

SHORT TERM CONSEQUENCES OF HIGHWAY CONSTRUCTION

The Allyn Street Connector Case Study

by

Bruce J. Houghton, Research Assistant

Robert H. Wortman, Associate Professor

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INTRODUCTION

A review of the history of highway development indicates the evolution of a widening scope of planning and design problems which the highway engineer must address. Over a period of the last fifty years the prime emphasis in highway design has been directed primarily towards the development of an all weather hard surface roadway for automobile travel. As time progressed, emphasis was placed on a variety of design aspects directly related to this type roadway which further expanded the scope of design. Increased use of the automobile created a need for a closer consideration of the traffic characteristics of the roadway. Increased speed capabilities of the automobile introduced the need for examining geometric design elements and the interaction of the vehicle, roadway, and driver. Also, traffic flow and capacity became necessary design elements with increased traffic volumes. During the last decade highway safety, social and economic impacts, and environmental impacts have become dominant design characteristics which have resulted in major changes in design technology concepts. This expanded scope in design consideration has placed much broader responsibilities on the highway engineer with respect to planning and design.

Each year the Connecticut Department of Transportation expends large sums of money designated specifically for planning, design, improving, and constructing its highway system for the State. The most current design techniques are used to provide the driver with a safe and convenient mode of

transportation. Heavy emphasis is placed on a thorough investigation of highway impact on a community as part of the planning phase. The public is encouraged to participate in the planning and design phases through the public hearings. Once a project is constructed, however, engineers frequently fail to examine the aftereffects of the project implementation and verify the accuracy of design predictions and evaluate how the character of the community has reacted to such construction. In essence, the design loop remains open in that feedback information concerning a project frequently is not obtained.

It has been recognized that case study reviews of projects and the resulting consequences provide valuable insights into the understanding of the cause and effect behavior which is vital in design. This understanding in turn improves the design process and subsequently the design product. At the current time, the emphasis is on the understanding of the impact of a highway on a community.

The Study

During the summer of 1973, a project was initiated at the request of the Connecticut Department of Transportation which was aimed at examining the consequences of highway construction. For this particular study, a rather recently constructed project was selected; thus the examination focused on the short term effects of the project.

The project that was selected was the Allyn Street Connector in Mystic. This project was the subject of considerable controversy during the design and construction phases and continues to be an issue in the Mystic community.

The Allyn Street Connector is located in the Town of Groton and provides access from I-95 to the west side of Mystic. The Connector also serves the Groton Long Point area as well; thus it provides general access to the eastern edge of the Town of Groton.

The village of Mystic is actually situated in two towns (Groton and Stonington) and is physically separated into two pieces by the Mystic River. This physical separation contributes to traffic flow problems in the community because of the limited access. The flow problems are compounded by the fact that traffic in Mystic Center is frequently interrupted by the raising of the drawbridge which provides the only access at that location.

The intent of the research project was to study changes in traffic characteristics, environmental impact, and the general public opinion of the roadway. With respect to traffic and environmental questions, the study examined the changes which actually did occur in relation to the changes that were predicted in the planning of the improvement. Public opinion was included in the study in an attempt to determine if opinions had changed on the part of the citizens since they had had the opportunity to use and view the completed roadway.

Study Limitations

The research project had several limitations which certainly should be recognized. First, the time and resource constraint limited the scope of the geographic area and topics that were analyzed as well as the depth of the studies that were undertaken. This meant that the study focused primarily on readily identifiable traffic and environmental measures. It was not

possible to undertake questions such as economic and social impact on the community.

Secondly, the project was constrained by the availability of historical data and the form in which the data existed. It is particularly difficult to undertake before-and-after studies when there has not been a plan of action developed with respect to data prior to the construction of the roadway. The study had to be based on historical data and information which existed even though it was not in an ideal form for analysis.

Finally, the reconstruction of pieces of historical information is always subject to interpretation on the part of the researcher. In all cases, it is not possible to be fully certain as to the meaning of each piece of information. Any attempt to summarize cause and effect relationships is difficult when information must be interpreted in the course of the research.

II

THE ALLYN STREET PROJECT

A full understanding of the Allyn Street project requires an understanding of the evolution of the project from its initial inception as part of the planning of the Connecticut Turnpike until its actual completion on June 6, 1972. During this time, the project experienced a dormant period in which nothing was done for virtually a decade. In this section, a brief summary of the project is presented. This history is based on information obtained from the design files for the project which are maintained by the Connecticut Department of Transportation as well as transcripts of the public hearings.

During 1959 and 1960, the Connecticut Highway Department (now the Connecticut Department of Transportation) was planning the Groton section of Interstate 95 which runs along coastline of Connecticut. This roadway is part of the total National Defense Highway System and connects two major metropolitan areas, New York City and Boston. As part of its planning phase for this roadway, a public hearing was held on December 1, 1959 to present and discuss four potential routes with a directed emphasis by the Highway Department on the proposed route which now exists. Several questions were asked at this hearing about the merits of each proposed route, especially the route located near the Groton reservoir, but it was evident that most citizens attending the meeting favored the same general alignment that was being emphasized by the Highway Department.

At this particular public hearing a concern was expressed by the administrator of the Mystic Oral School about the proposed interchange at Cow Hill Road in Mystic. Apparently students traveled this route to and from the downtown area, and an interchange could create a very hazardous situation for the deaf children. The moderator conducting the public hearing indicated that the State would give this problem full consideration before any final decision would be made about the location of that interchange.

On January 22, 1960, a representative of the Connecticut Highways Department contacted the administrator of the Mystic Oral School and members of the Groton Town Council to present them with a new proposed plan to move the interchange at Cow Hill Road south and realign Mystic Street to meet that interchange. As part of that same plan, it was proposed to extend the existing Allyn Street north along new right-of-way to meet the interchange and provide a safe and convenient connection between Interstate 95 and U.S. Route 1. The new proposal was fully acceptable to both the Mystic Oral School and the Groton Town Council. As a result of that meeting, a new revised map was placed on file at the Groton Town Hall indicating the new proposal.

The Allyn Street extension now became part of the Interstate 95 construction program and its planning, design, and land acquisition was almost totally complete. When the Bureau of Public Roads notified the Connecticut Highway Department that it could not participate in funding the extension as part of the Interstate 95 program, it was decided that the extension was not a necessary element for proper functioning of the interchange. Because the State of Connecticut did not have funds available at that time to build the Allyn Street extension, the project was eliminated from the Interstate 95 construction program.

It is significant to note that even though the project was subsequently dropped in connection with the Interstate 95 program, the right-of-way for the Allyn Street project was acquired based on design standards at that time. The change in design standards later required additional land acquisition; however the land, for the most part, was acquired at the early date and retained by the State.

In 1969, the Connecticut State Legislature included the Allyn Street extension in its omnibus bill for highway construction. A legislative hearing on this bill generated several comments strongly favoring construction of the Allyn Street extension and no opposition was expressed. Upon final passage of the bill, the previous construction plans for the project were updated to current design standards; and the project was advertised for bids in July, 1970. During the time plans were being revised, a great deal of support for the project was registered by several Groton Town governing bodies. As part of the final Allyn Street extension program, the Town of Groton requested the Connecticut Highway Department to incorporate both sewer construction and sidewalk construction into the overall project. The town agreed to finance the additional construction.

As a result of 1969 legislation enacted by the Connecticut State Legislature, the Allyn Street extension became a somewhat unexpected reality. This project had been planned, designed, and a large percentage of the right-of-way purchased as part of the Interstate 95 construction program before it was abandoned by both the Bureau of Public Roads (now the Federal Highway Administration) and the State of Connecticut because of funding problems. Between the time the roadway was designed and the 1969 legislation was enacted, many

social, economic, and environmental concerns developed related to highway construction, and public attitude was far from receptive about constructing more roads on new right-of-way.

Even though the Allyn Street extension received no opposition in the early sixties, new residents locating along a quiet, secluded residential street who were apparently unaware of any proposed reconstruction of Allyn Street and changing public attitude toward highway construction led to strong opposition of this new roadway after enactment of the 1969 legislation. Most arguments against the extension were related to ecology and conservation of the Pequot Woods (a possible historical plot of woods which had been designated as a green belt on the Groton Town Plan), excessive speeds, high traffic volumes, increased accidents, and increased noise and air quality. These arguments were expressed quite strongly by a public interest group called TREES (To Reassess Environment, Ecology, and Safety).

It had been decided that a public hearing was not required for the project, and work proceeded with respect to the roadway design and construction. On August 19, 1970 bids for the Allyn Street extension project were opened.

By this time, the Department was receiving considerable written as well as verbal opposition to the roadway. Basically, the opposition focused on the general need for the roadway and the effect on the overall character of Mystic. Because of this mounting opposition to the Allyn Street project, the Commissioner of Transportation decided to delay the awarding of a contract until a properly scheduled public hearing could be conducted for this project. The hearing was held at the Robert E. Fitch Junior High School on September 24, 1970 with a large number of Mystic residents in attendance. The results of

this meeting indicated that the support and opposition were approximately equal and most of the views expressed had already been emphasized previously.

After a short presentation by the Connecticut Department of Transportation explaining the location and design features of the roadway, the local citizens were allowed to express their views on the project. The meeting was quite lengthy and most of the views expressed had already been stated previously through written and verbal correspondence with CONNDOT.

From the Department's point of view, it appeared that the Allyn Street extension was definitely needed. The location of the interchange at Mystic Street as part of the Interstate 95 construction program dictated the need for the extension as was recognized at that time, and high traffic volumes on two local streets adjacent to the location of the extension helped substantiate that assumption. Because of the high volumes on Pequot and High Streets, the safety of pedestrians and residents along those streets was seriously jeopardized along with that of tourists who were forced to use those streets when exiting at the Mystic Street (now Allyn Street) interchange. This viewpoint was certainly supported by the local supporters of the project.

Subsequent to the hearing, all bids for the project were rejected on October 8, 1970. A summary of the results of that public hearing was prepared by the Deputy Transportation Commissioner of the Bureau of Highways and forwarded to the Commissioner of Transportation for his action on the project. The Commissioner, after reviewing the summary, directed the project to be constructed. The project was readvertised in July, 1971 and new bids were opened on August 4, 1971. The low bid at that time was approximately \$50,000 higher than the low bid a year earlier. Construction began on September 13, 1971 and was

completed on June 6, 1972 with only minor incidents resulting from strong opposition to the roadway occurring during the initial phases of construction.

It should be noted that the controversy was not ended with the construction of the roadway. There is evidence that the roadway continues to be an issue in the community and the subject of considerable debate and discussion.

III

RESEARCH PROCEDURES

The material in this section summarizes the methods and procedures that were utilized in the conduct of the study. It must be recognized that because the research study was conceived after Allyn Street was built, the scope and nature of the study were limited to the pertinent historical information and data that were available.

Conceptually, this investigation parallels an environmental impact study. The main difference is the time that the study is undertaken with respect to the design and construction of the project. In this case, the consequences were examined after the project has been built.

Ideally, the Allyn Street project could be conceived as a component of an operating system and the consequences could be defined as the impact or the effect on the components in the system. Thus, the influence of the street on the area could be systematically described in terms of adverse effects as well as the benefits.

In the case of this particular study of the consequences of the Allyn Street project, the actual planning, design, and construction preceeded the requirements for the accomplishment of an environmental impact statement. The formal documentation which is necessary for an impact statement would have provided an excellent basis for a comparison of the before and after conditions; however such a study was not available.

As an alternate procedure, the design file for the Allyn Street project and the public hearing transcripts were reviewed. This material was on file at the Connecticut Department of Transportation. The purpose of this review was to identify and determine the design issues, the planning projections for the roadway, the anticipated consequences resulting from the construction of Allyn Street, and the concerns of the public with respect to the impact of the road. Based on this work, the following six areas were identified for analysis:

- a) vehicular speed,
- b) traffic volume,
- c) accidents,
- d) air quality,
- e) noise, and
- f) development.

In addition to these six topic areas, there was interest in exploring public attitudes related to the Allyn Street project; thus a number of discussions were conducted with citizens who were involved in the project in various ways. In the material that follows, a discussion is presented of the procedures that were utilized in each of the analyses.

Vehicular Speed

There was no speed information available for streets in the area prior to the construction of Allyn Street. Also, Allyn Street represented a new roadway; thus there would simply be no data on which to base a study for the

preconstruction period. The analysis of speeds, therefore, was primarily an evaluation of the speed characteristics in the area at the present time. This permitted a comparison of the current situation in relation to the posted speed limits and the concern on the part of the public with respect to potential high speed movements that might result from the improvement of Allyn Street.

Actual field measurements of vehicular speeds were made using radar speed meter equipment at four locations. Three of the locations were on Allyn Street and one location was on High Street. For the most part, the measurements were taken during the first two weeks of November, 1973. One of the locations (#3) on Allyn Street was studied in July, 1973 by the Connecticut Department of Transportation. Figure 1 indicates the location of the speed measurement sites with respect to the street network.

All of the speed studies were conducted during the mid-day period between the hours of 11 A.M. to 3 P.M. Traffic was free flowing, and the weather was clear and dry in all cases.

Traffic Volume

The traffic volume studies consisted of obtaining historical volume information from CONNDOT for the streets in the area and supplementing this information with current counts for the streets in the area. The historical data are presented in a later section of this report.

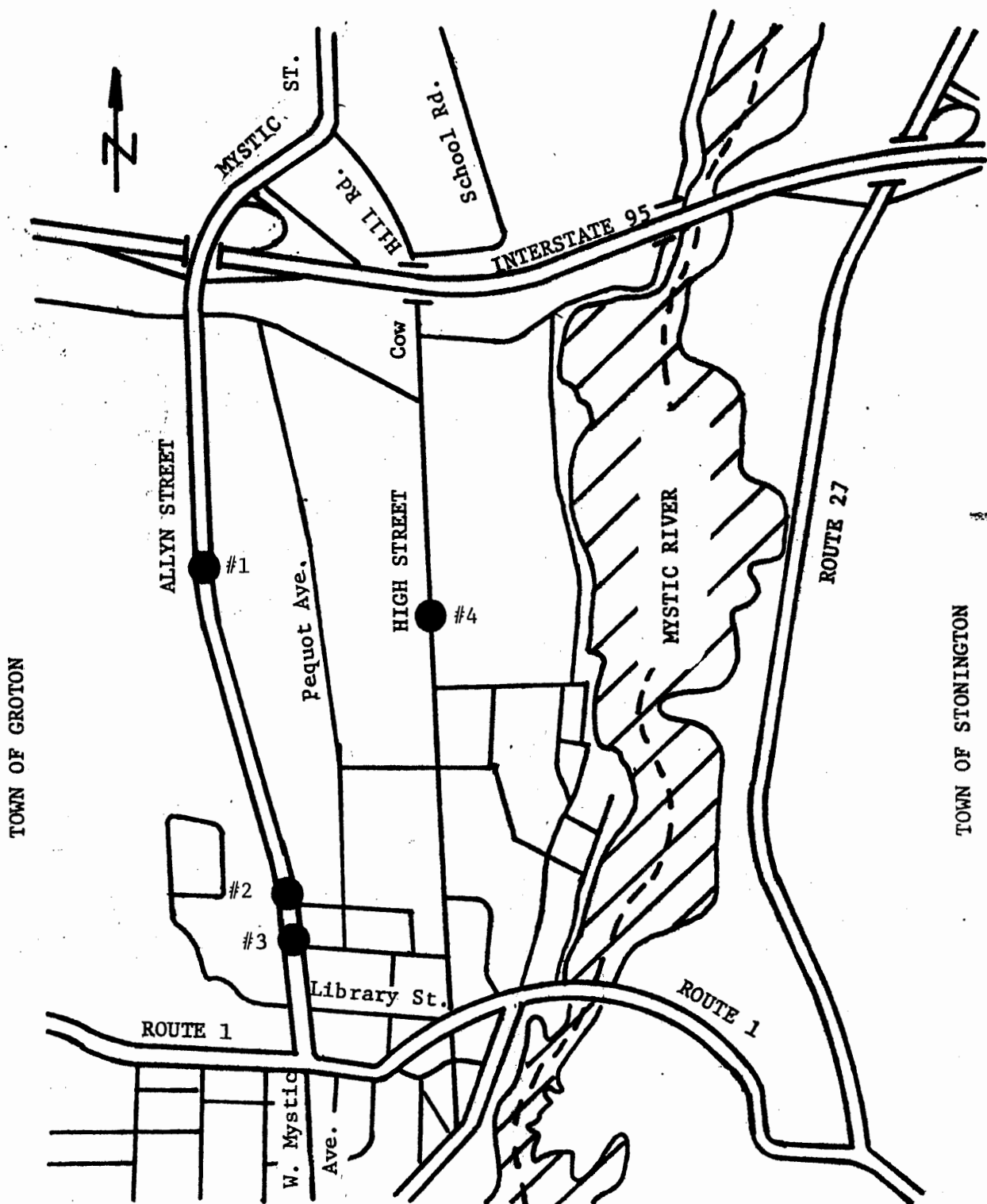
Basically, the historical counts were obtained from a review of CONNDOT files.

Many of these counts were taken as a result of monitoring traffic flow after advance warning signs for the interchange on Interstate 95 for Mystic

FIGURE 1

SPEED MEASUREMENT LOCATIONS

● DENOTES MEASUREMENT LOCATION



were changed. The citizens of Mystic felt the original signing directed some traffic off the expressway for the Seaport Museum which should have been using the Route 27 interchange in Stonington. These volume counts do establish some sort of flow pattern for the Mystic area prior to the construction of the Allyn Street extension and were used for comparison with current traffic volume counts.

