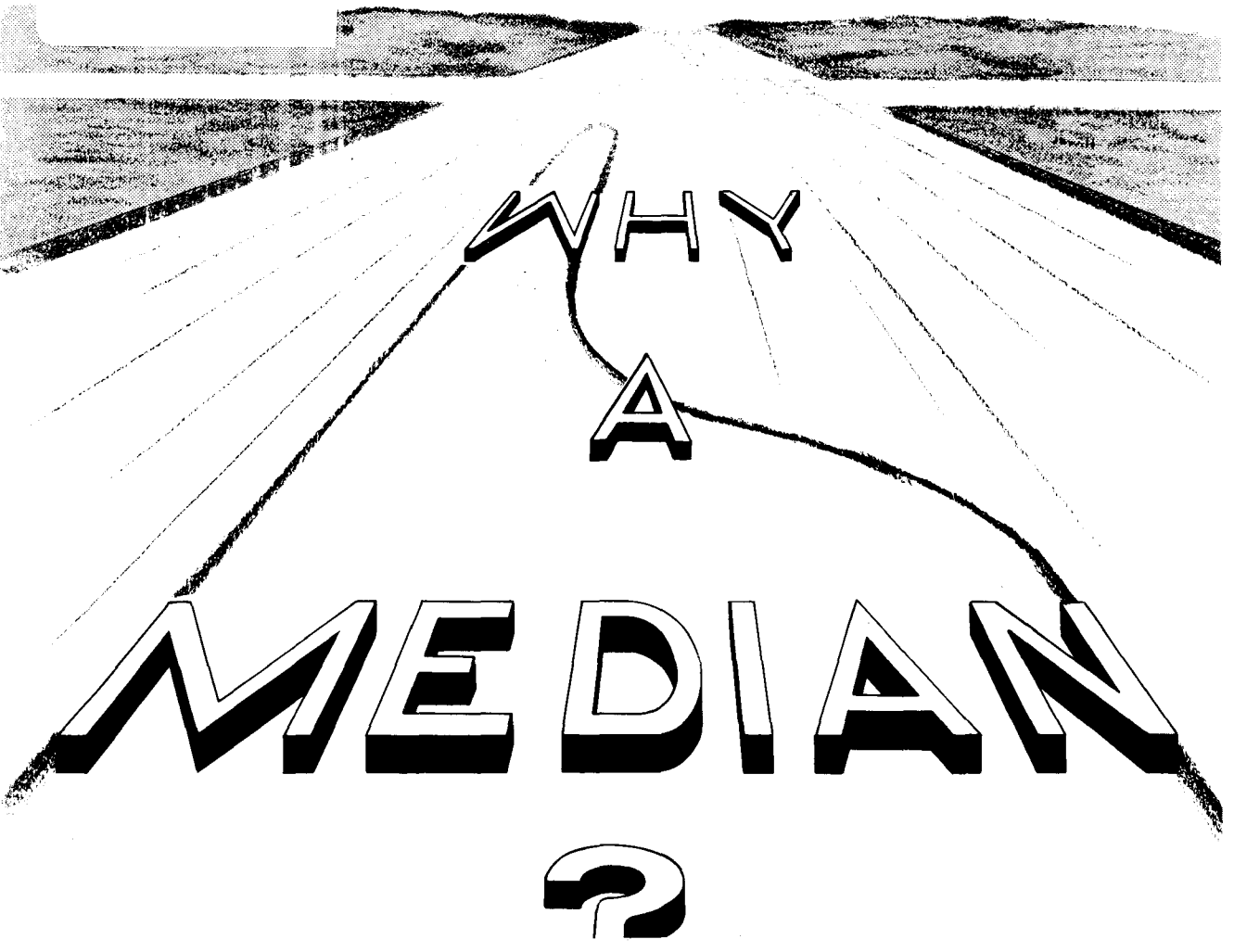
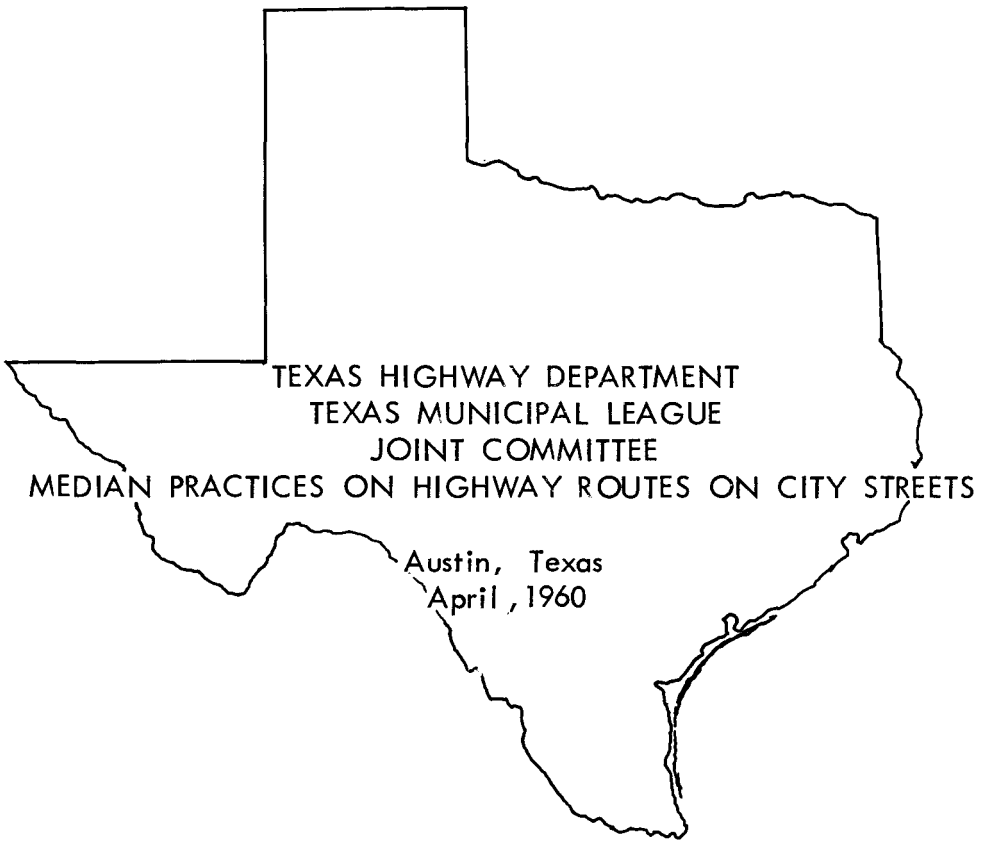


