belmont Street. Another island would accomplish the same purpose for Belmont Street cars turning left up to the Oakley Country Club.

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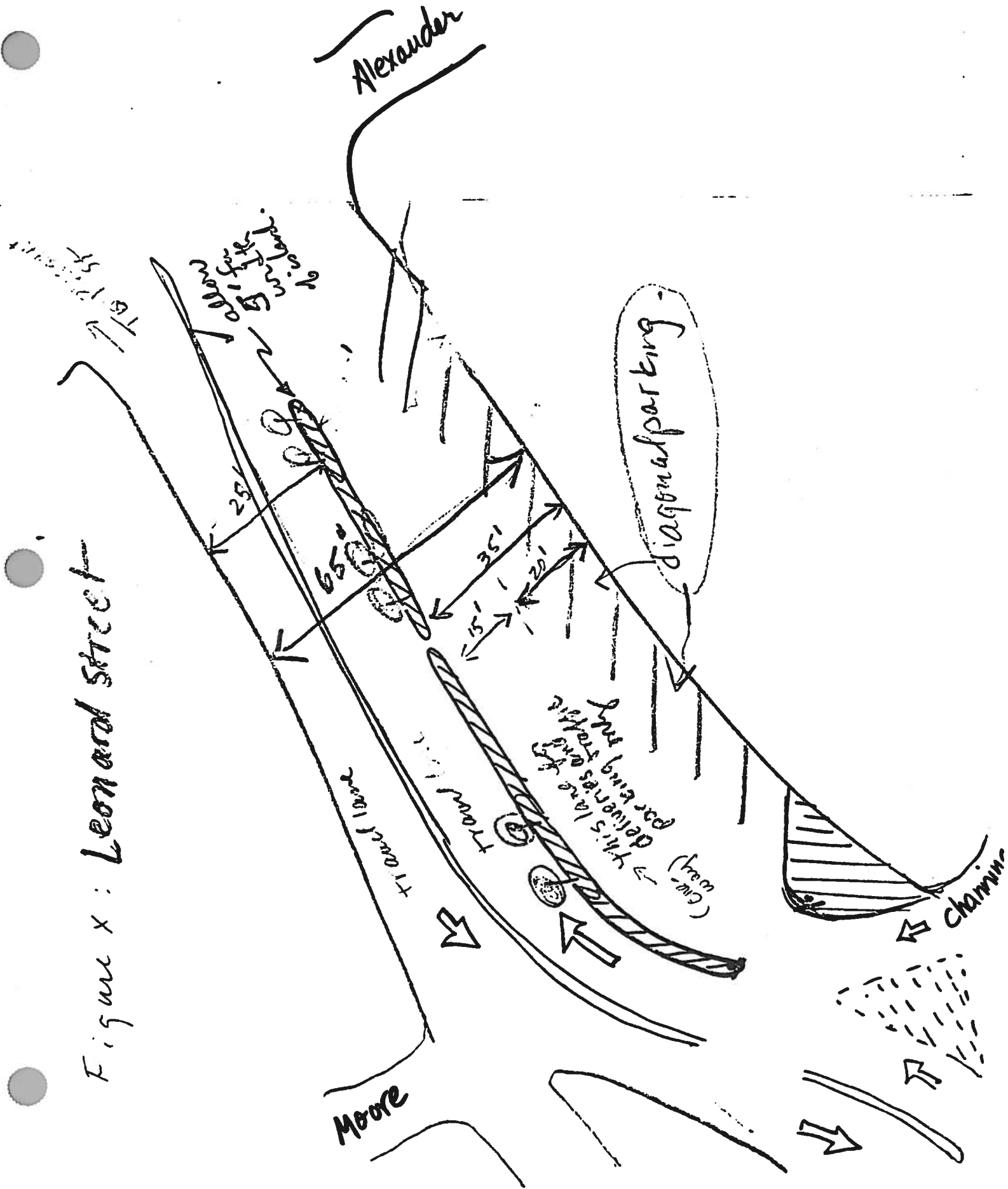
APPENDIX E
SPECIFIC RECOMMENDATIONS OF PRIORITIES FOR
THE REDESIGN OF STREETS AND INTERSECTIONS