During the months of November and December, 1973, traffic counts were made over extended periods at five locations in the Mystic area. Portable recording volume counters with pneumatic detectors were utilized to collect this data. The following indicates the time periods during which the counts were taken:

Allyn Street	October 23 - November 10 November 14-18
Route 27	October 23 - November 10
High Street	October 23 - November 10
Pequot Avenue	October 23 - November 10
West Mystic Avenue	November 14-18

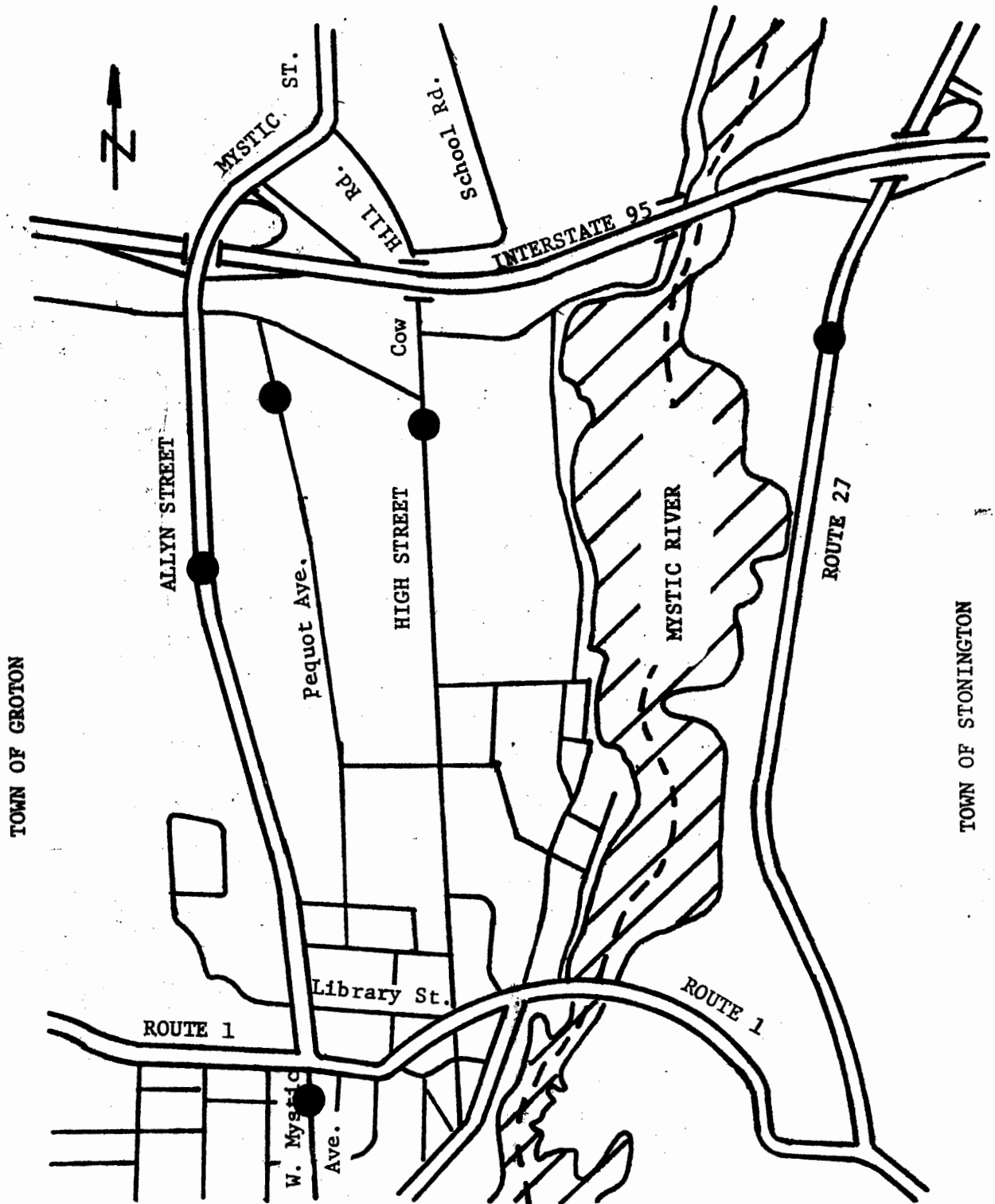
Additional counts were taken on Allyn Street during the period of June 5-11, 1974 as a check on the seasonal variation of volumes on Allyn Street. The location of these counts is shown in Figure 2.

In addition to these volume counts, turning-movement counts were obtained at the intersection of Allyn Street and Route 1 on December 22, 1969 and July 13, 1973. These counts were made by the Connecticut Department of Transportation.

FIGURE 2

VOLUME COUNT LOCATIONS

● DENOTES COUNT LOCATIONS



Accidents

Accident records maintained by the Town of Groton and the Connecticut Department of Transportation provided a source of data for an analysis of motor vehicle accidents. There was evidence that the records of the Town of Groton were incomplete. Also, CONNDOT has a record of only the accidents which are legally reportable. A check was made in both organizations and duplicate records were eliminated.

Noise and Air Quality

Existing noise and air quality on the Allyn Street extension were also evaluated as part of this study. Basically, all the analysis was prepared by the Connecticut Department of Transportation with this study only locating possible sites where noise level measurement should be taken and air quality evaluation conducted. All actual field measurements for noise and complete mathematical computations for both noise and air quality were conducted by the Department of Transportation based on criteria and input supplied by this study. The mathematical computations follow recommended procedures established by the Federal Highway Administration. The evaluation of noise and air quality was then compared against the predicted values with recommended national standards to see if the levels for Allyn Street meet federal requirements. Figure 3 shows the area of concern for air quality analysis, and Figure 4 indicates the locations of noise level measurements.

FIGURE 3

AMBIENT AIR QUALITY ANALYSIS ZONE

/// DENOTES APPROXIMATE ANALYSIS ZONE

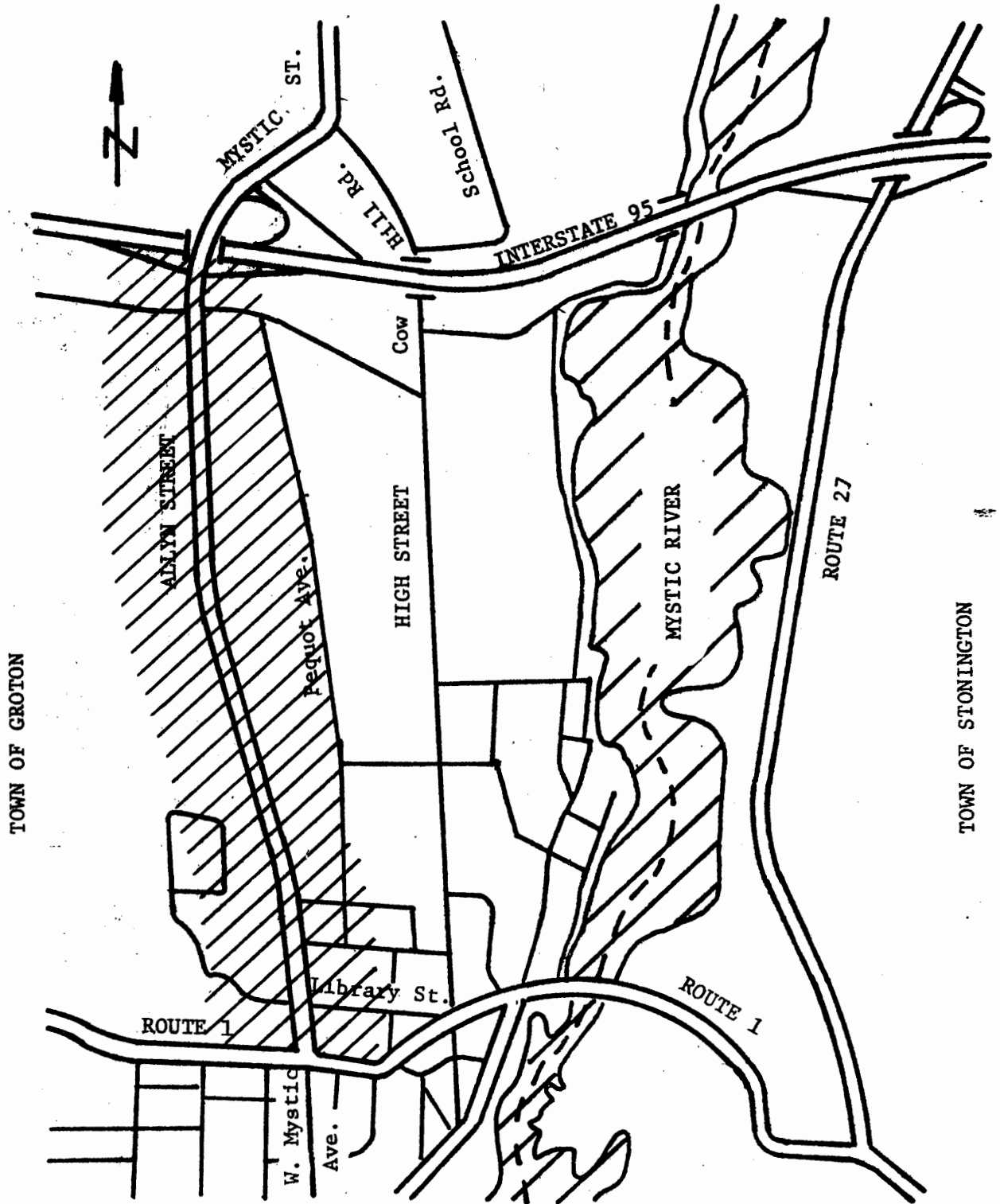
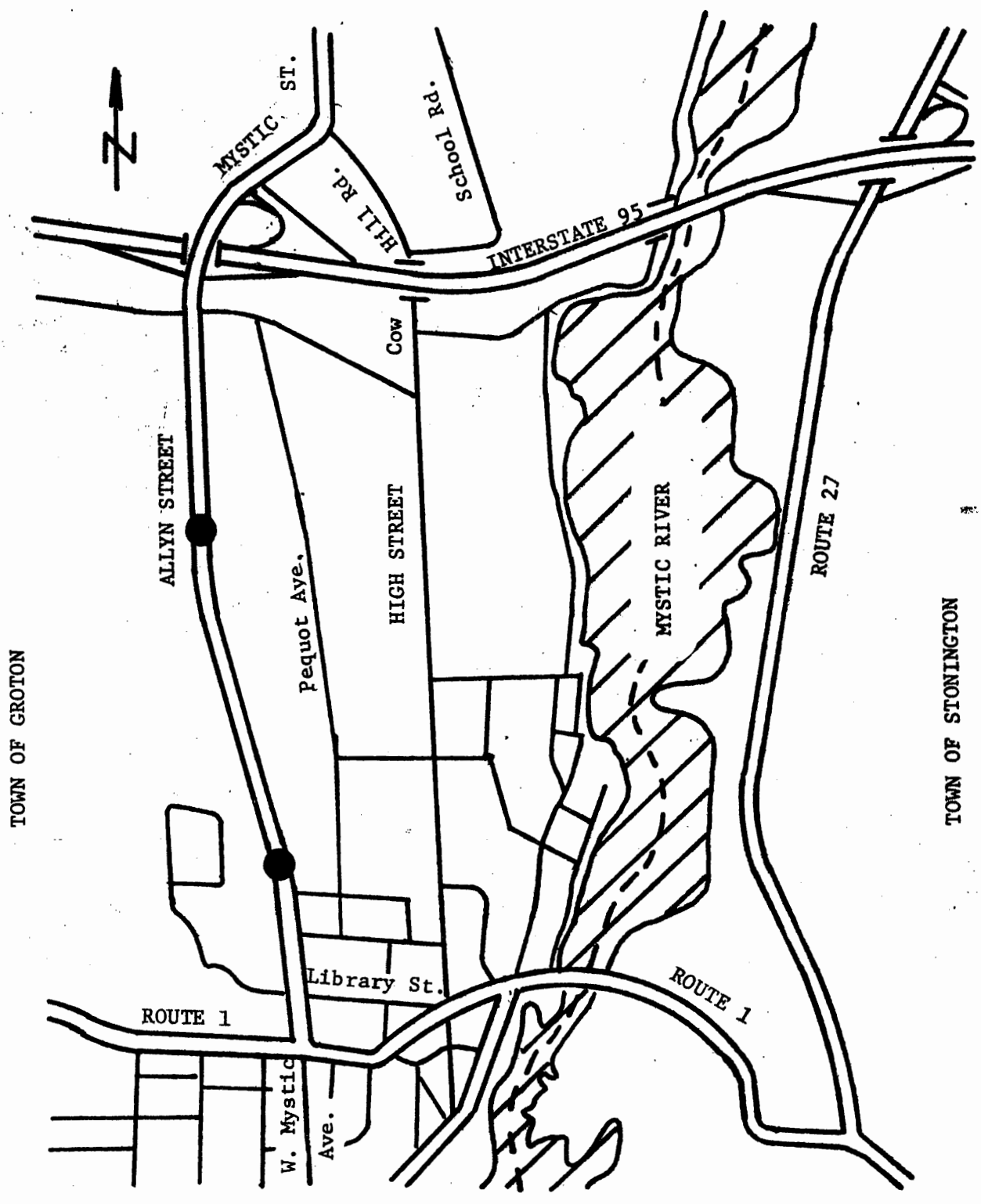


FIGURE 4

NOISE LEVEL MEASUREMENT LOCATIONS

● DENOTES MEASUREMENT LOCATION



Development

The evaluation of development was based primarily on land use changes along Allyn Street. For this portion of the study, land use classifications, zoning regulations, and building permit requests were used as indicators of development. The Groton Town Planning Department provided the necessary information for this analysis.

Basically, the corridor along Allyn Street was virtually undeveloped outside of the town limits. A study, therefore, focused on determining if any development had occurred or was being planned.

Public Attitudes

Because of the controversial nature of the Allyn Street project, a decision was made to include some work in this study which centered on public attitudes and opinions of the residents in the Mystic area. More specifically, questions were examined which address:

- a) the public viewpoint of the roadway,
- b) changes in public attitudes related to the roadway,
- c) the conduct of the public hearing,
- d) the planning and design process,
- e) involvement of the public in design,
- f) current problems which exist,
- g) the type of persons who are involved in the public involvement, and
- h) the consequences of the Allyn Street improvement.

The intent of this effort was not to conduct a public opinion survey of the citizens in the area. It was believed, however, that discussions with the citizens would provide further insights into the impact of the roadway.

Based on the public hearing transcripts, a list of names was compiled of persons who were active in commenting on the project. These persons were contacted, and a personal interview with each was accomplished. These interviews normally took about one hour and provided information with regard to public insight about the project. Both public officials as well as private individuals were interviewed.

The personal interview was selected because the research staff wanted the persons to discuss the project and provide candid information with respect to their opinions and beliefs. A list of questions was developed to guide the interviewer in order to insure that each person was asked the same general questions. The list of questions is shown in Appendix A.

IV

ANALYSIS OF DATA

The following discussion reflects the analysis of data for each of the traffic characteristics or impact questions that were included in the study. This analysis provides the basis for conclusions about the Allyn Street project and its short term consequences.

Vehicular Speed

For each of the speed measurement sites, the mean and 85th percentile speeds were computed based on the data that was collected. Table 1 presents the summarization of the speed information. The cumulative speed distribution curves for each of the sites are given in Appendix B.

From Table 1, it can be noted that the 85th percentile was well above the posted speed limits on the respective roadway locations. In fact, the average vehicular speed always exceeded the speed limit and was frequently well above that value.

The 85th percentile value is accepted by traffic engineers as a valid basis for setting reasonable speed limits for a roadway; thus, the posted limits do not reflect reasonable values based on the traffic flow. It must be recognized that drivers adjust their speeds to the characteristics and conditions of the roadway. For example, a significant reduction in speed can be observed in comparing site 3 with site 2. This reduction can be attributed to an increase in development and potential conflict along the roadway. Based on this information, it is obvious that the drivers believe

TABLE 1

TRAFFIC SPEED DATA							
All Speeds in Miles Per Hour							
Street	Location ²	Direction	Average Speed	85% Speed	Speed Limit	Sample Size	
Allyn Street	1	North	47.4	52.2	45	100	
Allyn Street	1	South	51.2	57.2	45	100	
Allyn Street	2	North	36.4	40.5	25	100	
Allyn Street	2	South	41.1	45.8	25	100	
Allyn Street ¹	3	North	32.6	34.6	25	100	
Allyn Street ¹	3	South	32.7	33.8	25	100	
High Street	4	North	36.2	39.8	25	30	
High Street	4	South	39.5	44.4	25	30	

¹ Source: Connecticut Department of Transportation Speed Study, July 1973.

² See Figure 1

that the safe speed of the road is faster than the posted limit. In the view of the residents of the area, this would certainly reflect that a speeding "problem" does exist.

A means for controlling speeds on highways that has been relatively effective is law enforcement. Many traffic studies in the past have indicated that the presence of law enforcement officers either giving out speeding tickets, patrolling the roadway, or just monitoring speeds with a radar unit has created lower speeds. The presence of law enforcement officers periodically on a roadway indicates that speed limits are being enforced in that vicinity. Because the Groton Town Police Department has a relatively small force for the total number of streets and highways within the town, it is difficult for officers to spend any length of time on any one specific roadway. Therefore, neither local residents nor tourists are subjected to speed traps or law enforcement officers on any particular street in Groton with any degree of frequency.

For a roadway such as Allyn Street, constant surveillance is necessary to keep the travel speeds within the posted speed limits. After motorists become aware that law enforcement is present on this street, they become much more conscious of their speed relative to the posted speed limit. This method of speed control is expensive in terms of time and effort relative to the geographic area covered. Enforcement should not be considered as the solution to the problem but must be compatible with engineering for the roadway and education of the public.

Traffic Volume

Table 2 summarizes the traffic volume information for the streets under study. This table serves to indicate that some changes have resulted in traffic flow as a consequence of the Allyn Street construction. For example, the average daily traffic (ADT) on High Street and Pequot Avenue has dropped substantially between the 1971 and 1973 volume counts, the average daily traffic for West Mystic Avenue has made a considerable increase, and the average daily traffic for Route 27 in Stonington has remained virtually the same. Recent traffic volume counts on Allyn Street (October, 1973) show an average daily traffic of 3585 Vehicles Per Day (VPD). This volume appears to have been developed by removing traffic from Pequot Avenue (approximately 630 VPD) and High Street (approximately 2000 VPD) and the result of a new travel pattern probably formed by people in Groton Long Point and Noank utilizing West Mystic Avenue and Allyn Street as a more efficient way of traveling to commercial and industrial areas in the main section of Groton. The traffic volume on West Mystic Avenue has doubled since 1969 and now has an estimated average daily traffic of 1685 vehicles per day.