WHY A MEDIAN ?

Texas Highway Department
Texas Municipal League
Joint Committee
Median Practices on Highway Routes on City Streets



TEXAS HIGHWAY DEPARTMENT
TEXAS MUNICIPAL LEAGUE
JOINT COMMITTEE
MEDIAN PRACTICES ON HIGHWAY ROUTES ON CITY STREETS

Austin, Texas
April, 1960

TEXAS HIGHWAY DEPARTMENT
TEXAS MUNICIPAL LEAGUE
JOINT COMMITTEE
MEDIAN PRACTICES ON HIGHWAY ROUTES ON CITY STREETS

Chairman	Frank Frey, Urban Engineer, Texas Highway Department, Austin
Vice Chairman	Eugene Maier, Director, Department of Public Works, Houston
Secretary	Paul R. Tutt, Supervising Designing Engineer, Texas Highway Department, Austin

COMMITTEE MEMBERS

TEXAS MUNICIPAL LEAGUE

Albert W. Rollins	City Engineer	City of Arlington
George Dieter	Director of Public Works	City of Waco
Lynn Andrews	City Manager	City of San Antonio
C. J. Griggs	City Manager	City of Wichita Falls
Henry B. Nabers	City Manager	City of Abilene
R. W. Burr	Director of Planning and Traffic	City of Lubbock

TEXAS HIGHWAY DEPARTMENT

C. W. Smith	District Engineer	District 4
T. C. Collier	District Engineer	District 9
W. E. Carmichael	District Engineer	District 12
R. O. Lytton	District Engineer	District 15
G. A. Youngs	District Engineer	District 19
J. F. Snyder	District Engineer	District 21

The following people have served on the committee during the course of its work:

F. M. Davis former District Engineer, Texas Highway Department, San Antonio
Marvin Springer former Director of the Department of City Planning at Dallas
Dick G. Pepin former City Manager at Odessa
Drahn Jones former Director of Public Works at Corpus Christi
Charles Spivey former Director of Planning at Lubbock.