Road Engineering

Curbing and Narrowing of Travel Lanes

1. Pleasant Street between Route 2 and Brighton Street
Structurally narrow to one travel lane in each direction. This would be among the most effective internal measures we could take toward reducing the amount of commuter traffic flowing from Arlington and Route 2 onto Brighton and Pleasant Streets and through Belmont.
2. Pleasant Street between Brighton Street and Concord Avenue
Our strong recommendation is that this section of Pleasant Street be redesigned and curbed with structural offsets for parking as was done in Arlington. In the interim, however, boundaries between travel lanes, parking lanes, and sidewalk should be clearly delimited with paint. Travel lanes should be delimited at a uniform width, sufficiently narrow to discourage excess speed and illicit passing.
3. Pleasant Street between Concord and Trapelo Road
Paint lines clearly delimiting the boundary of the travel lanes. This is particularly important given the curvature of the road, the dirt and deterioration that accumulates on the uphill side of the road, and the way in which the smooth and paved shoulders extend into otherwise indistinguishable parking lots and commercial property on the downhill side of the road.
4. Common Street
Paint in parking offsets on each side, restricting travel lanes to one lane in each direction.
5. Leonard Street
Clear designation of one travel lane of single car width in each direction is deemed necessary for controlling speed and prohibiting passing in this area given its density of pedestrian traffic and high frequency of stopping, parking, and boarding/unboarding cars. Beyond simply repainting lane boundaries, we recommend that the Selectmen consider a design change for this wide and critical road.

Figure X: Leonard Street



6. Concord Avenue between Belmont Center and Blanchard Road
As with Pleasant Street, we recommend that this road be curbed with structural offsets for parking and allowing only a single travel lane in each direction. In the interim, the boundaries between travel lanes, parking lanes, and sidewalk should be clearly delimited with paint.
7. Grove Street between Belmont Street and Washington Street
As with Pleasant Street, we recommend that this road be curbed with structural offsets for parking and allowing only a single travel lane in each direction. In the interim, the boundaries between travel lanes, parking lanes, and sidewalk should be clearly delimited with paint.
8. Concord Avenue, North of Belmont Center
The outer edges of the travel lanes should be clearly delimited with paint.
9. Brighton Street
As with Pleasant Street, we recommend that this road be curbed with structural offsets for parking and allowing only a single travel lane in each direction. In the interim, the boundaries between travel lanes, parking lanes, and sidewalk should be clearly delimited with paint.
10. Payson Road
Presently a broad residential street which invites speeding, Payson Road could be made safer with curbing and narrowing of the street.
11. Belmont Street
This very broad street often has 2 lanes of traffic in both directions. We suggest precise lane demarcation for one lane of traffic in both directions, and clearly marked parking lanes.
12. Oakley Street
Curbing and lane painting and good signing of the curve in the road at Benton Road would slow traffic. Additional signing for the branch library and crosswalk painting for the branch library is needed.
13. Cushing Avenue
A squaring off of Payson-Cushing intersection with a stop sign on Cushing would decrease drivers' wild swings through the intersection. A stop sign on Cushing at Oak would help slow drivers who speed down Cushing toward Oakley or Payson.

14. Elm and Payson Streets

The island should have rotary traffic in place of 2-way traffic on each leg. The island should also be curbed as people often cross it to get to the park and cars have been known to drive right through and over the island.

15. Goden Street

Needs defined edges with curbing.

Street Repairs

1. Consistently and immediately repair all potholes, cracks, and flaws on major streets in Belmont.

Sidewalk Construction

1. Pleasant Street between Brighton and Leonard/
Clifton Streets
Complete the sidewalk on both sides of the street.
Note that stretches without sidewalks fall on curves in the road, making it extra dangerous for pedestrians to detour into the roadway.
2. Cross and Claflin Streets between Channing and
Alexander Streets
These streets are heavily trafficked by pedestrians and vehicles in this area such that complete sidewalks are imperative for safety.
3. Prospect and Clifton Streets between Pleasant Street and
Park Avenue
This is the only direct route up the hill for pedestrians. Given the density and speed of the traffic and the highly curved nature of the street, sidewalks are deemed critical.
4. Pleasant Street between Clifton and Concord on the
north side
This stretch of Pleasant Street should have a sidewalk on both sides particularly in view of the church and Women's Club traffic.
5. All streets immediately adjacent to the Belmont Hill
School
These streets should have sidewalks so that students do not have to walk in the streets.

Sidewalk/Bikepath Construction

1. Pleasant Street between Concord and Trapelo Road
2. Brighton Street
3. Upper Concord Avenue
4. Marsh Street

Traffic Signal Alterations

Installation of Pedestrian Crossing Lights

1. Common Street at Orchard Street
2. Brighton Street at Flanders Road
3. Brighton Street at Bond Street
4. Trapelo Road at Pine Street
5. Cross Street at Monroe Street*
6. Pleasant Street at Monroe Street*
7. Trapelo Road at Shaw's
8. Trapelo Road at Sycamore

*Review with abutters recommended

Traffic Signal Alteration

1. Extend a signal detector from the pedestrian light at Andros Diner to the Corner of Agassiz Street so that resident vehicles can safely exit from that neighborhood.
2. Emplace an additional (slave) signal at the entrance to Pleasant Street from Eastbound Route 2 with a sign prohibiting right turns on red.
3. Prohibit right turns on red from Leonard Street onto Pleasant Street.
4. Consider programming signals on Trapelo Road so as to allow synchronization of signals to expedite inbound and outbound rush period traffic. This might be coupled with prohibition of on-street parking during rush periods (especially on the block east of Andros Diner).
5. Allow right turn on red at Brighton Avenue to Pleasant Street.
6. Place a traffic signal with left turn lights at Trapelo and Moraine to prevent traffic from Shaw's Supermarket from backing up through this intersection.