The present average daily traffic for Allyn Street (3585 VPD) is 60 percent of the 1990 design year volume of 6000 VPD. Due to the fact that the Allyn Street extension was a new highway and the existing Allyn Street was not a thru road prior to 1972, there is no practical way to establish a rate of growth over the last two years for the average daily traffic volume. Reviewing the traffic growth on Route 27 in Stonington during the past ten years with all the development that exists on that roadway, especially the Mystic Seaport

TABLE 2

TRAFFIC VOLUME		1964	1965	1969	1970	1971	1972	1973
Average Daily Traffic (ADT) (Vehicles Per Day)								
Allyn Street				700*			2700	3585
Route 27	6400				8400	7400		7620
High Street						4000		2000
Pequot Avenue			2300			1000		370
West Mystic Ave.	700			750				1685

* Before Allyn Street extension constructed.

Museum, it appears the design year value of 6000 ADT for Allyn Street is reasonable and should not be violated during the design period.

An examination of the hourly variation in volume on Allyn Street reveals definite morning and evening peaking characteristics. This serves to further indicate that the route is being used to serve work trips in the area.

The hourly variation for High Street and Pequot Avenue shows less of a peaking characteristic. This indicates less work trip use and a greater portion of the volume associated with local residents.

Figure 5 represents the turning movements at the intersection of Allyn Street with New London Road. Figure 5a shows the volumes which were measured in 1969 while Figure 5b indicates the 1973 values. The values shown are the number of vehicles during the twelve hour period.

Prior to construction of the Allyn Street extension, most traffic heading North on West Mystic Avenue turned right onto New London Road, but after Allyn Street was completed almost twice as much traffic continued onto Allyn Street with a small percentage making either left or right turn movements. These figures further substantiate that new travel patterns have been established by residents of Groton Long Point and Noank enroute to points West of Mystic.

Accidents

The availability of significant and accurate accident data for the local streets in Mystic was marginal and the information located appeared to be relatively incomplete. Two sets of accident data were finally utilized for the purpose of evaluating traffic accident characteristics and patterns for Allyn Street, High Street, Pequot Avenue, and West Mystic Avenue. The

FIGURE 5a

VOLUME COUNT INFORMATION FOR INTERSECTION
OF ALLYN STREET AND U.S. ROUTE 1

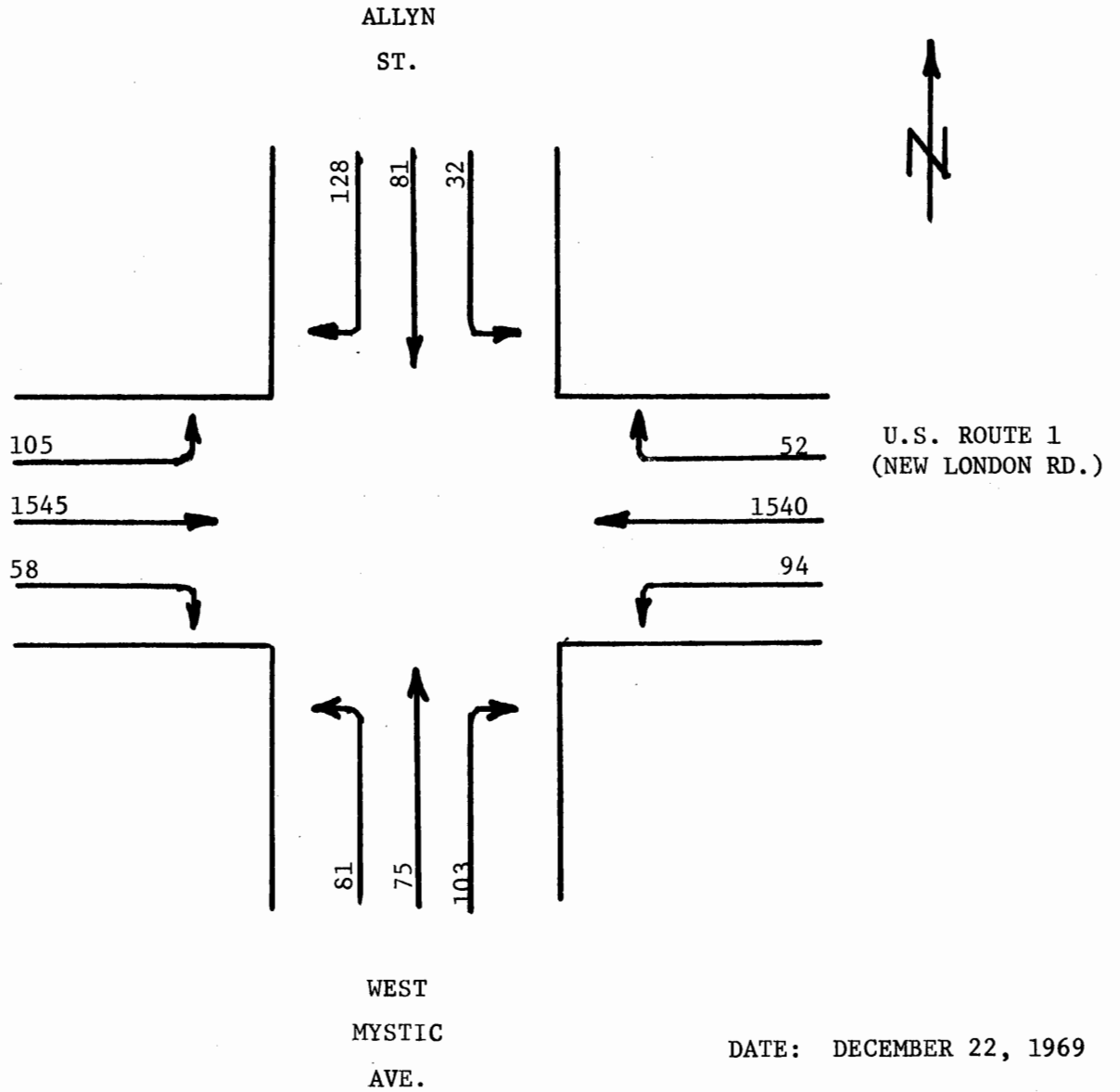
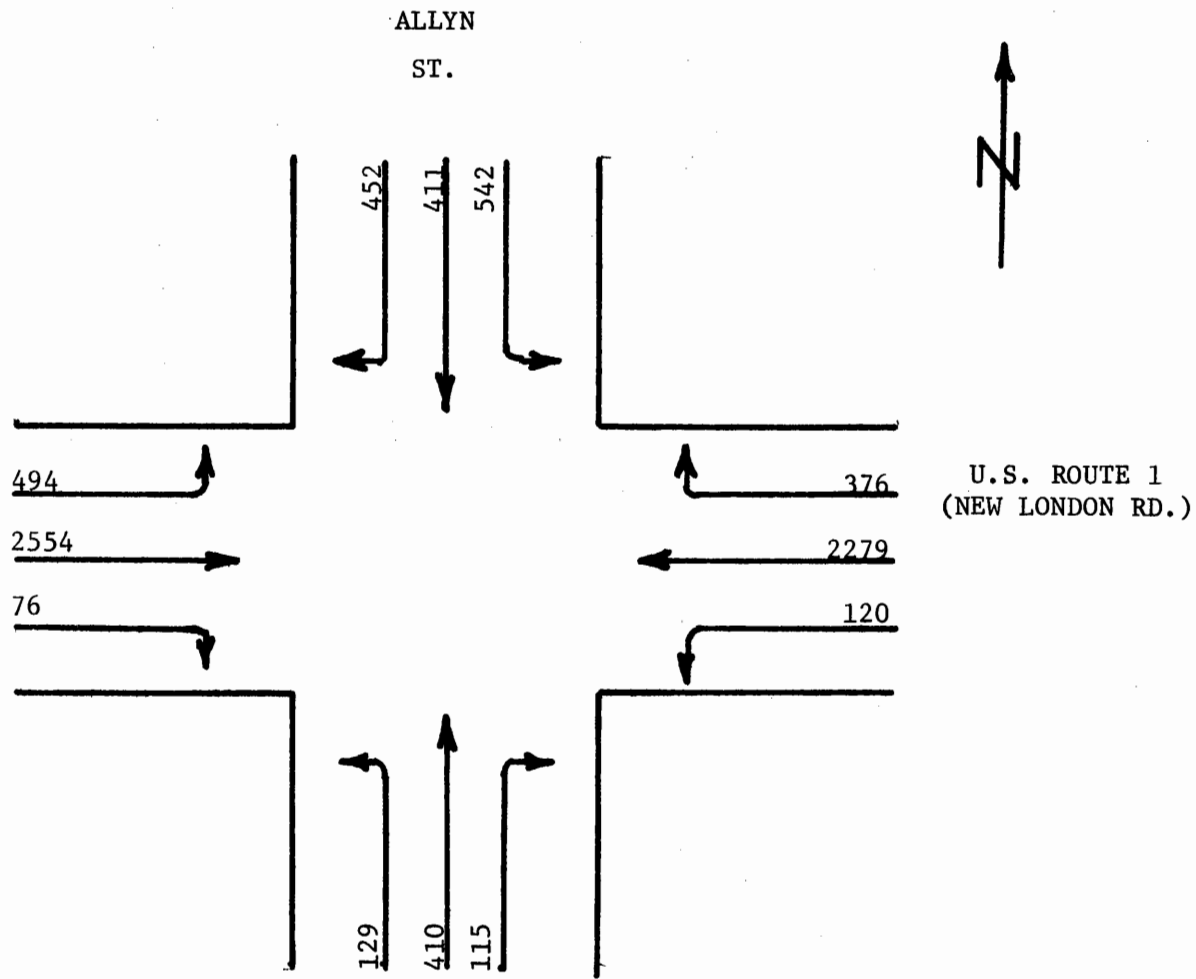


FIGURE 5b

VOLUME COUNT INFORMATION FOR INTERSECTION
OF ALLYN STREET AND U.S. ROUTE 1



WEST
MYSTIC
AVE.

DATE: JULY 13, 1973
TIME: 6 AM - 6 PM

analysis was prepared on a before-and-after basis with the intent to show how the construction of the Allyn Street extension affected accident patterns for each street.

The accident information supplied by the Connecticut Department of Transportation was determined to be incomplete with the degree of incompleteness varying for different periods from 1968 through 1972. Personnel in the Traffic Division of the Department of Transportation were unable to specifically identify inaccuracies in the accident data for any given period. The Groton Town Police Department also supplied this study with accident information, but this information was very sketchy in detail for any particular accident. An effort was made to coordinate data supplied by each agency in an attempt to develop enough meaningful information to provide a short accident analysis. A summary of the accident information is given in Table 3. This information is graphically depicted for each year on accident spot maps which are in Appendix C.

The overall accident experience on local streets in Mystic for the period January 1, 1968 to June 30, 1972 (4-1/2 years) was somewhat higher than would generally be expected for the average village street. After completion of Interstate 95 in 1964, traffic volume on Pequot Avenue and High Street began to increase significantly causing hazardous situations for each street. Table 3 indicates that for the 4-1/2 year period prior to the construction of the extension, Pequot Avenue had six accidents, High Street had 30, and West Mystic Avenue and the existing portion of Allyn Street each recorded one. It should be noted, however, that Allyn Street was not a through street; thus traffic using that portion of Allyn Street and West

TABLE 3

ACCIDENT INFORMATION						
January 1, 1968 to December 31, 1973						
Street	Time Period	No. of Reported Accidents	Type of Injuries	Number of Vehicles Involved	No. of Accidents By Year	
Allyn Street	1-1-68 to 6-30-72	1	None	1 Acc. - 1 Vehicle	1 - 1968	
Allyn Street	7-1-72 to 12-31-73	12	2-severe 3-moderate	7 Acc. - 2 Vehicles 5 Acc. - 1 Vehicle	6 - 1972 6 - 1973	
High Street	1-1-68 to 6-30-72	30	3-severe 2-moderate 5-minor	20 Acc. - 2 Vehicles 8 Acc. - 1 Vehicle 1 Acc. - 3 Vehicles 1 Acc. - 4 Vehicles	6 - 1968 6 - 1969 5 - 1970 5 - 1971 8 - 1972	
High Street	7-1-72 to 12-31-73	13	2-minor 1-fatal	10 Acc. - 2 Vehicles 3 Acc. - 1 Vehicle	3 - 1972 10 - 1973	
Pequot Avenue	1-1-68 to 6-30-72	6	1-severe 2-moderate 1-minor	3 Acc. - 2 Vehicles 3 Acc. - 1 Vehicle	3 - 1969 3 - 1970	
Pequot Avenue	7-1-72 to 12-31-73	None				
West Mystic Avenue	1-1-68 to 6-30-72	1	1-severe 1-moderate	1 Acc. - 1 Vehicle	1 - 1969	
West Mystic Avenue	7-1-72 to 12-31-73	6	2-moderate	6 Acc. - 2 Vehicles	2 - 1972 4 - 1973	

Source: Connecticut Department of Transportation
Town of Groton Police Department

Mystic Avenue was of a local nature. The traffic and accidents on these streets at that time cannot be associated with the construction of Interstate 95.

After completion of the Allyn Street extension, traffic volume and accident patterns changed on the local Mystic streets. The extension provided a more convenient route for travel between Interstate 95 and U.S. Route 1, and volume counts indicate that traffic on Pequot Avenue and High Street that was originally generated by the Mystic Street interchange switched to the new roadway. This change in traffic pattern has brought about some change in the accident pattern in the area.

The most notable change is the increase in accidents on West Mystic Avenue. The Allyn Street extension made a convenient link between Interstate 95 and U.S. Route 1, and residents of Groton Long Point and Noank apparently utilize the new roadway as a quicker way to travel to the City of Groton and its commercial and industrial areas. This new pattern has created an increase in traffic volume on West Mystic Avenue which has resulted in an increase in the total number of accidents. During the post construction period beginning in July, 1972, there were six accidents reported on West Mystic Avenue; each one had multiple vehicle involvement characteristics.

The Allyn Street extension itself has also registered an extremely high number of total accidents since its completion. For the 1-1/2 year period up to December 31, 1973, the roadway has recorded twelve accidents with five of them involving moderate to severe injuries. Most of the accidents reported for this period are either located in proximity to Interstate 95 or in the built up area in Mystic. No accidents occurred on the main thoroughfare of the extension.

A reduction in accidents on High Street would be expected due to the reduction of vehicles using the street after the construction of Allyn Street. This has not been the case because the reported accidents on this street for the post-construction period have increased rather than decreased when compared to figures for previous years. It should also be noted that a comparison of the severity of the accidents on Pequot Avenue and High Street for the before and after construction periods reveals little change. For the before construction period, 14 of the 36 accidents resulted in some type of injury and 25 of these accidents involved multiple vehicles. After construction, there were 13 accidents in the study period of which three resulted in injury and 10 involved multiple vehicles. All of the accidents in the after construction period occurred on High Street. The accident situation on High Street, therefore, has not been alleviated by the construction of the Allyn Street extension.

Air Quality

The overall air quality in the Mystic area does not appear to be significantly affected by the Allyn Street improvement. Because the traffic volumes on Allyn Street are relatively low, the amount of pollutants produced by the vehicles is relatively insignificant compared to the total pollutants resulting from all of the traffic in the Mystic area. Also, the traffic on Allyn Street generally is comprised of vehicles which previously utilized High Street and Pequot Avenue.

At the time of the study, equipment which would measure air quality and pollution was not available. Furthermore, there were no measurements available

for the pre-construction period. The air quality analysis, therefore, was a comparison of predicted pollution levels and air quality against current standards.

The prediction of pollution levels and air quality was prepared by the Bureau of Planning and Research, Connecticut Department of Transportation. Their analysis developed estimates for the situation in 1974 and the expected long term situation in 1990. The results of this analysis are shown in Table 4 along with the Federal Ambient Air Quality Standards. These results would indicate that ambient air quality in the Allyn Street area could be expected to be well below the minimum Federal standards both for the current time as well as the future.

A potential situation where some air pollutant buildup could occur would be at the signalized intersection with West Mystic Avenue, U.S. Route 1 (New London Road), and Allyn Street during peak traffic flow. This buildup would be for a relatively short period of time for the normal work week in the off season tourist travel, but could become a little more significant during the summer months when traffic is heavier and temperatures are warmer. In any event, the duration of buildup of pollutants would still remain short enough to allow for a flushing of the environment before the ambient air quality reached any potential danger level.

Large increases in traffic on Allyn Street could change this entire situation. At the present time, however, this would not appear to be a problem because of the relatively low pollutant levels.

TABLE 4

AMBIENT AIR QUALITY ANALYSIS FOR THE ALLYN STREET EXTENSION, GROTON				Federal Ambient Air Quality Standard (PPM)	
Pollutant	Hourly Air Pollution* Loads (gm/hr)		Ambient Air Quality (PPM)		
	1974	1990	1974	1990	
Carbon Monoxide	7,725	2,010	0.64	0.25	35 [1 Hr. Averaging Time]
Hydrocarbons	1,170	338	0.13	0.08	
Nitrogen Oxides	2,180	1,045	--	--	0.24 [1 Hr. Averaging Time 6-9 A.M.]
Evaluation Criteria*:	1974	1990	1990	1990	Wind Speed: 4 mph
Vehicles Per Hour:	300	300	400	400	Wind Direction: 22-1/2°
Hourly Vehicle Mileage:	300	300	400	400	Atmospheric
Average Speed (mph):	50	50	55	55	Condition: stable

* Source: Connecticut Department of Transportation, Bureau of Planning and Research

Noise

Table 5 indicates the measured as well as computed noise levels which can be expected along Allyn Street at different distances from the roadway. Also, figures were developed to correspond with the expected noise levels for increased volumes of traffic. The 600 VPH figure represents a value which is 50% above the design hourly volume for the roadway.