Charles J. Keese, Charles Pinnell, Charley Wootan and others of the Texas Transportation Institute at Texas A and M College assisted the Committee in much of its work.

In addition to these, many of the Districts and Divisions, particularly the Planning Survey Division of the Texas Highway Department and many of the cities of Texas, have assisted the Committee in its work.

STEPHEN J. MATTHEWS
Executive Director
C. C. CRUTCHFIELD
Field Consultant
WM. A. OLSON
Legal Counsel

TEXAS MUNICIPAL LEAGUE

An Association of Cities for Municipal Progress

402 Vaughn Building
Austin 1, Texas
GReenwood 6-6003

TO TEXAS CITIES AND TOWNS

During the past year and a half, the Texas Municipal League and the Texas Highway Department have joined in a comprehensive study of practices on median dividers on highway routes through our cities and towns. It is noteworthy that it could be done at this particular time when urbanization - and even metropolitanization - is so rampant, and traffic problems are becoming more acute.

The League, through its representatives, endorses the findings set out in this report and encourages all Texas cities and towns to follow the recommendations herein.

We are grateful to the League committee members for giving so generously of their time and talents, and are appreciative of the Texas Highway Department and its staff for providing the opportunity to study this important area. We trust that the success of this report and the application of its recommendations will continue the cooperative spirit in which many mutual problems have been solved.