Intersection Redesign/Signal Emplacement*

1. Concord Avenue at Bright Street
2. Concord and Oak Street
3. Trapelo and Oak

(Note: Intersections already recommended for redesign in the TAMS report are not listed here.)

Emplacement of Stop Signs

1. Old Middlesex and Oakley
2. Spruce and Oakley
A branch library at or near these intersections invites young pedestrians; stop signs will make their crossing less hazardous.
3. Cushing and Oak Avenue (east-west)
Cushing Avenue is densely populated with many young children and is frequently used as a short-cut from Cushing Square to points east. A stop sign halfway along its distance to Oakley would force drivers to slow down.

Emplacement of Other Signs

1. Post "Maximum Clearance" signs at B&M underpass on Concord Avenue
These signs should be posted on both sides of the underpass and should indicate the maximum clearance at the center of the traffic lanes, not the center of the bridge.
2. Emplace "Speed Information" signs on all major Belmont Streets
3. Emplace flashing "School Zone" signs on both sides of streets in all school zones
4. Display "Pedestrian Crossing" signs prominently at all pedestrian crossings that are not at otherwise signaled intersections

APPENDIX F
SUGGESTED METHODS OF COLLECTING INFORMATION
NEEDED FOR TRAFFIC PLANNING

1. Mechanical volume counts by Belmont Police Department
 - a. For each street, two 24 hour counts should be taken, consistently separated by at least one week.
 - b. All counts should be taken between September 15 and May 15 exclusive of holidays or major periods of vacation or intercession of schools and universities in the region.
 - c. Counts should be taken on all streets included in the 1985 and 1986 counts and should additionally include:

Pleasant Street between Brighton and Clifton
Leonard Street
Concord Avenue at the B&M underpass
Trapelo Road west of Mill Street
Trapelo Road east of Mill Street
Trapelo Road east of Lexington Street
Belmont Street west of Common Street
Common Street north of Trapelo Road
Common Street between Belmont and Trapelo Road
Grove Street between Huron Avenue and Washington Street

2. We recommend that an origin/destination study be undertaken of morning and evening rush traffic at each of the major entries and exits from Belmont so as to obtain firm documentation of the proportion of traffic that is traveling through as contrasted with to and from Belmont.

3. As a compliment or alternate to a sound and thorough origin/destination study, we recommend that a "Driving Survey" be enclosed henceforth in the annual Belmont Census mailings. The purpose of this survey would be to obtain driving frequency and destination statistics from all Belmont residents. Given this information and the Police Department's traffic volume counts, we could roughly deduce the amount of nonresident traffic in Belmont.

4. Collect information on the number and tonnage of trucks traversing Belmont streets.

APPENDIX G
POSSIBLE JOINT EFFORTS THAT COULD BE INITIATED
BY THE TOWN OF BELMONT

1. Join forces with Arlington regarding the Route 2 overpass on Pleasant Street to achieve:
 - a. Repainting of the street surface to allow one and only one through lane in each direction and two lanes for left turns onto Route 2;
 - b. Retiming of the traffic signals to allow more time for traffic to turn left onto Route 2 and less time for traffic to continue straight down Pleasant Street in either direction;
 - c. Designating Lake Street between Cross Street and the Pleasant/Lake Street entrance to Route 2 east-bound as one-way in the westerly direction only. (This is to prevent traffic coming from Arlington from taking unwanted advantage of the extended left turn signal and traveling down Lake Street to Cross Street instead of getting on Route 2 as intended.)
2. Join forces with Arlington regarding the Route 2 overpass on Park Avenue to achieve:
 - a. Repainting of the street surface to allow one and only one through lane in each direction and two lanes for left turns onto Route 2;
 - b. Retiming of the traffic signals to allow more time for traffic to turn left onto Route 2 and less time for traffic to continue straight down Park Avenue in either direction.
3. Negotiate with Waltham to route their garbage fleet around Route 128 (or elsewhere) instead of down Route 60; again, Arlington might join such negotiations.