Table 6 indicates the current design standards for noise and reveals that the noise levels are generally within the accepted standards.

In discussing noise on Allyn Street, it should be very definitely pointed out that some areas do experience excessive noise levels at certain times of the day, week, and year which become exceptionally disturbing. Of particular concern is the Allyn Street, West Mystic Avenue, New London Road signalized intersection. Prior to Allyn Street, traffic traveling west from downtown Mystic along New London Road experienced no interruptions of any kind. Now with the signalized intersection, all vehicles, including heavy duty semi-tractor trailers, must stop periodically at that intersection. The noise caused by those heavy duty trucks accelerating on the green light creates an excessive level of disturbance for those residents living near the intersection. This noise is especially noticeable and disturbing during summer months when windows are open and people are trying to watch television, listen to a radio, conduct a normal conversation, or sleep. No noise level measurements were conducted in this area because meaningful results are hard to develop. It would be practically impossible to delineate individual noise sources and identify which sources are directly a result of the Allyn Street connector.

A lesser noise source which should be mentioned is that of the Mystic Street interchange. Normal traffic traveling Interstate 95 in addition to

TABLE 5

Varying Offsets from Allyn Street (from Edge of Pavement)		Existing L ₁₀ (dBA)*		Computed L ₁₀ (dBA) for the Following Traffic Volumes at 50 MPH				
		Measured	Computed	300 VPH	400 VPH	500 VPH	600 VPH	
				300 VPH	400 VPH	500 VPH	600 VPH	
50'				69	70	71	71	
70'	63	65		66	67	68	69	
100'				63	64	65	66	
200'				57	59	60	60	
300'				54	55	56	57	
400'				51	53	54	55	
500'				49	51	52	53	
600'				48	50	51	51	

*Based on 368 vehicles per hour at 40 mph
 (Source: Connecticut Department of Transportation)
 1 See Figure 4 for location

TABLE 5 (CONT'D)

NOISE LEVEL MEASUREMENTS AND PREDICTIONS (Location II) ¹						
Varying Offsets from Allyn Street (from Edge of Pavement)	Existing L ₁₀ (dBA)*		Computed L ₁₀ (dBA) for the Following Traffic Volumes at 40 MPH			
	Measured	Computed	300 VPH	400 VPH	500 VPH	600 VPH
50'			67	68	69	69
75'	66	65	64	65	65	66
100'			61	62	63	64
150'			58	59	60	60
200'			55	57	57	58
250'			53	55	56	56
300'			52	53	54	55
350'			51	52	53	54

* Based on 384 vehicles per hour at 40 mph
(Source: Connecticut Department of Transportation)

¹ See Figure 4 for location

TABLE 6

CURRENT NATIONAL NOISE LEVEL STANDARDS FOR EXTERIOR RESIDENTIAL USE	
Federal Highway Administration Standards	Housing and Urban Development Standards
$L_{10} = 70$ dBA (not to exceed more than 6 minutes out of the 60 minutes representing the noisiest hour of the day)	$L_{10} = 65$ dBA (not to be exceeded more than 8 hours out of 24 hours)

traffic exiting and entering the highway and conducting various turning movements at the termini of ramps develops a potential high noise level source during peak traffic movement. Again, actual sources are hard to identify and allocate directly to the Allyn Street connector, but they should be considered when and if residential development occurs in that area.

Development

The potential demand for development in the general area of the Pequot Woods and at the Interstate 95 interchange resulting from the construction of the Allyn Street extension became an intensive concern of the residents of Mystic as final plans were being formulated. It was felt that any possible increase of commercial or residential development in that area would create an adverse impact on the woods and the functional operation of existing streets in addition to destroying the character of the surrounding residential neighborhoods. Although the Connecticut Department of Transportation explained that Allyn Street would be a limited access highway in the rural section and zoning and the Groton Town Plan designated low density residential uses for land directly adjacent to the roadway, residents were not convinced that rapid development would not prevail in that area as a result of the Allyn Street extension.

Now that the roadway has been completed for a period of approximately two years, it appears that the potential for development has not yet materialized. A lengthy discussion with the Groton Town Planner provided a great deal of information as to why development has possibly been retarded in this area. A review of requests for building permits and zoning variances in the area of Allyn Street indicates the desire of commercial and residential developers to

utilize this land, but the citizens of Mystic and the Town of Groton have thus far acted as a unified body to vote down any potential variance changes or reclassification of land use. As long as this effort continues, development will remain at a minimum along the connector and at the interchange.

The argument that Allyn Street would destroy the designated greenbelt was investigated by the Department of Transportation and it was found that a minimum amount of land (approximately 3 acres) would actually be included in the roadway right-of-way. Of the possible included land, none could actually be considered part of the greenbelt because no definite limits were ever recorded. The outline of the greenbelt was sort of an imaginary designation of areas that should be considered open space on the land use plan, but little of the open space was actually purchased by the town prior to construction of Allyn Street. Probably one of the most notable consequences of the Allyn Street project is the fact that the Town has formalized its plans for a greenbelt and proceeded with the purchase of property.

Public Attitudes

A total of 18 in-depth interviews were conducted with persons in the Mystic area for the purpose of gaining insights into the attitudes and opinions with respect to the Allyn Street project. While it was anticipated that more interviews would be accomplished, time constraints and the inability to contact or schedule other interviews restricted this phase of the work.

It must be recognized that the interviewed group basically consisted of citizens who were actively involved with the project at the time of the design and the construction of the roadway. In this respect, those persons

who were interviewed did not represent a random sample of the area residents and officials. Although the interviews did provide an understanding of the project from the local residents viewpoint, a statistical tabulation of the comments generated from the interviews would have little meaning. A summary of the response to interview questions, however, is presented in Appendix D.

Based on the interviews, it is possible to make a number of subjective inferences with respect to the attitudes of the public. First, the public attitudes related to the planning, design, and construction of the Allyn Street extension, continues to be varied with a split of the general public still very much evident. Secondly, there has been little change in opinions and attitudes regarding the project. Those persons who initially favored the project generally continue to express satisfaction with the resulting roadway, and those who opposed the project generally continue in their beliefs. Thirdly, the residents generally expressed a favorable opinion regarding the overall safety improvement and the acceptable air quality and noise levels. The exceptions to these opinions were those residents who live on or near Allyn Street. Fourthly, it should be noted that the residents felt that conservation was not a legitimate argument for opposing construction of the connector. Finally, the Allyn Street project has apparently caused the community to focus on other development issues. For example, the citizens acknowledge the need for addressing such problems as traffic flow and parking in the downtown area.

The public and the public hearing

The events leading to the final decision to schedule a public hearing on

the proposed Allyn Street extension are a definite concern of this study. In addition, the conduct of the hearing, the evaluation of the results of the hearing, and the way in which the results were attempted to be integrated into the final design of the roadway must be investigated also to provide a complete evaluation of the effectiveness of the hearing. As a further step in the total evaluation, the interview directed specific questions toward citizen attitude and satisfaction of the hearing and its effectiveness regarding their opportunity for providing input into the final roadway design. These specific factors plus miscellaneous information generated through general discussion are the basis for the evaluation.

A memorandum generated by the Connecticut Department of Transportation on February 16, 1970 as interoffice correspondence clearly indicates why the Allyn Street extension became such a controversial roadway project. In part, this memo stated "A substantial amount of rights-of-way has been acquired under Project No. 58-90 with only minor partial takes remaining. Public participation in design considerations would, therefore, have very little meaning."

"For those reasons and to facilitate the expeditious completion of this project, it is recommended that the public hearing requirements be waived." After considerable opposition mounted concerning the construction of this project, the then Commissioner of Transportation, Mr. G. J. Conkling, directed that a public hearing be scheduled on this roadway.

Because of a lack of information on the concept, character, and need for such a highway and a lack of knowledge about its specific location, many residents in Mystic, especially residents directly adjacent to the existing section of the proposed route, became very concerned about their neighborhood,

the safety of their children, the conservation of a potentially historical Pequot Woods, and their overall living environment. This was a natural reaction under the circumstances and the concerned opposition to the project felt a need to join forces as a means of either blocking construction or providing input into the design of a structure which would become a permanent fixture in the residential community.

As a result of concerned citizens and strong opposition to the extension, an organization known as "TREES" was formed as a public interest group to represent the residents along the existing Allyn Street. This group wrote letters, ran articles through the news media, and attended all meetings concerning the connector as a means of expressing their dissatisfaction with the new highway. Their arguments centered around conservation of the Pequot Woods and the extensive safety hazards that would result from Allyn Street. As their organized opposition mounted, they were able to convince the Commissioner of Transportation that a public hearing was necessary to give the citizens of Mystic an opportunity to publicly express their views on the Allyn Street connector. The hearing was scheduled and was held on September 24, 1970.

A careful and detailed review of the dialogue that transpired at the public hearing indicates that a few basic factors about the roadway concerned most of the opponents. Most comments by opponents elaborated on the designated greenbelt as part of the town plan, conserving trees in the Pequot Woods and along the existing residential street, and the increased volume and high speeds that would be developed by Allyn Street. The major points expressed by the proponents dealt with need for a safe and convenient means of traveling from Interstate 95 to U.S. Route 1 for both local citizens and tourists, and the need to remove the extremely high traffic volume from High Street and Pequot

Avenue which presented a definite safety hazard to motorists, pedestrians, and adjacent property owners. Although the hearing was very long and became quite emotional as the strong opponents and proponents quibbled about trivial points, the impact on the Connecticut Department of Transportation was sound and created a sense of need to complete a total reevaluation of the Allyn Street extension before making any definite final decision on constructing the roadway.

As a direct result of the hearing, the Department of Transportation evaluated several aspects of the roadway design to see if there was any possible way to potentially improve upon the geometry or alignment of the road. Every alternative considered was an attempt to save as many trees as possible and destroy as little existing residential property. Although different concepts were considered, it was the opinion of the Department of Transportation that it was absolutely essential to remain within the right-of-way bought as part of the Interstate 95 construction program. This single design constraint eliminated most new roadway alternatives.

Even though the Department of Transportation did attempt to alter the design of the roadway by incorporating some of the input expressed by concerned citizens at the public hearing, the design and constraints of the roadway were far beyond any possible alterations. With this fact in mind and a recall of other facts previously discussed, it could appear as though the public hearing was scheduled only as a means of satisfying the desires of the people with no real purpose intended regarding any major design change. This is an area of completely insufficient facts and evidences to substantiate any general assumptions.

In reviewing answers to particular questions asked in the personal

interview sessions, it became quite evident that most citizens attending the public hearing were quite confident that the conduct of the meeting was very satisfactory and that everyone who wanted to express an opinion was given an ample opportunity. It was further established that most participants, both pro and con, felt that although the Department of Transportation was expressing good intentions, attempts were never made to incorporate input provided by local citizens into the design or to affect the final decision to build the connector. Most everyone interviewed stated that the decision had already been made, the State Legislature mandated the Department of Transportation to build it, and there was no possible way to influence the design as a result of the public hearing.

The public and the Allyn Street improvement

As a result of the personal interviews, several additional points of interest concerning the effects of Allyn Street were revealed. Many residents living on Allyn Street prior to the construction of the extension who purchased their residential property after the Interstate 95 construction program stated that they were never aware that a high-type limited access highway was proposed to be built as an extension of the existing Allyn Street. Claims were registered by these people that real estate agents neglected to inform them of the proposal and that the sale of the property was potentially misrepresented. A review of files in the Right-of-way Division of the Department of Transportation clearly indicates that any property purchased under the Interstate 95 program was noted on deeds recorded in the town records and a proper title search would identify such a transaction. If individual property owners had carefully read their title searches, they would have been fully aware

that recent negotiations by the Department of Transportation had occurred and should have taken the initiative to investigate the reason why. Most negotiations were referenced to the map at the town offices showing the Allyn Street connector.

A second factor resulting from the interviews was the sequence of events leading to the inclusion of Allyn Street on the Omnibus Bill passed by the 1969 State Legislature. Many of the citizens interviewed felt that political motivations were involved and that Allyn Street was being used to promote passage of other important legislation for other parts of Connecticut. Some residents of Mystic feel they were victims of political trade offs and expressed concern that public desire was not solicited before voting money for the connector.

As a result of personal contact with many citizens of Mystic concerning the project, emotional and political feelings within the community were substantially affected. There are indications that resentment to the project will linger in Mystic for many years to come.

A final effect resulting from Allyn Street which should be discussed is the possible damage to the Pequot Woods. A biologist toured the woods with the Groton Town Conservationist prior to the Allyn Street construction and determined that many of the trees were diseased and that saving them would not provide any great asset to the community. No report was available to indicate any further deterioration of the trees or if any program was developed to preserve those trees that still have useful life. Many residents commenting in the personal interviews indicated that the woods have been used more for recreational purposes since the connector was built. The woods appear to be much more accessible to local citizens now.

V.

CONCLUSIONS

Based on the studies that were undertaken, a number of conclusions may be drawn with respect to the Allyn Street improvement. It must be recognized that an historical review frequently reveals aspects of a project that may not be accomplished in the same way if they were to be done today. Furthermore, these conclusions are in no way intended to place blame for the events that took place or the consequences that resulted. The following conclusions simply express what was learned from the review of the project, and this information will hopefully guide efforts associated with future improvements.

- a) As was expected, traffic was removed from High Street and Pequot Avenues upon the opening of Allyn Street. Certainly, the better accessibility to Interstate 95 has attracted some additional traffic; however this traffic is not a large volume. Basically, this traffic as well as other traffic on Allyn Street is of a local nature with respect to the Mystic area. In essence, the forecast of traffic volumes for Allyn Street can be considered to be reasonably good.

It should be noted that the traffic on Allyn Street can be controlled to a certain extent by the signing on Interstate 95. At the present time, the signing reflects a local street with little meaning to a tourist. Because of this situation, the directional signing on Interstate 95 should reflect the

development objectives of the residents and the community.

- b) The concern of the residents about vehicular speeds on Allyn Street proved to be true. Speed studies do substantiate that the roadway permits high speeds, and speeding is a problem in terms of the posted limits.

It would appear that the speeding problem, however, is not limited to Allyn Street. The speed studies reveal violation of the posted limits on High Street as well. It is important to realize that this street primarily serves local traffic; thus this is somewhat of a local problem. Education and enforcement as well as design will have to be examined in addressing this problem.

- c) It is concluded, based on available accident data, that the frequency and total number of accidents were significantly reduced only for Pequot Avenue as a result of the Allyn Street connector, High Street has shown no improvement, and conditions on West Myrtle Avenue became worse. The increase in total accidents on West Mystic Avenue is most likely related to the increase in traffic volume. As time progresses and traffic flow patterns become even more stable than at present, potential accident frequency may decrease unless traffic volume shows a heavy increase.
- d) While air quality measures were not available for the period prior to the Allyn Street construction, there is no reason to believe that the air quality has significantly changed due to the project. In the Allyn Street area, the measured air quality is currently

well below the published standards.

- e) Noise is predominately an isolated problem. While noise levels are generally within the accepted levels, there are indications that noise is a problem at the intersection with Library Street and with Route 1. Residents in this area expressed concern over the noise which basically results from the traffic controls at the intersections. Noise problems could increase if the road becomes more heavily used by trucks. Because of the residential character of the area, the use of nationwide standards for acceptable noise levels may not be fully applicable.
- f) No significant advancement in land development has occurred for the initial two year period following the completion of the roadway. Land surrounding the Mystic Street interchange has remained practically totally stagnant and with the exception of one adjacent property owner, no visual development is occurring along the main section of Allyn Street. There is an indication by the zoning board that pressure is constantly being applied for zoning variances in that area, but so far the citizens have blocked any development attempts. This emphasizes the fact that development can be controlled by policy. This policy must be explicitly stated during the design of a roadway.

The construction of Allyn Street did not serve to disrupt the Pequot Woods nor the greenbelt area. While this was a concern of many citizens, there were apparently many misconceptions at the time of the construction of Allyn Street.

- g) After careful review of questions directed toward selected citizens of Mystic who participated directly in the public hearings for the Allyn Street connector, it was determined that most people felt the meeting was properly and fairly conducted and that every citizen who attended was given an ample opportunity to express an opinion. It was further concluded that although the hearing was being held to gather public input, most citizens realized it was only a formality and that comments would not affect the final decision to build Allyn Street. This conclusion may not be applicable to public hearings in general due to the fact that the hearing was conducted after the bids for the project were received.
- h) During the time period between the design and construction of Interstate 95 and the Allyn Street project, there were a number of changes in the community as well as in societal values. For example, there were changes in society's general attitude towards highways during this period. These changes must be recognized and considered where extended delays are encountered with respect to a specific project.
- i) To a certain extent, the Department encountered a situation in which the opposing parties in the community had many conflicts that were not really resolved. The role of the Department should be carefully examined in such situations. A solution was implemented without community goals and objectives with respect to growth being clearly defined. This resulted in CONNDOT being criticized when actually the community must share some of the responsibility.
- j) The problems of interacting with the public during the planning and

design process have yet to be overcome. It is evident that the public frequently fails to understand the technical aspects of design and has difficulty visualizing the final design product. On the other hand, the department has not yet found a way to truly involve the public in design. In this case, the public was not actually given real alternatives; thus their participation was superficial except for design detail.

VI

RECOMMENDATIONS FOR FURTHER STUDY

While this study served to reveal a number of points which should be considered, there are many questions that remain unanswered with respect to the planning and design of transportation facilities. Based on this study, the following recommendations are made which give direction for further study.

- a) A review of the Allyn Street project reveals that it probably could not be considered a typical highway improvement project because of the delay which occurred. In addition, this research study was conceived after the construction of the roadway. It is recommended that the Department consider undertaking a review of other projects to determine if there is a pattern of consequences that can be detected. In selecting other projects for review, the research should be initiated prior to construction in order to properly document the "before" condition. Furthermore, it would be helpful for the researchers to be able to follow the project through the planning, design, and construction rather than attempting to reconstruct the history of the project.
- b) The Department of Transportation has had a certain degree of autonomy in the construction of transportation facilities. In this case, the Department really had made the decision to build the project even though the project was the immediate problem of the community. The role of CONNDOT should be reexamined in such situations especially when the project is the source of community division.