Steve J. Matthews
Executive Director

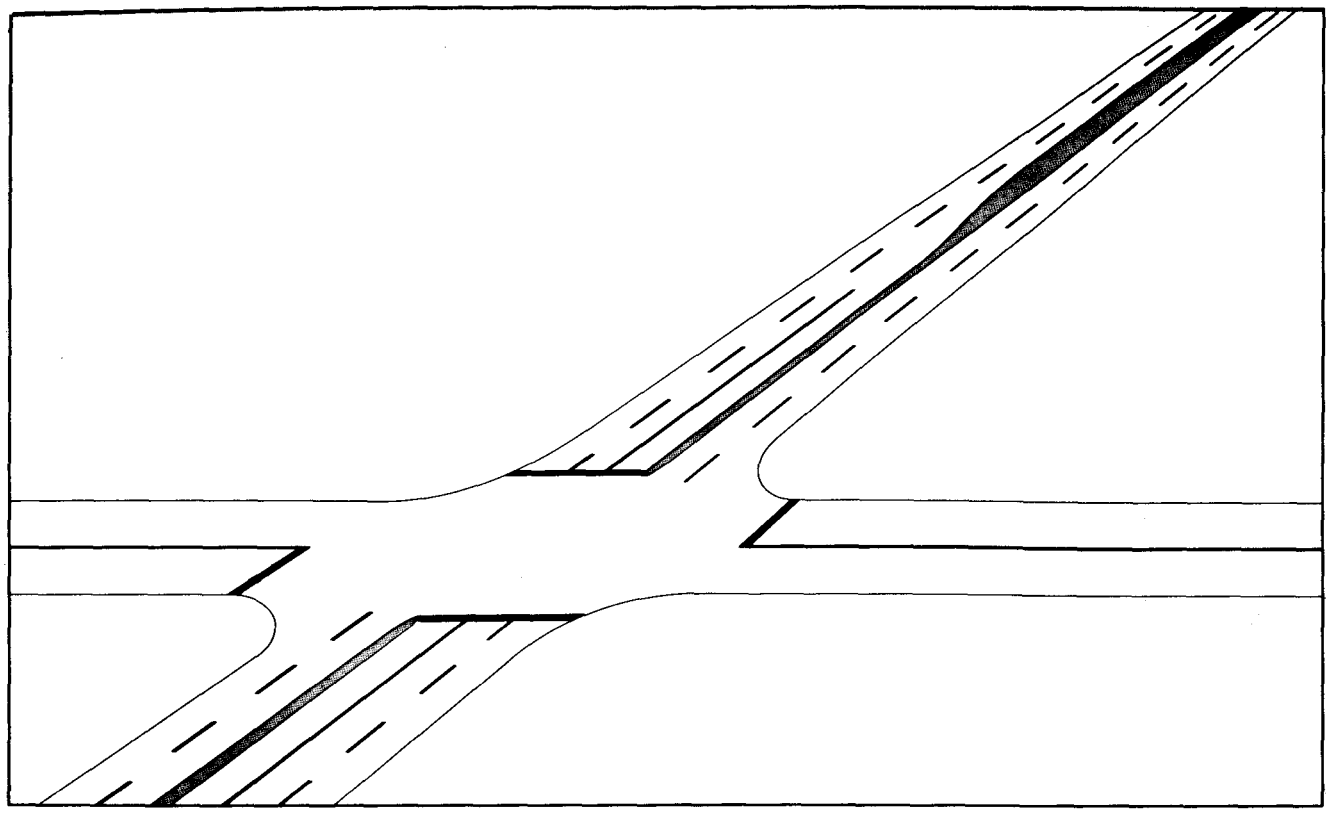
TO THE HIGHWAY COMMISSION

This report on median practices on highway routes on city streets is unusual in that it is the result of efforts of a joint committee composed of representatives of the Texas Municipal League and the Texas Highway Department. The use of median dividers has been a worrisome problem to both the Department and Texas cities. This committee was formed in September, 1958 and has been studying and discussing this matter for more than eighteen months.

I believe it is significant that a committee of this composition is in agreement. The cooperation of the League and the time and efforts contributed by the individual members from the various cities are appreciated.

I endorse the findings set out in this report and believe it will furnish valuable guidance to both Department and City personnel. The Department is publishing the report and distribution will be made by both agencies.

D. C. Greer
State Highway Engineer



TYPICAL MEDIAN DESIGN WITH LEFT TURN LANE

AT CROSS-STREET INTERSECTION

TEXAS HIGHWAY DEPARTMENT
TEXAS MUNICIPAL LEAGUE
JOINT COMMITTEE
MEDIAN PRACTICES ON HIGHWAY ROUTES ON CITY STREETS

Mr. S. J. Matthews
Executive Director
Texas Municipal League
402 Vaughn Building
Austin, Texas

Mr. D. C. Greer
State Highway Engineer
State Highway Building
Austin, Texas

Gentlemen:

This Committee was formed in September of 1958 through the joint efforts of the Texas Municipal League and the Texas Highway Department. We were asked to study the use of median dividers on urban arterial routes, these having been a source of some difference of opinion among the various governmental agencies and individual citizens affected by them in various ways.

The Committee has made a detailed study of this subject and this report represents our findings and recommendations. Additional research is still in progress and we feel that it should be continued. It is our belief that it will further substantiate the findings presented in this report.

This report is submitted in the hope that you will endorse it and that it will be given wide distribution to City and Highway Department personnel who will be able to use it in the planning and design of urban highway and street work.

Sincerely yours

W. F. Frey

W. F. Frey, Chairman

Eugene Maier

Eugene Maier, Vice Chairman

WHY WAS THE COMMITTEE FORMED ?

General Problem Statement

To study and make recommendations regarding design policies for medians on highways in urban areas.

Specific Statement of the Problem

Since the application and design of medians on State Highway extensions in urban areas is often a matter of controversy among the Texas Highway Department, local city officials and abutting businesses, it is desirable to study the influence of median location and design on the safety and capacity of an urban highway extension and the economic effect of medians on abutting business and property owners. The results of the study would be submitted by this committee to the State Highway Engineer and the Executive Director of the Texas Municipal League with the recommendation that they be adopted for use on highways in urban areas and other urban arterial streets.

What Is a Median ?

For the purpose of the work of the committee, a median is defined as any traffic separator on a four or more lane road which is more positive than the standard double stripe at standard spacing.