- c) The design standards for highways are relatively inflexible in that they currently optimize safety, motorist economy, and traffic flow. The broader design considerations associated with community goals and development must be recognized and incorporated into design. The inclusion of such considerations in the design standards will require extensive and careful study.
- d) It is recognized that public participation is a vital part of the planning and design process. The effective involvement of the public continues to present a major problem and merits further study.

APPENDIX A

INTERVIEW QUESTIONS

1. Are you a resident of Mystic?
2. a) If not, how are you associated with Mystic?
b) Where do you reside?
3. If a resident, where do you reside?
How long have you lived in Mystic?
Why did you move to Mystic?
4. Have you ever held a public office in Mystic or Groton?
What office?
During what period?
5. Do you have school age children? What ages?
6. Are you familiar with the Allyn Street Connector?
7. What is your interest in this project?
8. Did you attend any of the public hearings or public informational meetings concerning Allyn Street conducted by the Connecticut Department of Transportation?
9. Why did you attend these particular meetings and how did you participate?
10. Are you satisfied that the people of Mystic were fully informed about the Allyn Street Connector project through the public hearings and public informational meetings?
11. Do you feel the people were given an ample opportunity to provide input for the design of Allyn Street?
12. Are you satisfied that all questions were answered fully either at the meetings or at a later date through correspondence with the Department of Transportation?
13. Are you satisfied the Connecticut Department of Transportation attempted to evaluate the comments expressed at the public meetings before making any final decision on the design or construction of Allyn Street?

14. What other types of public meetings do you attend?
15. In what ways do you feel Allyn Street has been either a benefit or a detriment to the traffic problems?

Do you feel the street has been beneficial or detrimental to the community planning goals?
16. Do you feel the Connecticut Department of Transportation fairly negotiated and fully attempted to satisfy the requests and complaints of abutting property owners and the general public?
17. Prior to the constuction of Allyn Street residents were very concerned about safety, air quality, noise level, and potential development; now that this project has been completed, how do you feel about these items? Were you concerned about these items prior to construction?
18. Do you feel the Connecticut Department of Transportation fully explained its reasons for building the Allyn Street Connector and do you think the reasons were satisfactorily justified?
19. Have your opinions about this project changed since it has been built?
20. Do you feel the Allyn Street Connector was really a necessary improvement?
21. Do you consider yourself a member of any particular public interest group and to what extent are you involved?
22. Do you feel this project was accurately and substantially publicized by the news media and the Department of Transportation?
23. What are your thoughts concerning conservationists using the Pequot Woods as a tool for blocking construction of Allyn Street?
24. Do you feel the Department of Transportation made every effort to provide suitable features where pre-existing landscape impacts were indicated?
25. Do you believe the traffic signs on I-95 for the Allyn Street interchange, as they now exist, solve the problem of tourists exiting on Allyn Street enroute to the Mystic Seaport Museum? Would other measures permit better utilization of the road?
26. Do you feel the construction of Allyn Street has affected the traffic problems at the draw bridge in Mystic? In what ways?
27. Do you believe traffic circulation and/or safety has improved on roads adjacent to Allyn Street since its construction?
28. With regard to traffic and transportation, what do you feel are the biggest problems confronting Mystic?

29. Do you have any other comments concerning the Allyn Street Connector that you would like to express at this time?
30. In view of today's energy problem, do you feel projects such as Allyn Street connectors have merit for today's and future traffic?

APPENDIX B

DISTRIBUTION OF TRAFFIC SPEEDS

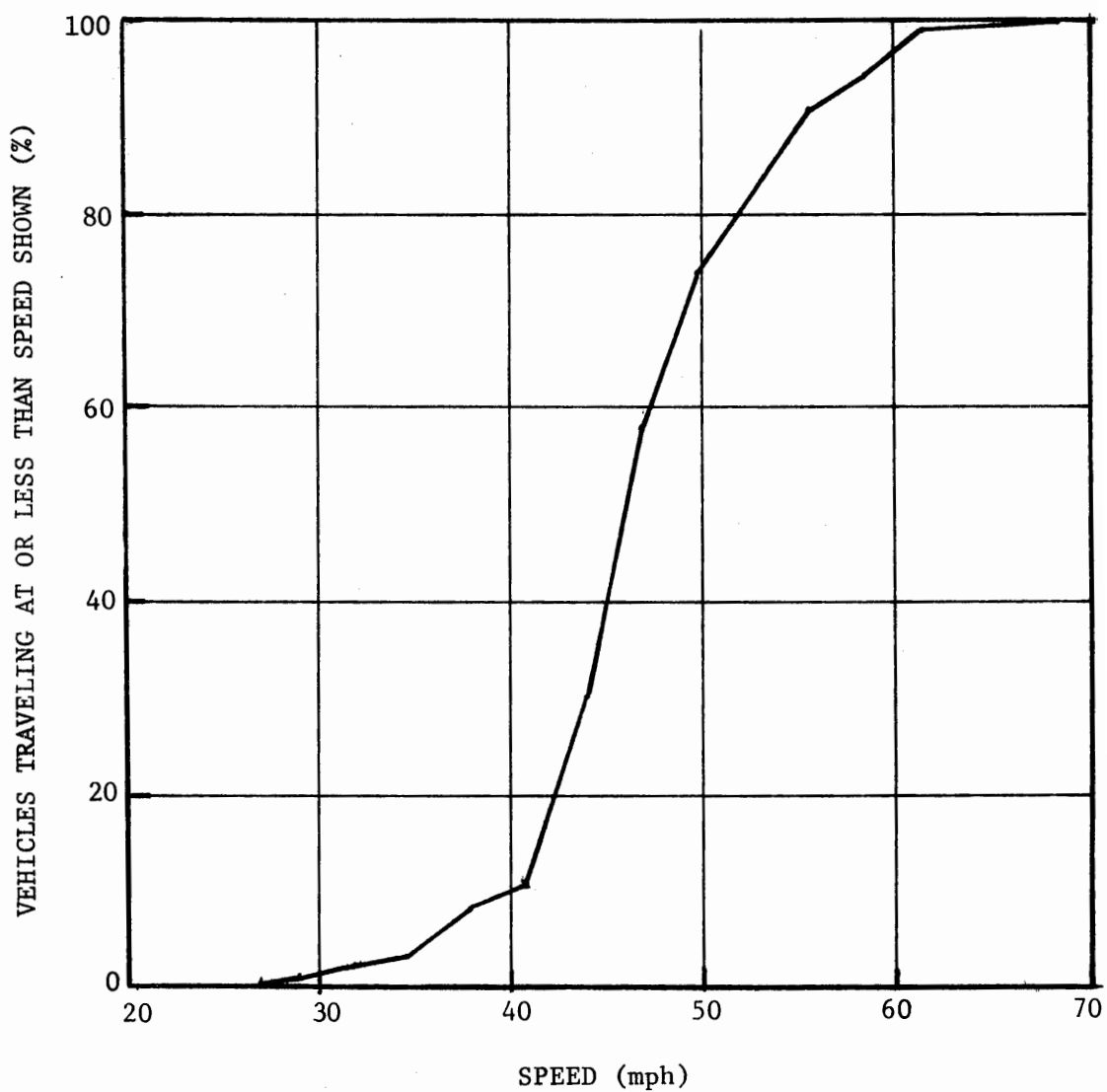
Date: 11-6-73 Time: From 1:00 PM to 2:00 PM

Location: Allyn Street Connector - Mystic (Loc. #1-N)

Pavement Type: Bituminous Concrete Direction: North

Weather Condition: Sunny Speed Limit: 45 MPH

Mean Speed = 47.4 MPH 85% Speed = 53 MPH



DISTRIBUTION OF TRAFFIC SPEEDS

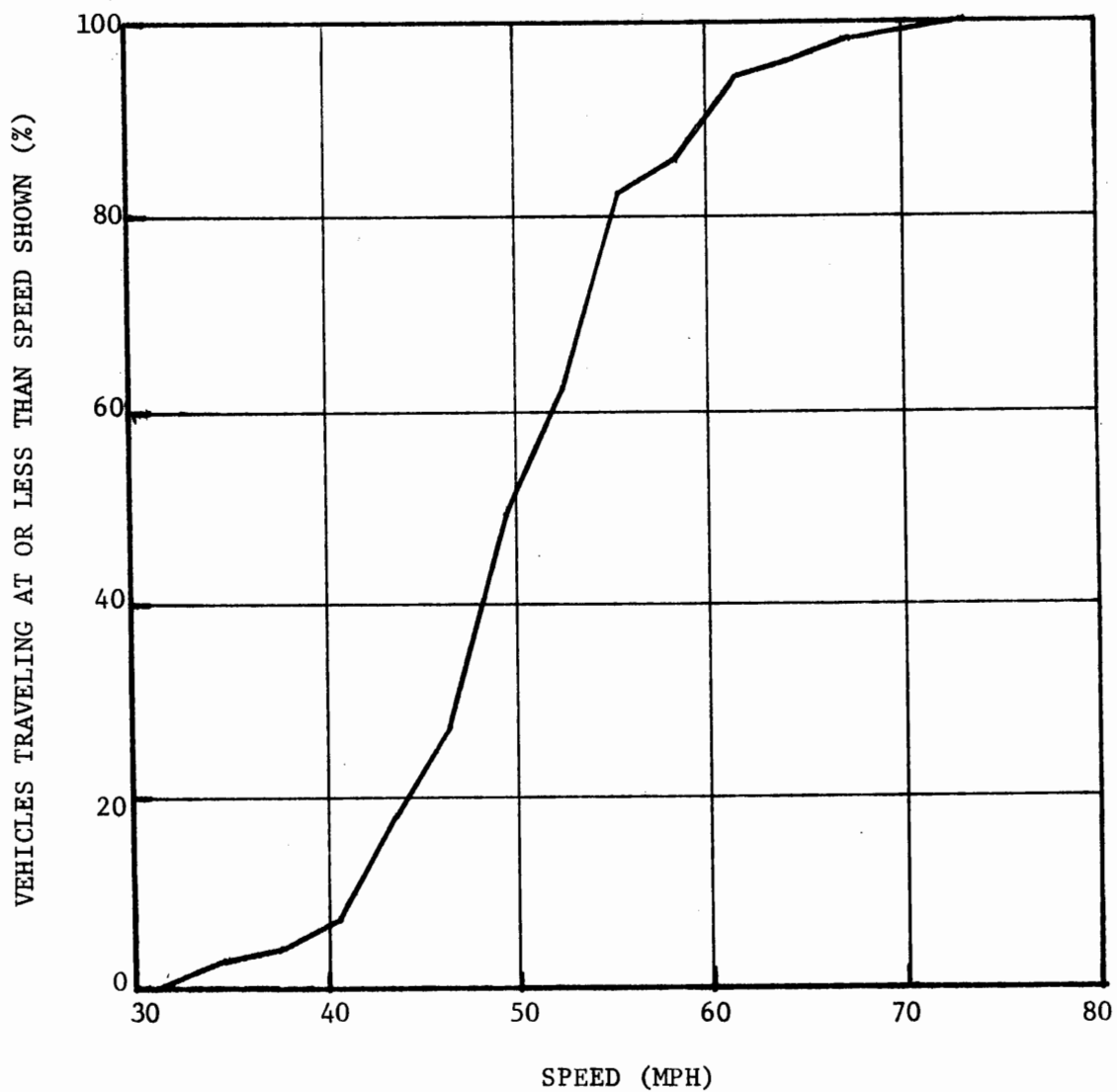
Date: 11-6-73 Time: From 11:30 AM to 12:30 PM

Location: Allyn Street Connector - Mystic (Loc. #1-S)

Pavement Type: Bituminous Concrete Direction: South

Weather Condition: Sunny Speed Limit: 45 MPH

Mean Speed = 51.2 MPH 85% Speed = 58 MPH



DISTRIBUTION OF TRAFFIC SPEEDS

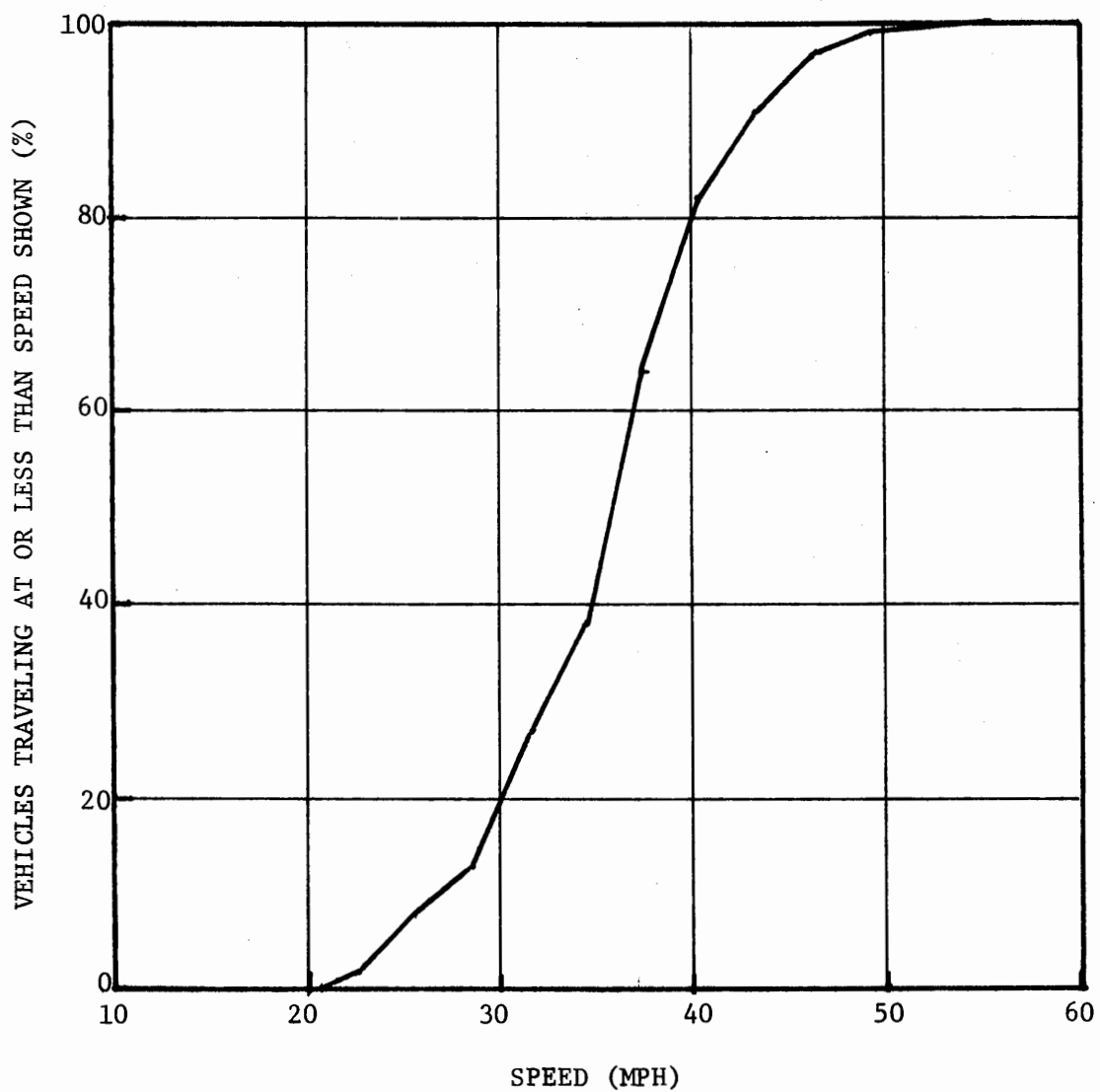
Date: 11-8-73 Time: From 1:00 PM to 2:00 PM

Location: Allyn Street Connector - Mystic (Loc. #2-N)

Pavement Type: Bituminous Concrete Direction: North

Weather Condition: Partly Cloudy Speed Limit: 25 MPH

Mean Speed = 36.4 MPH 85% Speed = 42 MPH



DISTRIBUTION OF TRAFFIC SPEEDS

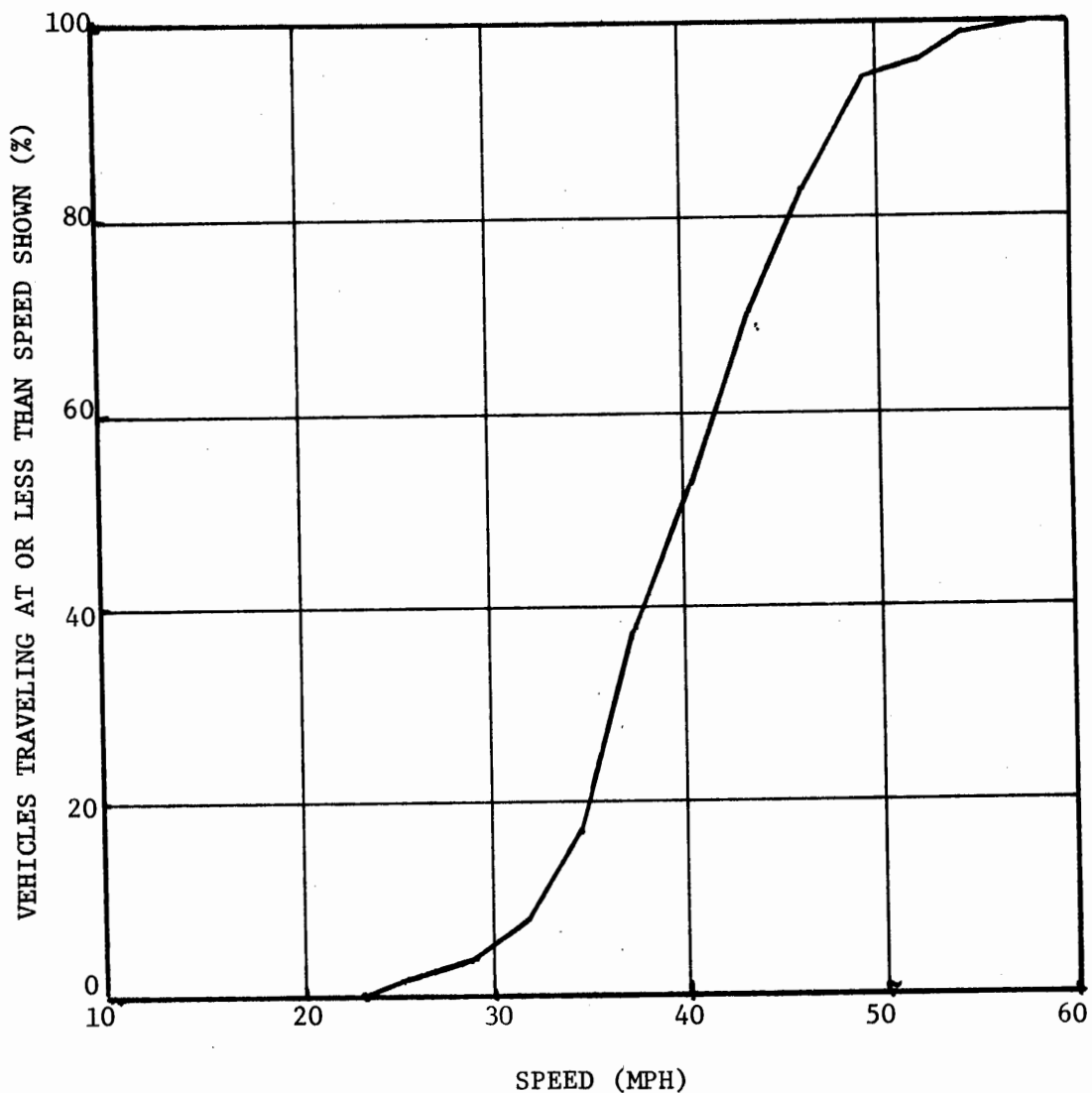
Date: 11-8-73 Time: From 11:30 AM to 12:30 PM