Classifications of Medians are tabulated on Page 19.

WHEN TO USE A MEDIAN

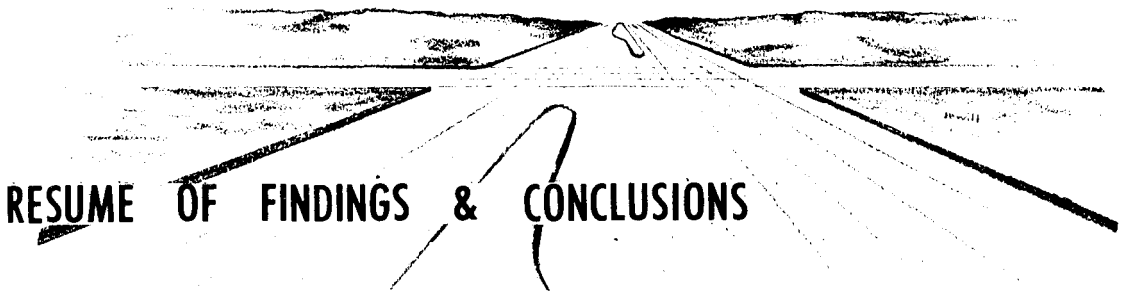
Over a period of time, median dividers have been constructed on numerous urban arterial projects. Many agencies have been involved and little or no uniformity in the design and application of medians has resulted. The following are Warrants intended to help standardize the use of medians. When these conditions exist in the design of a new arterial street or when an existing arterial street is to be improved, a median which forms a barrier that traffic will not cross intentionally should be included as a part of the design.

1. The average daily traffic for the design year (usually 20 years in the future) is 9,000 cars or more, regardless of the expected speeds; or
2. (a) Traffic volumes are such that a facility with four or more lanes are needed for moving traffic. This determination based on the design standards of the agency responsible for the development; and

   (b) The speed which traffic is expected to move during the off-peak periods is 35 miles per hour or higher (speed determination should be based on design operating speed values rather than posted values).

These conditions require a median wide enough to accommodate a lane for left turning traffic at intersections.

There may be locations where these conditions are not satisfied but where a median is desirable. These locations might be where there are a large number of points of access to the artery, where it is necessary to control unsafe movements, where a large number of pedestrians must cross the thoroughfare, where cross street traffic volumes are unusually high or where one or more other undesirable conditions which might be cured or partially cured by a median exist . These locations should be studied carefully to determine if a median would materially improve the situation.



RESUME OF FINDINGS & CONCLUSIONS

Change has been the byword of our nation's street and highway traffic since the artificially created period of abatement during the World War 11. Our population has increased. People have moved from the rural communities to the cities. Many of our cities have more than doubled in population and now cover many times the area which they formerly occupied. Our automobile population in Texas is now more than three times what it was in 1945.

These figures have been recounted many times in the past few years and it is not necessary to elaborate on them in this report. They do make one point very clear, however. The traffic problem now is not the traffic problem of 1945 and the methods of dealing with this problem now are not the same methods that would have been satisfactory in 1945.

Dividing the street or highway so that the two opposing streams of moving vehicles are separated from each other by an area now commonly called a Median has been found to be one measure which, along with others, will assist in keeping traffic moving in an orderly, efficient and safe manner. Like many of the measures necessary to keep traffic moving, the median restricts some traffic movements, thereby causing indirection for some traffic, but some restrictions are often a matter of public necessity. Owners and occupants of property adjacent to it sometimes feel that a divided roadway is a detriment to the use of their property, but, generally, the other improvements and increased traffic efficiency which accompany the median more than offset any disadvantage, particularly to retail business.

WHY PROVIDE A MEDIAN ?