Location: Allyn Street Connector - Mystic (Loc. #2-S)

Pavement Type: Bituminous Concrete Direction: South

Weather Condition: Partly Cloudy Speed Limit: 25 MPH

Mean Speed = 41.1 MPH 85% Speed = 48 MPH



DISTRIBUTION OF TRAFFIC SPEEDS

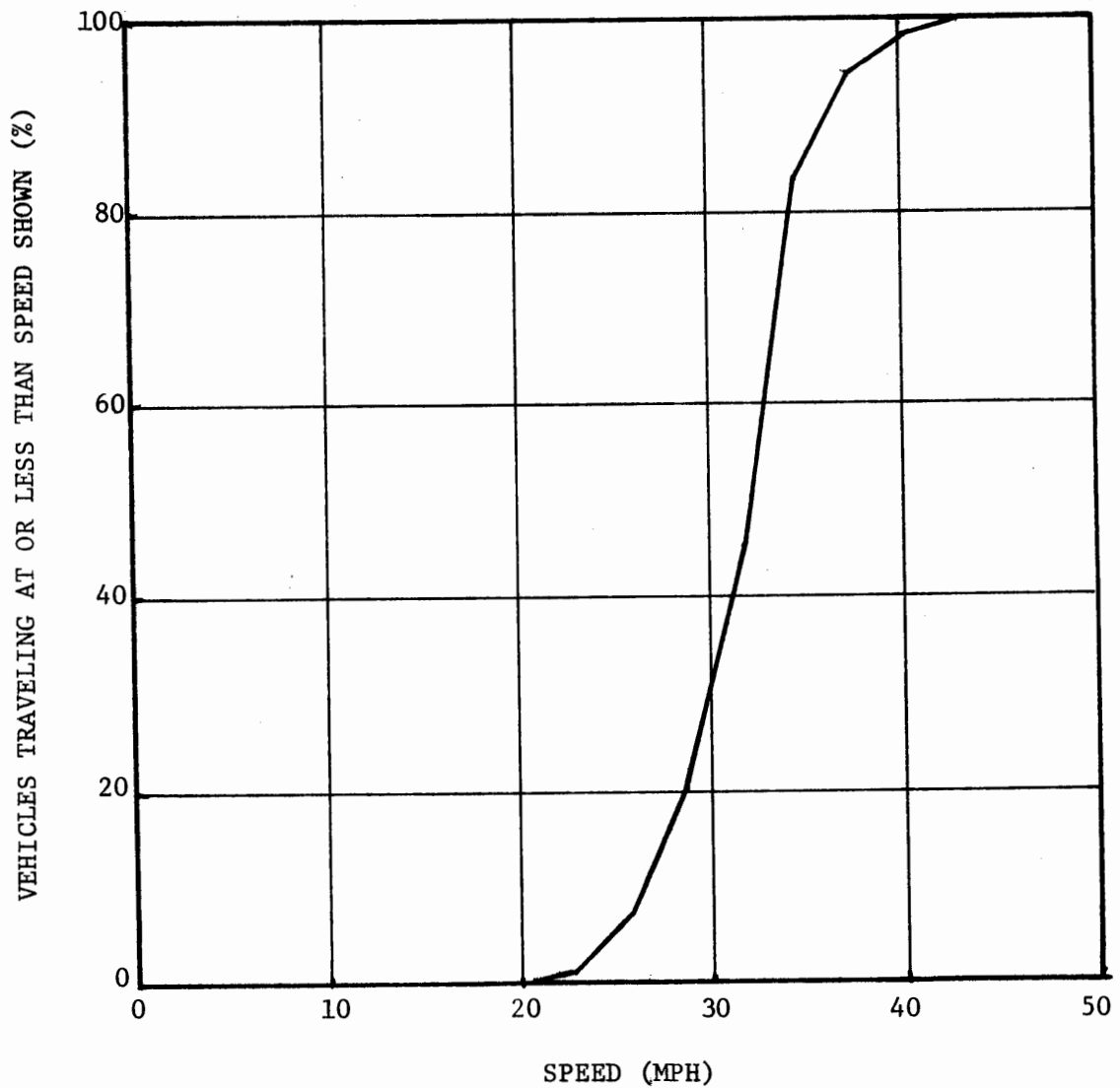
Date: 7-12-73 Time: From 1:00 PM to 2:45 PM

Location: Allyn Street Connector - Mystic (Loc. #3-N)

Pavement Type: Bituminous Concrete Direction: North

Weather Condition: Sunny Speed Limit: 25 MPH

Mean Speed = 32.6 MPH 85% Speed = 36 MPH



DISTRIBUTION OF TRAFFIC SPEEDS

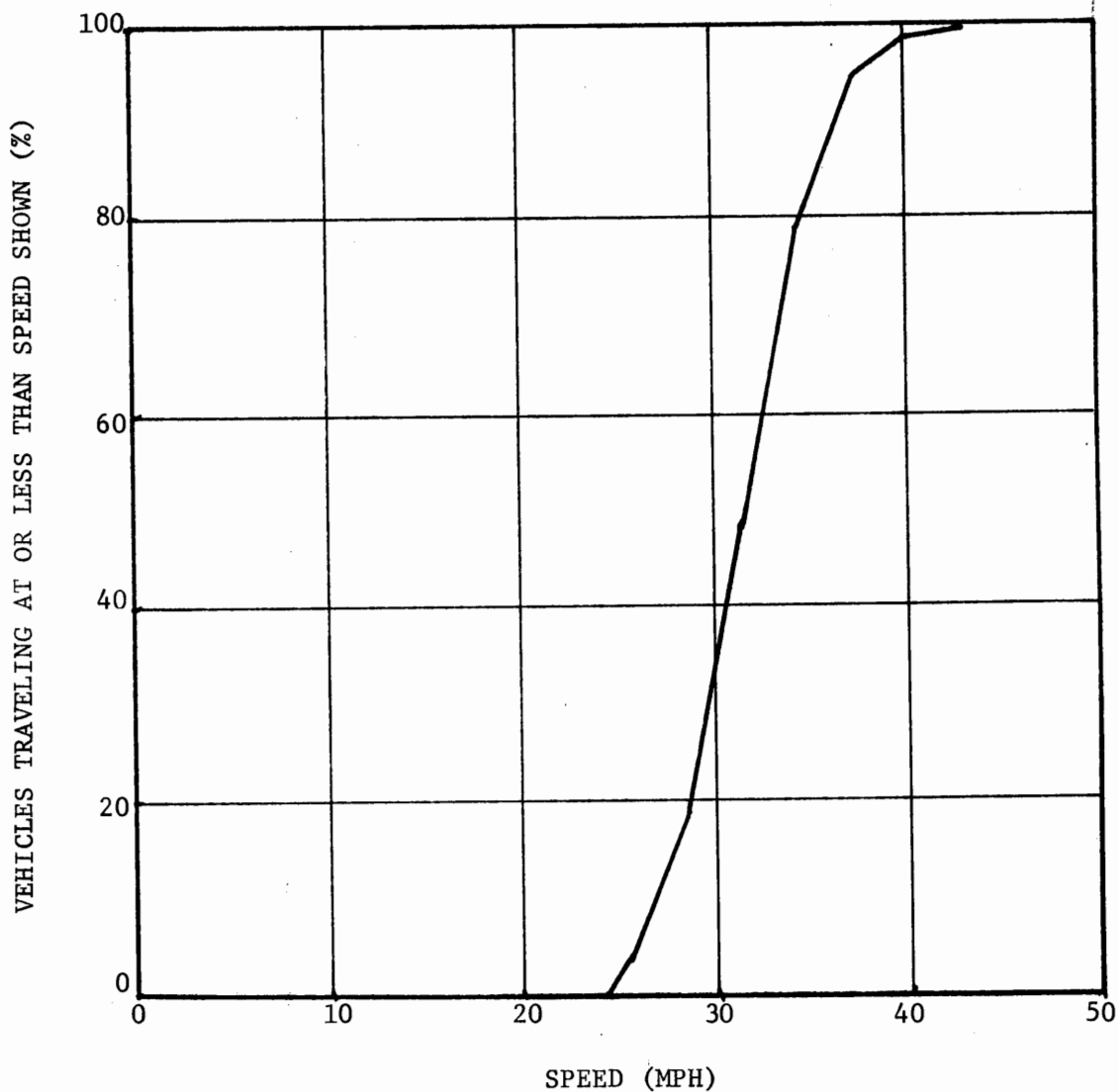
Date: 7-12-73 Time: From 1:00 PM to 2:45 PM

Location: Allyn Street Connector - Mystic (Loc. #3-S)

Pavement Type: Bituminous Concrete Direction: South

Weather Condition: Sunny Speed Limit: 25 MPH

Mean Speed = 32.7 MPH 85% Speed = 37 MPH



DISTRIBUTION OF TRAFFIC SPEEDS

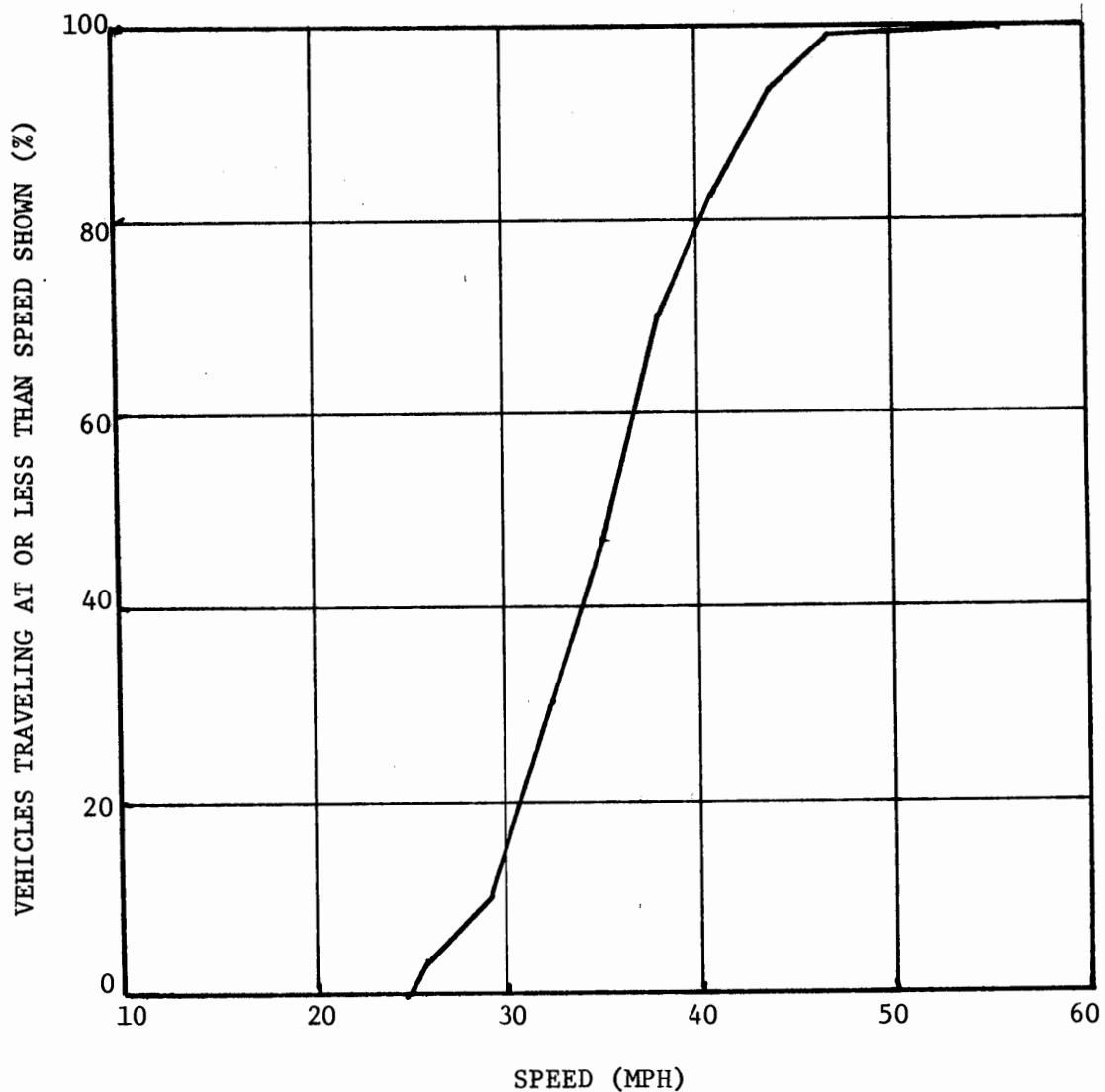
Date: 11-15-73 Time: From 11:00 AM to 12:00 PM

Location: High Street - Mystic (Loc. #4-N)

Pavement Type: Bituminous Concrete Direction: North

Weather Condition: Partly Cloudy Speed Limit: 25 MPH

Mean Speed = 36.2 MPH 85% Speed = 42 MPH



DISTRIBUTION OF TRAFFIC SPEEDS

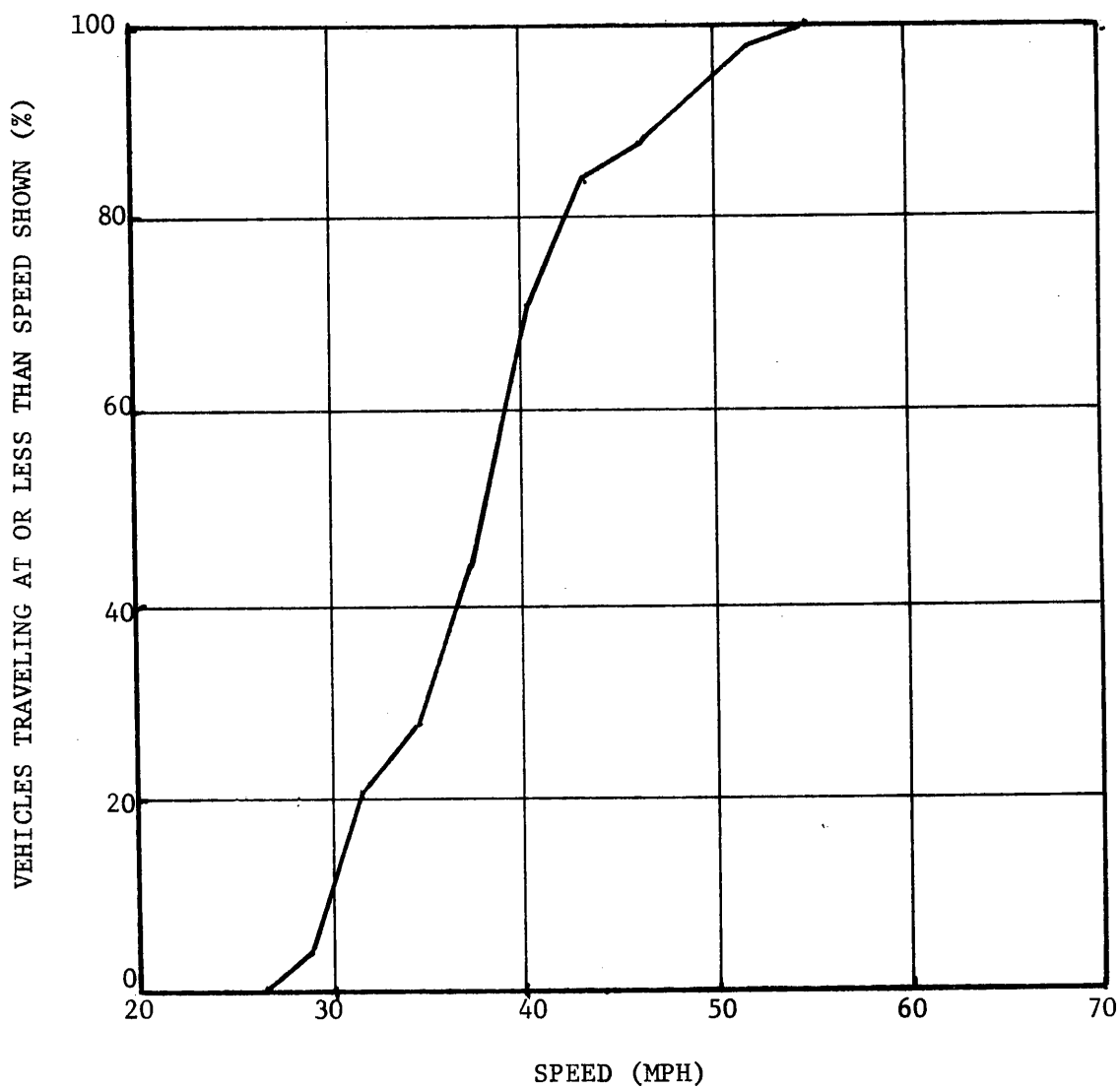
Date: 11-15-73 Time: From 12:30 PM to 1:30 PM