The median by itself is not a complete solution to the problem but, when properly designed and used in conjunction with other improvements,it can be expected to accomplish the following results:

1. The median provides an insulating area between opposing streams of moving traffic which reduces the strain on drivers and usually results in a reduction in the accident rate and particularly a reduction in head-on collisions.
2. The median provides protection and control of cross and turning traffic.
3. The median provides a refuge for pedestrians making it safer for them to cross a a wide street.
4. The median encourages efficient signing and signalization. More efficient signing and signalization are possible when traffic movements are regulated into orderly channels by the median and by other channelizing islands.
5. The median provides space for left turn storage at intersections. At intersections the median should be wide enough to accommodate an added lane for storing left turning vehicles. This left turn storage lane is one of the most important benefits of a median. When such a lane is provided, the efficiency and safety of the intersection is greatly improved. Left turning cars are separated from straight through traffic so that they do not impede the flow of the through traffic, thus increasing the capacity of the street. Also,vehicles waiting to make a left turn are not in the path of the through traffic and are not likely to be hit from the rear.
6. The median makes it possible for traffic to move smoothly and safely at higher operating speeds.

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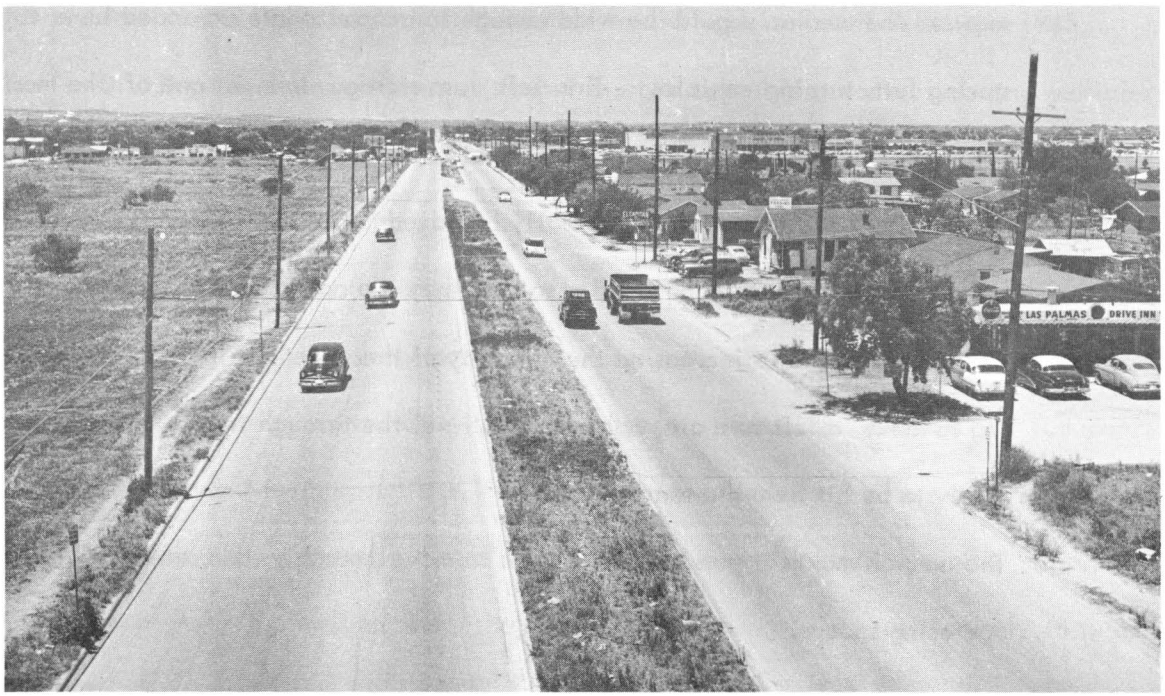

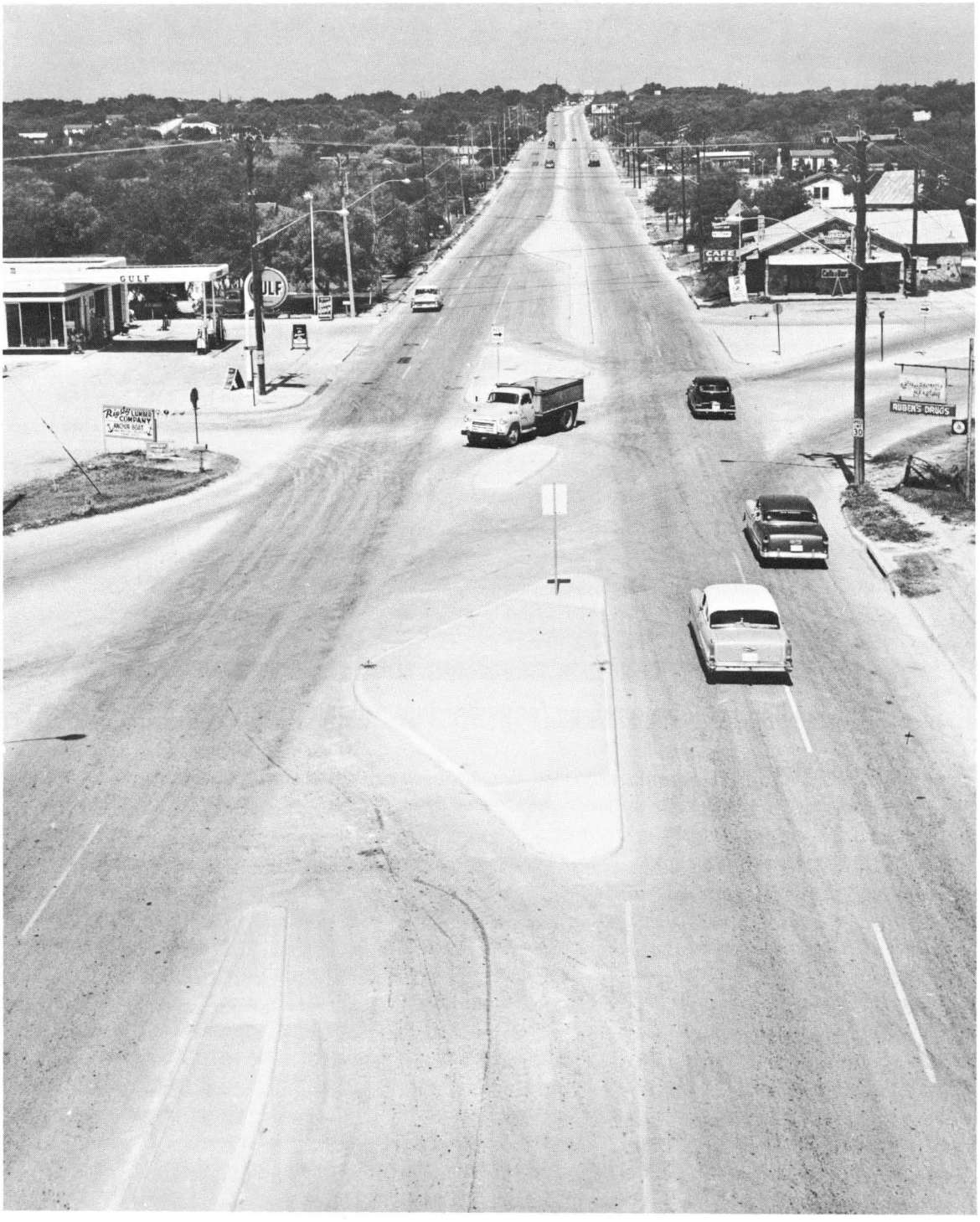

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