Location: High Street - Mystic (Location #4-S)

Pavement Type: Bituminous Concrete Direction: South

Weather Condition: Partly Cloudy Speed Limit: 25 MPH

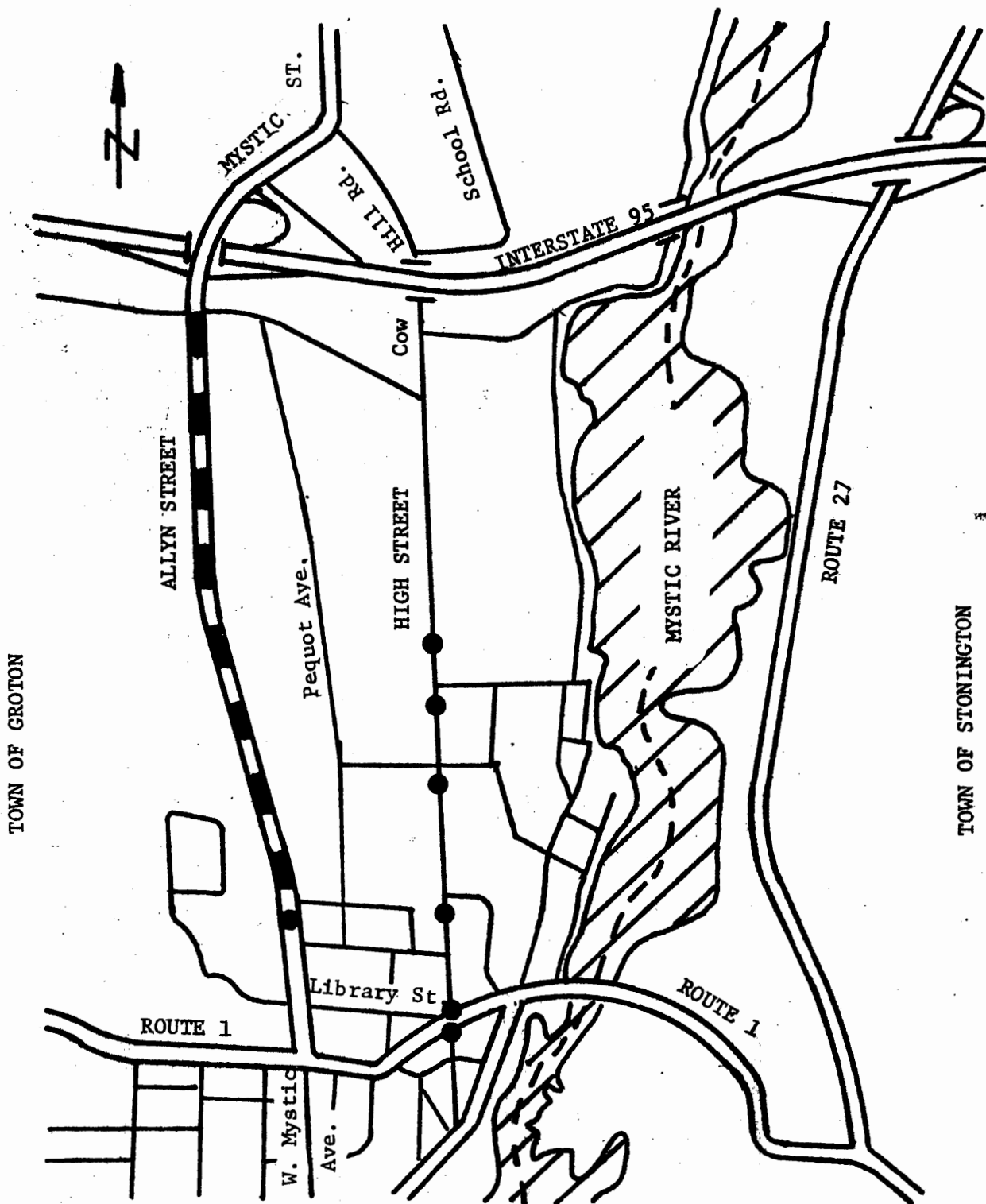
Mean Speed = 39.5 MPH 85% Speed = 45 MPH



APPENDIX C

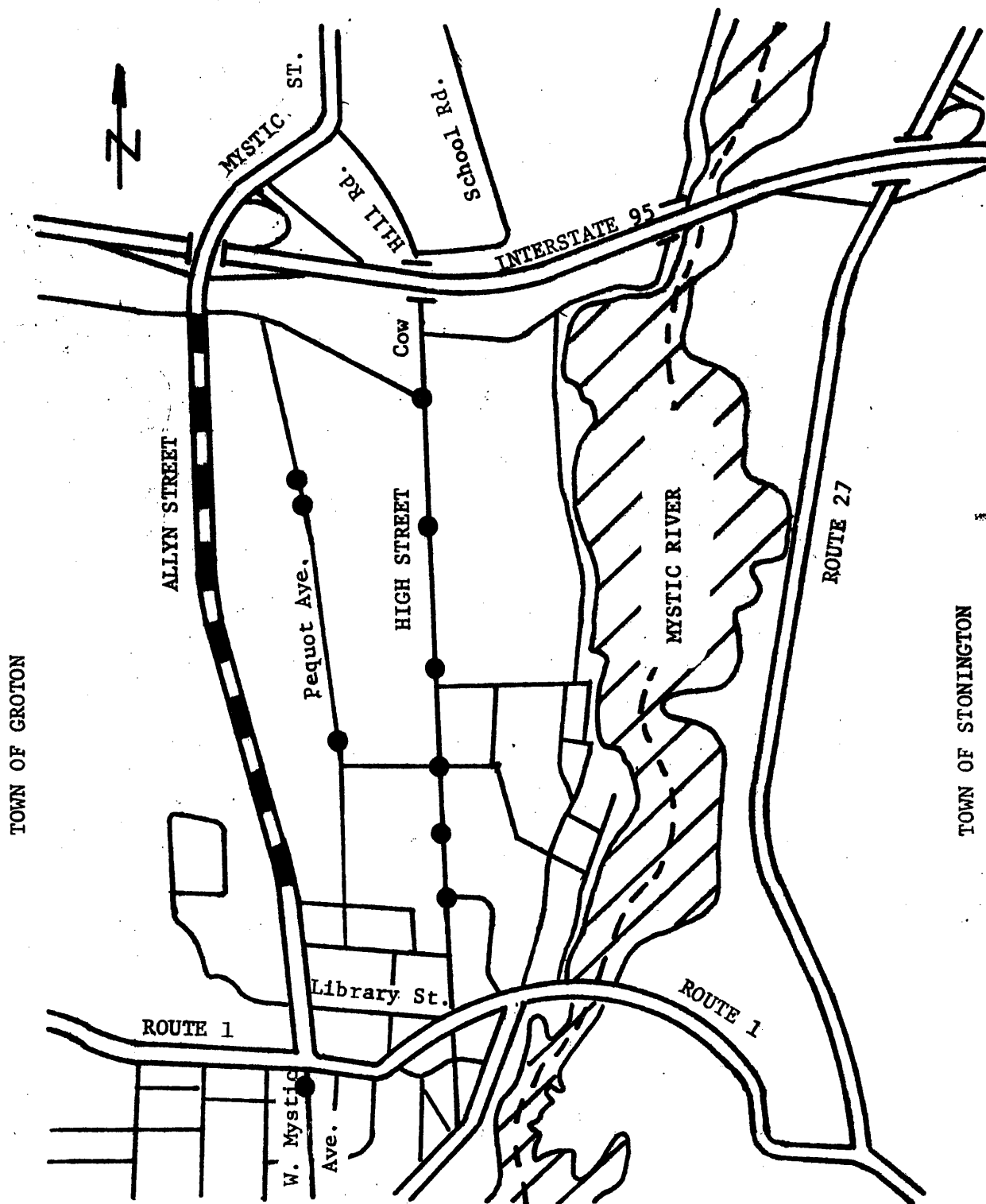
1968 ACCIDENT SPOT MAP

● indicates accident location



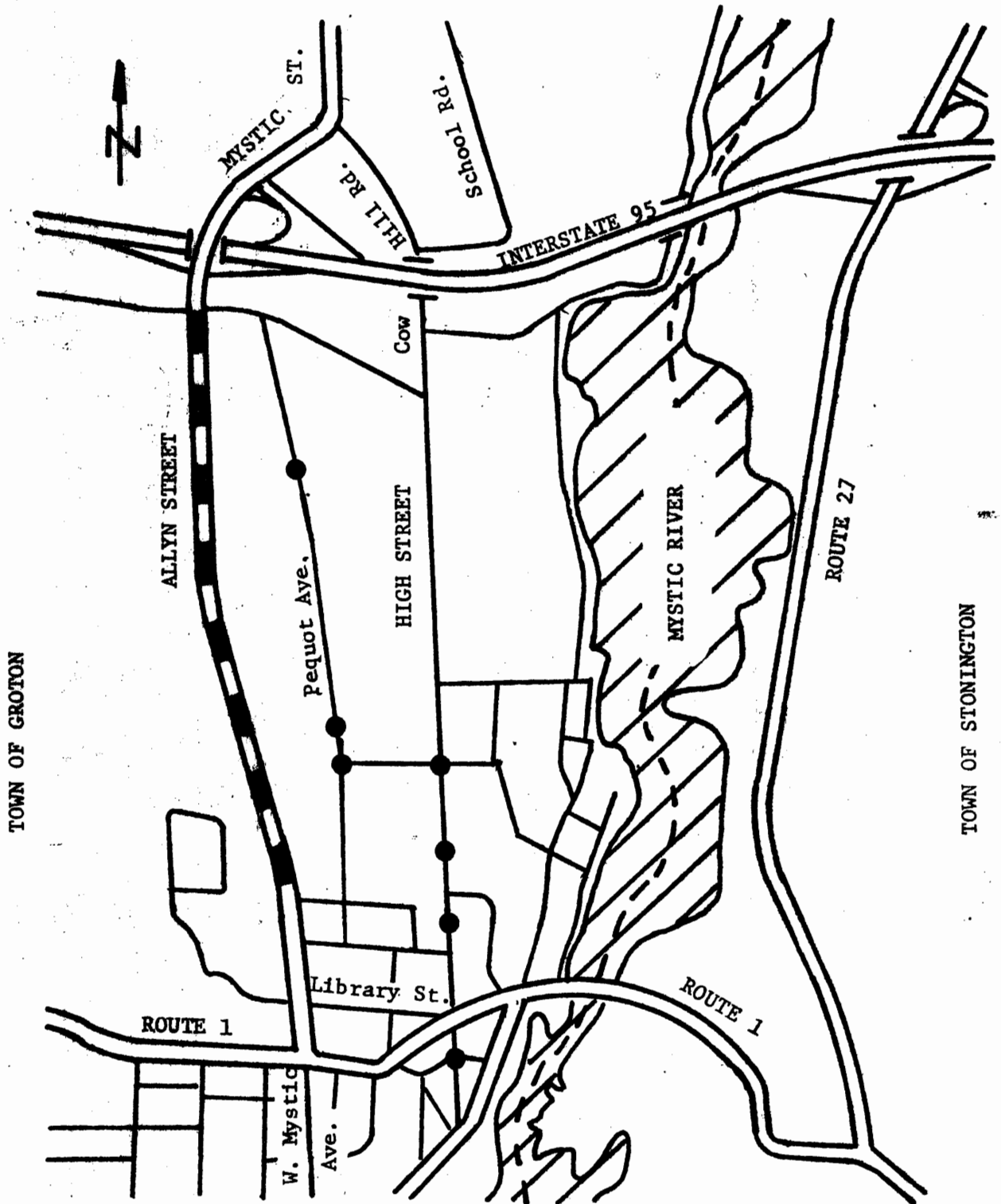
1969 ACCIDENT SPOT MAP

● indicates accident location



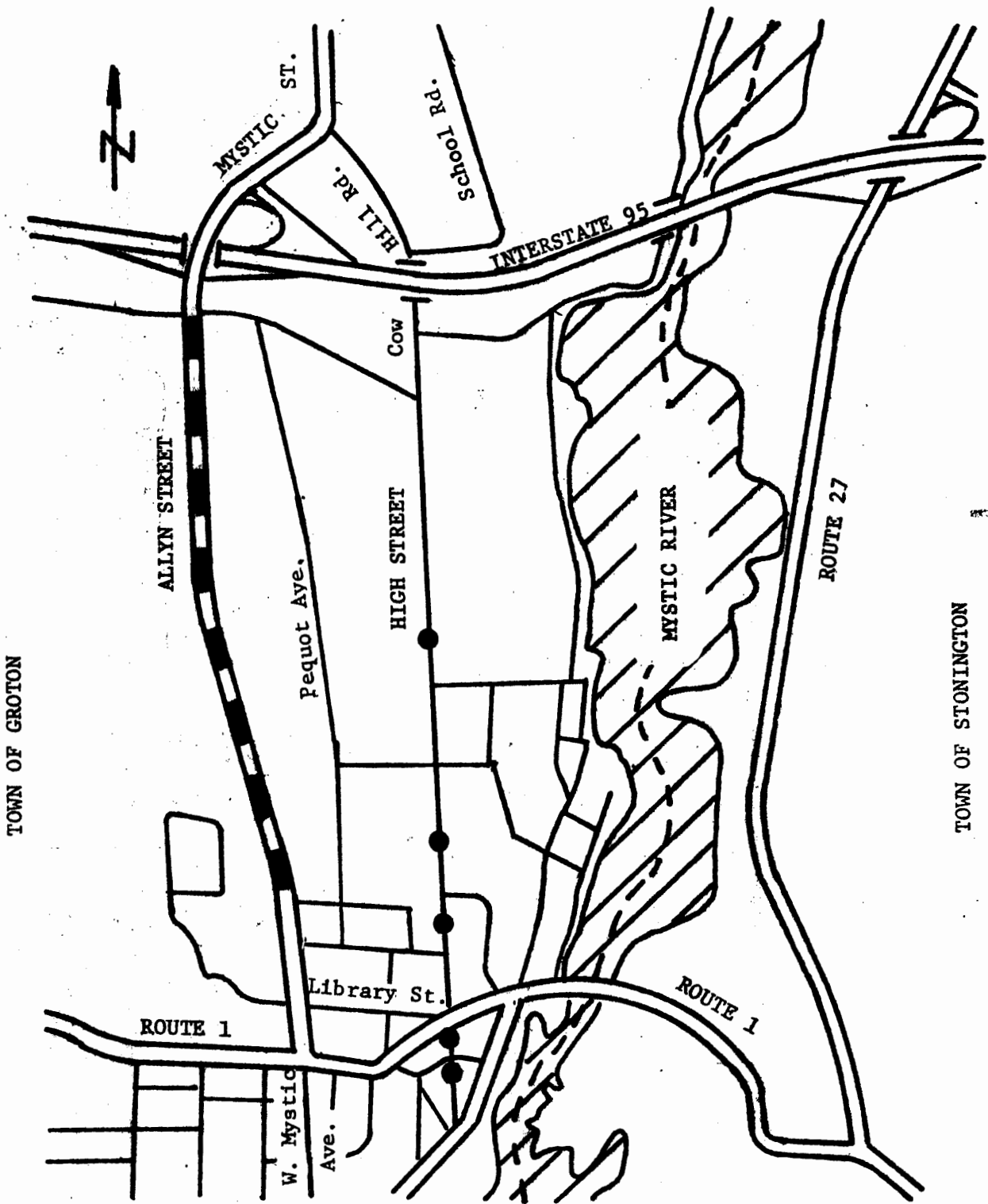
1970 ACCIDENT SPOT MAP

● indicates accident location



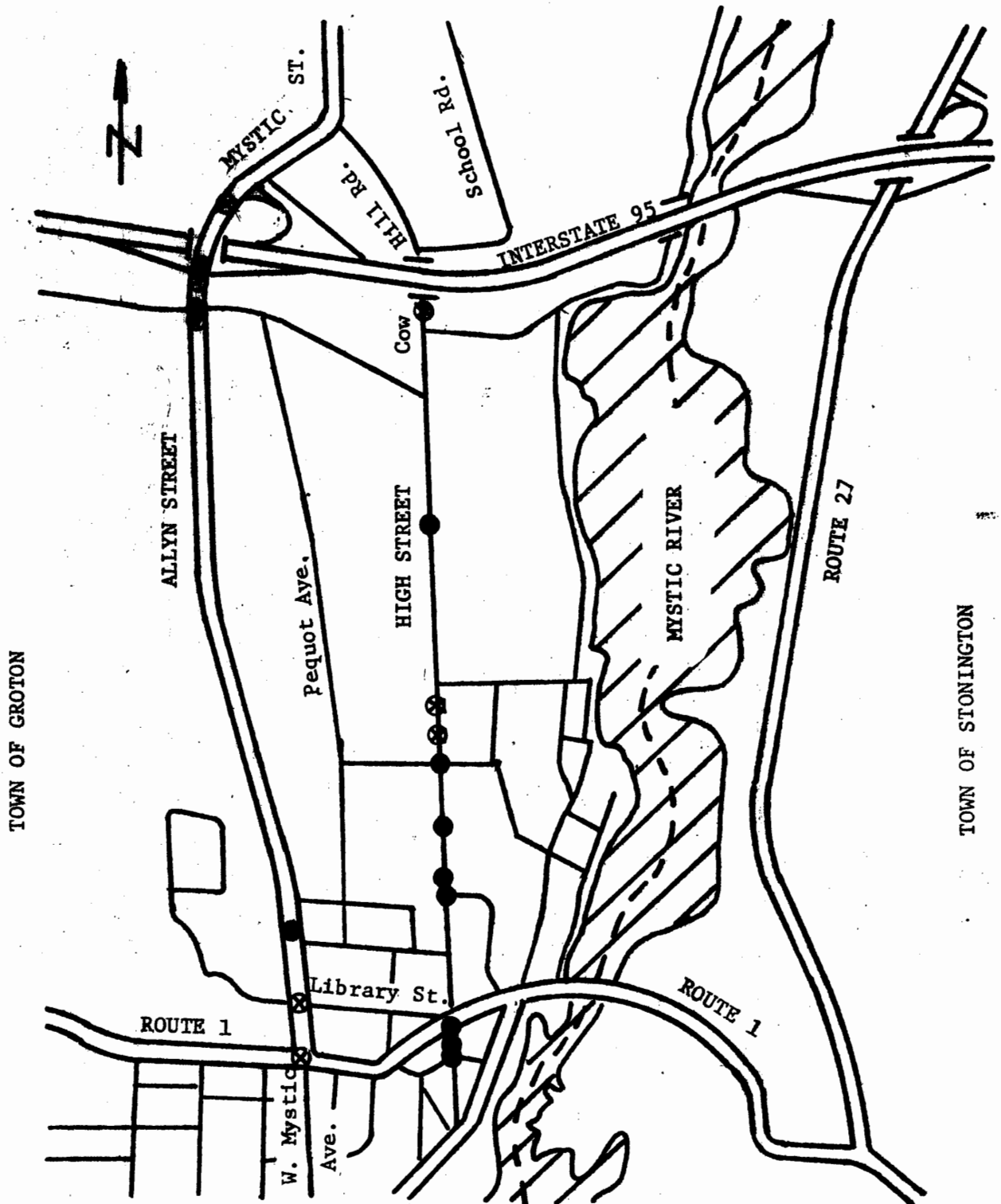
1971 ACCIDENT SPOT MAP

● indicates accident location



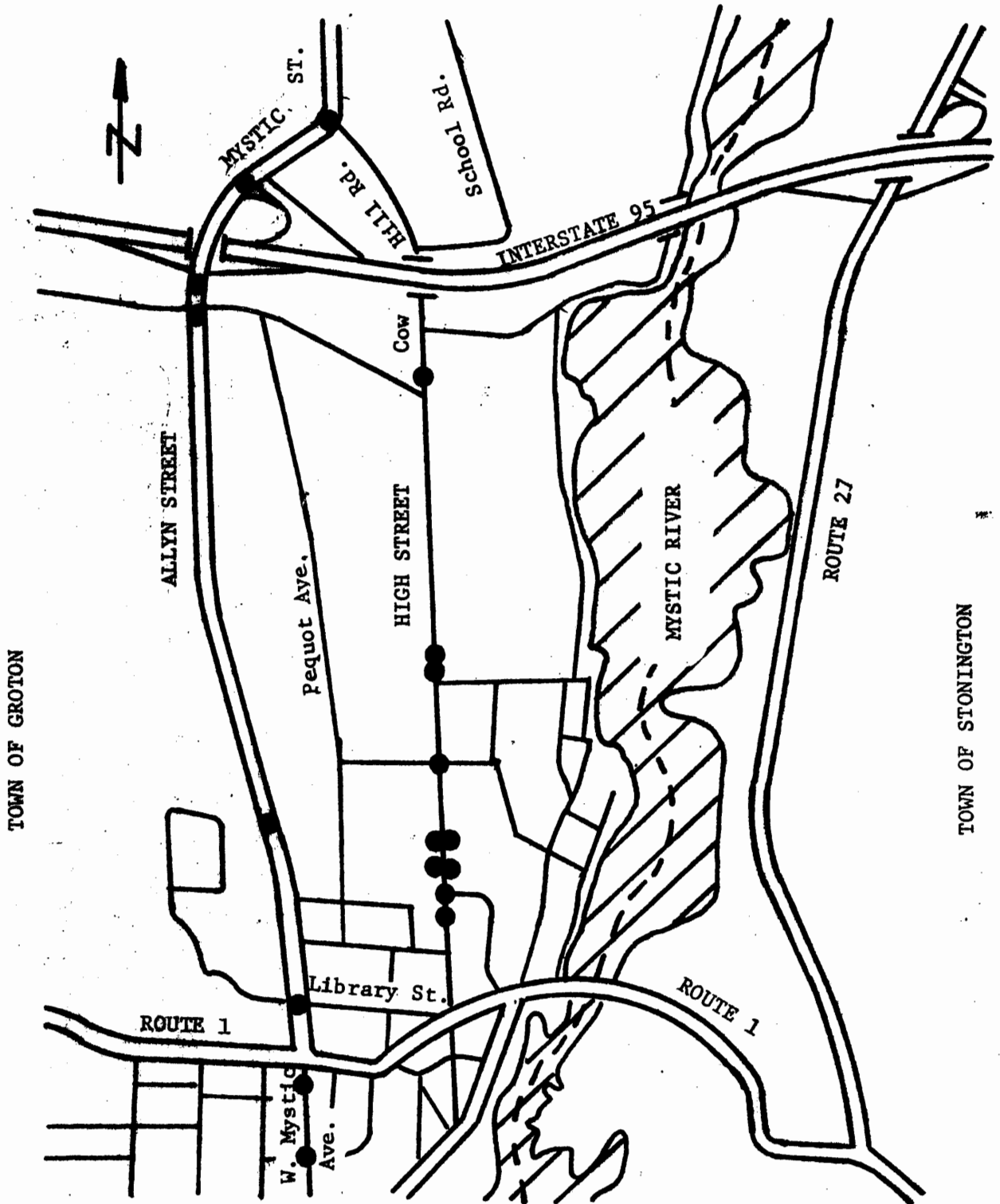
1972 ACCIDENT SPOT MAP

- indicates accidents during period 1-1-72 to 6-30-72
- ⊗ indicates accidents during period 7-1-72 to 12-31-72



1973 ACCIDENT SPOT MAP

● indicates accident location



APPENDIX D

SUMMARY OF COMMENTS TO SELECTED INTERVIEW QUESTIONS

- 8) Did you attend any of the public hearings or public informational meetings concerning Allyn Street conducted by the Connecticut Department of Transportation?
 - a) Everyone except four people interviewed answered "yes" to this question. Those people who answered "no" were interested in the hearing, but had a previous commitment that night.
- 9) Why did you attend those particular meetings and how did you participate?
 - a) Expressed the need for another north-south highway in the Town of Groton.
 - b) Construction of Allyn Street would make Pequot Avenue and High Street much safer.
 - c) Wanted to let the Connecticut Department of Transportation know about the strong opposition to the Allyn Street extension.
- 10) Are you satisfied that the people of Mystic were fully informed about the Allyn Street Connector project through the public hearings and public information meetings?
 - a) The public was not well informed initially, and the Connecticut Department of Transportation was forced to explain the connector through a public hearing.
 - b) The Allyn Street Connector was well covered in the local newspapers.
 - c) Mr. Shugrue held a very fair public hearing and everyone was fully informed.
 - d) The only reason for the public hearing was to allow opponents to

express their views concerning Allyn Street, and they were given an ample opportunity.

- e) The information provided at the public hearing was after the fact, because legislation had already been enacted to construct Allyn Street.
 - f) People were not fully informed about Allyn Street until after the decision to build the project was made.
- 11) Do you feel the people were given an ample opportunity to provide input for the design of Allyn Street?
- a) People had a more than ample opportunity to provide input. This input was selfishly directed.
 - b) Mr. Shugrue was very fair at the hearings and gave everyone an ample opportunity to express his views.
 - c) Input was allowed to be given. It was considered, and an attempt was made to incorporate it into the roadway design.
 - d) Everyone had a chance to provide input, but emotions were so high that suggestions were unreasonable.
 - e) All questions raised at the hearing were answered, but all people were not satisfied with some of the answers.
 - f) Input was allowed toward the design, but the Connecticut Department of Transportation did not listen.
 - g) The Department of Transportation listened to input from the people, but the decisions were final before the hearing was held.
- 12) Are you satisfied that all questions were answered fully either at the meetings or at a later date through correspondence with the Department of Transportation?

- a) All questions were answered, but everyone was not satisfied with all the answers.
 - b) The Connecticut Department of Transportation answered all questions to the best of their ability.
 - c) The Department of Transportation did not really explain the need for Allyn Street or the fact they were mandated to construct the roadway.
 - d) It was hard to determine because the people of Mystic were too emotional.
 - e) There were no real reasons behind some of the answers given by CONNDOT.
 - f) All questions were answered, but the answers only stated that roadway had to be built.
- 13) Are you satisfied the Connecticut Department of Transportation attempted to evaluate the comments expressed at the public meetings before making any final decision on the design or construction of Allyn Street?
- a) CONNDOT made a very good evaluation of the need for the roadway and their traffic predictions were very accurate.
 - b) No roadway has ever received more attention from the Connecticut Department of Transportation than Allyn Street did.
 - c) CONNDOT attempted to evaluate comments before making a final decision, but they were under legislative mandate to build the road.
 - d) With their training and limited contact with the people, they (CONNDOT) probably did do a good job. They should, however, have made more contacts with the general public.

- e) The money was there to build the road, and CONNDOT had to build it.
 - f) The decision to build Allyn Street was already made and final before the public hearing was ever held. CONNDOT listened, but they were unable to change their mind.
15. In what ways do you feel Allyn Street has been either a benefit or a detriment to the traffic problems?
- a) It was constructed for the convenience of residents on High Street.
 - b) It improved traffic problems on High Street and Pequot Avenue.
(Benefit)
 - c) Allyn Street fulfilled the need for a road from Interstate 95 to U.S. Route 1. (Benefit)
 - d) Traffic patterns for Mystic were improved, and traffic problems have decreased. (Benefit)
 - e) The roadway improved safety for pedestrians and school children.
(Benefit)
 - f) It provided good outlet for downtown Mystic traffic. (Benefit)
 - g) The roadway caused a speeding drag strip, and drastic increase in number of traffic accidents. (Detriment)
 - h) It destroyed Allyn Street for residential purposes and did not really solve the problem. (Detriment)
- 16) Do you feel the Connecticut Department of Transportation fairly negotiated and fully attempted to satisfy the requests and complaints of abutting property owners and the general public?
- a) It negotiated more than fairly.
 - b) The Connecticut Department of Transportation did an exceptional job of landscaping adjacent residential properties.

- c) The slope rights on some residents' property was unreasonable and drainage was in wrong direction.
 - d) CONNDOT listened to abutting property owners to see what they wanted and how they wanted their property repaired because of the construction.
 - e) Right-of-way taken by CONNDOT was unnecessarily too wide for that roadway.
 - f) Most people interviewed simply answered "yes" to this question with no extra comment.
- 17) Prior to the construction of Allyn Street residents were very concerned about safety, air quality, noise level, and potential development; now that this project has been completed, how do you feel about these items? Were you concerned about these items prior to construction?
- a) Now that the roadway is open, these items do not seem to be a concern.
 - b) The road is safe if signs and speed limits are obeyed. Noise and air quality are not a problem.
 - c) Noise has not increased, air quality is probably better, and zoning prevents commercial development in that area.
 - d) No housing is planned yet for development.
 - e) Four-way stops at Library Street and signals at the intersection of U.S. Route 1 have improved safety for school children. Air pollution and noise levels might be higher.
 - f) The crime rate along Allyn Street has increased. Noise has increased from 40 dBA prior to the extension to better than 90 dBA on festival weekend. Accident levels have increased and air quality is very bad.

- g) A problem at Library Street has developed as a result of Allyn Street and the accident rate has increased.
18. Do you feel the Connecticut Department of Transportation fully explained its reasons for building the Allyn Street connector and do you think the reasons were satisfactorily justified?
- a) CONNDOT satisfied Groton's demand with the construction of Interstate 95. They fully justified their reasons.
 - b) A north-south connector was definitely needed.
 - c) CONNDOT used 1963 rationale of dumping a heavy amount of traffic on substandard side roads from Interstate 95 as their reasoning. They could have done a better selling job of that theory.
 - d) The reasons were justified although emotions of citizens of Mystic might hide that fact.
 - e) The money to build the road was there. The bill was passed by the State Legislature to build it so it had to be built.
 - f) The design of the roadway was fully explained, but the need was not fully justified and their scope of the need was inaccurate.
 - g) Residents along the old section of Allyn Street were not satisfied.
- 19) Have your opinions about this project changed since it was built?
- a) 13 people answered "no" to this question, no one answered "yes", and some people did not answer.
 - b) One person said road was not as bad as was originally anticipated.
- 20) Do you feel the Allyn Street connector was really a necessary improvement?
- a) Four people answered "no" to this question, nine people answered "yes", and some people had no comment.

- b) It was not particularly necessary at the place it was located.
 - c) It was more of a convenience than a necessity, and it did not really improve the safety on High Street or Pequot Avenue.
 - d) The Allyn Street construction improved the safety on the side roads.
 - e) Allyn Street upgraded the residential use of adjacent side streets.
- 22) Do you feel this project was accurately and substantially publicized by the news media and the Department of Transportation?
- a) Very substantial coverage was given by news media, but the accuracy was questionable.
 - b) The news media was very accurate in most cases.
 - c) Both papers were very objective (New London Day and the Groton News) and did not editorialize. They gave both sides equal coverage.
 - d) The news media was very one-sided and favored the TREES organization.
 - e) Neither newspaper took sides.
 - f) The media did not always report important facts pertinent to the controversy.
- 23) What are your thoughts on conservationists using the Pequot Woods as a tool for blocking construction of Allyn Street?
- a) As a result of Allyn Street, the town has now started to buy up some of the land designated for the greenbelt. This is providing more conservation than was lost.
 - b) The blocking of construction was not necessary, and the roadway was drastically needed.
 - c) Conservationists did not believe in the rest of the town plan; so they should not have been concerned over Allyn Street.

- d) Allyn Street had to be blocking a legitimate historical site to prevent its construction.
 - e) The woods are being used now more than ever, and more people can enjoy them easier.
 - f) The roadway has not hurt the woods, but it probably will increase the potential for development.
 - g) The traffic problem probably could have been solved without cutting through the woods.
- 24) Do you feel the Department of Transportation made every effort to provide suitable features where pre-existing landscape impacts were indicated?
- a) More than enough landscaping was done considering the size of the project.
 - b) Allyn Street has more residential landscaping than any other roadway in the state.
 - c) The landscape is compatible with prior landscaping.
 - d) Many landscape features were removed for construction and then replaced the same as before.
 - e) CONNDOT could have done more landscaping on the rural portion of Allyn Street.
- 25) Do you believe the traffic signs on Interstate 95 for the Allyn Street interchange, as they now exist, solve the problem of tourists exiting on Allyn Street enroute to the Mystic Seaport Museum? Would other measures permit better utilization of the road?
- a) The signing should not be changed anymore, because the problem is pretty much under control.
 - b) People who know the area now use Allyn Street, and tourists who are unfamiliar with the area do not use it.

- c) When the advanced warning signs were changed to Allyn Street instead of Mystic Street (or Local Street), the problem was solved.
 - d) The signing is good from a local resident's point of view, but it is hard for the tourist traveling to Mystic.
 - e) Probably more people exit by mistake now than are misguided.
 - f) People are not being absolutely informed of where they are going when they now exit at Allyn Street.
 - g) The signs are not accurate on Interstate 95 now, and they have not been accurate since the interstate highway opened.
 - h) The traffic volume reduction on High Street and Pequot Avenue indicates the signs are effective.
- 26) Do you feel the construction of Allyn Street has affected the traffic problems at the draw bridge in Mystic? In what way?
- a) The problems at the drawbridge have not changed.
 - b) The problem has not changed and nothing could hurt it anymore anyway.
 - c) The problem at the drawbridge has not changed because the problem is at the signalized intersection (New London Road and Allyn Street).
 - d) Higher traffic volumes on Allyn Street have increased the problem at the drawbridge, especially during the heavy tourist season.
 - e) Allyn Street has not hurt the problem or helped it either.
 - f) The problem was not any worse when Allyn Street first opened, but more people are finding out about Allyn Street and now the problem is beginning to increase.
- 27) Do you believe traffic circulation and/or safety have improved on roads adjacent to Allyn Street since its construction?
- a) Safety has improved on High Street and Pequot Avenue and the heavy volume has been removed from these streets also.

- b) Because of the lower volumes, High Street and Pequot Avenue appear to be much safer.
 - c) The volume on Pequot Avenue and High Street has been reduced, but it has increased on Library Street.
 - d) Conditions have not really improved for any of the adjacent streets.
 - e) High Street still has the same problems of high volume and a high number of accidents.
- 28) With regard to traffic and transportation, what do you feel are the biggest problems confronting Mystic?
- a) Mass transit should be established for the area.
 - b) Parking in downtown Mystic is a problem.
 - c) The bridge across the Mystic River should be improved, and more streets paved within the community.
 - d) The traffic problems at the Interstate 95 interchange for Route 27 in Stonington should be alleviated.
 - e) The horizontal and vertical alignment of U.S. Route 1 should be improved.
 - f) Highway speeds should be reduced, and tourists' confusion should be corrected.
 - g) The traffic circulation problem of downtown Mystic should be improved.
 - h) Traffic should be kept moving through downtown Mystic.
- 29) Do you have any other comments concerning the Allyn Street connector that you would like to express at this time?
- a) It was very unfortunate that the Allyn Street connector became such a controversial project.

- b) Many people are finding the Allyn Street connector a much more convenient way to travel from residential areas in Mystic to the City of Groton or the Town of Stonington.
- c) The roadway will most likely attract new commercial development to a once quiet residential community.
- d) There is a continual asking for zoning variances along Allyn Street to make it commercial rather than residential.
- e) During the roadway construction period, the road was not built as designed, poor construction materials were used, and there was poor construction supervision.
- f) Roadway plans stated the old pavement was to be removed and it never was, and the drainage design was very inadequate for adjacent residents.