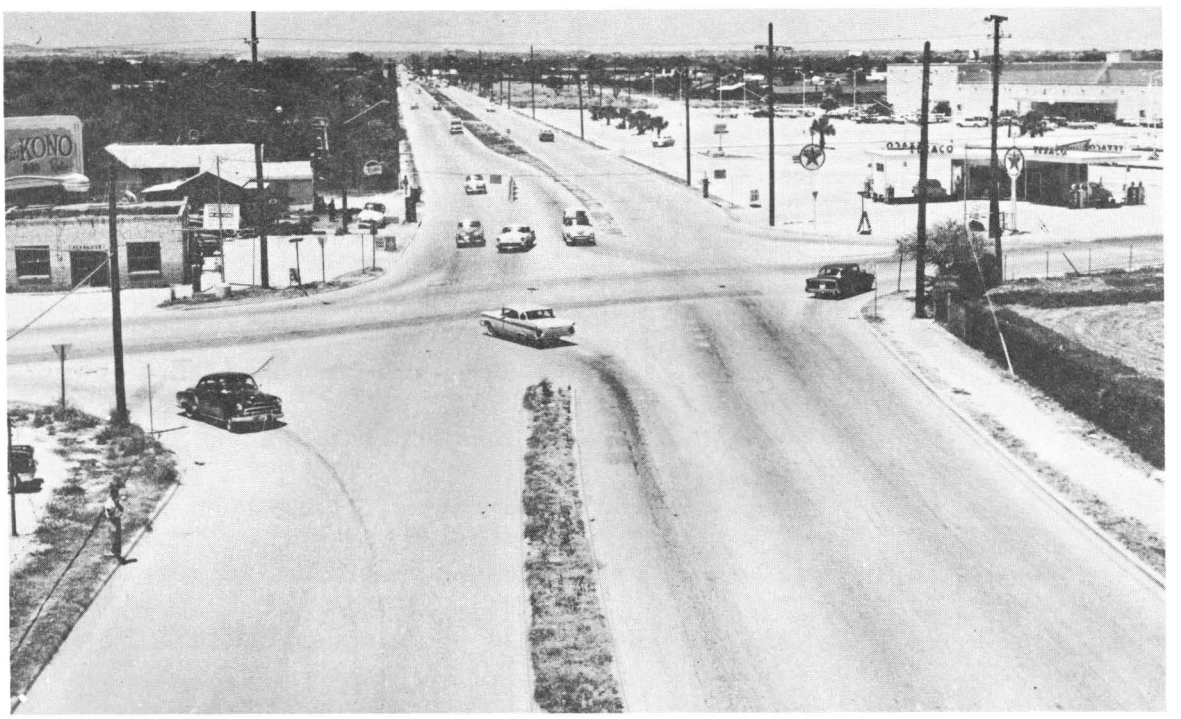
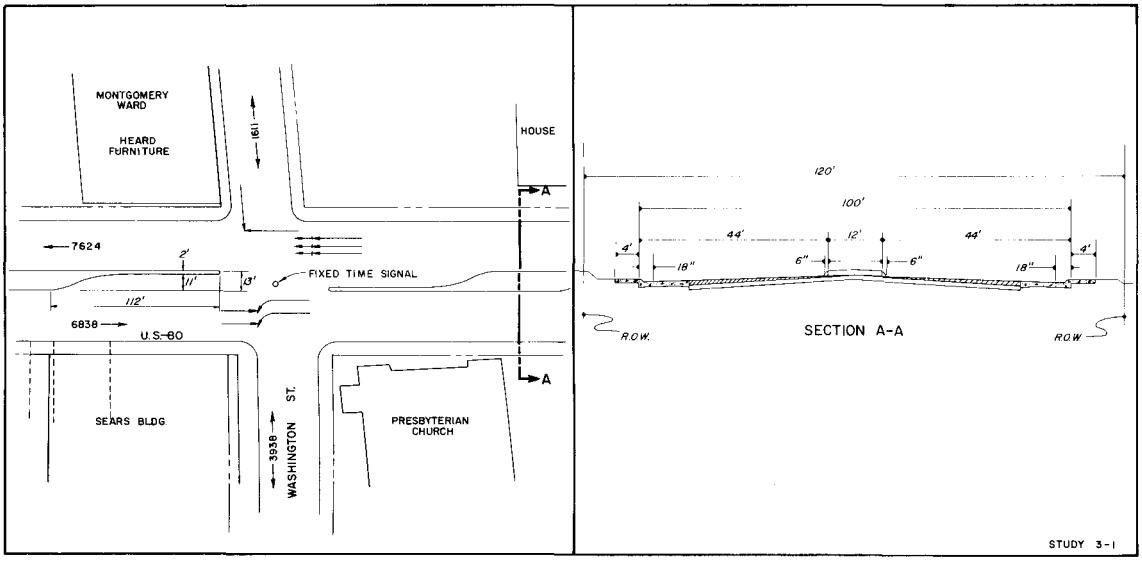
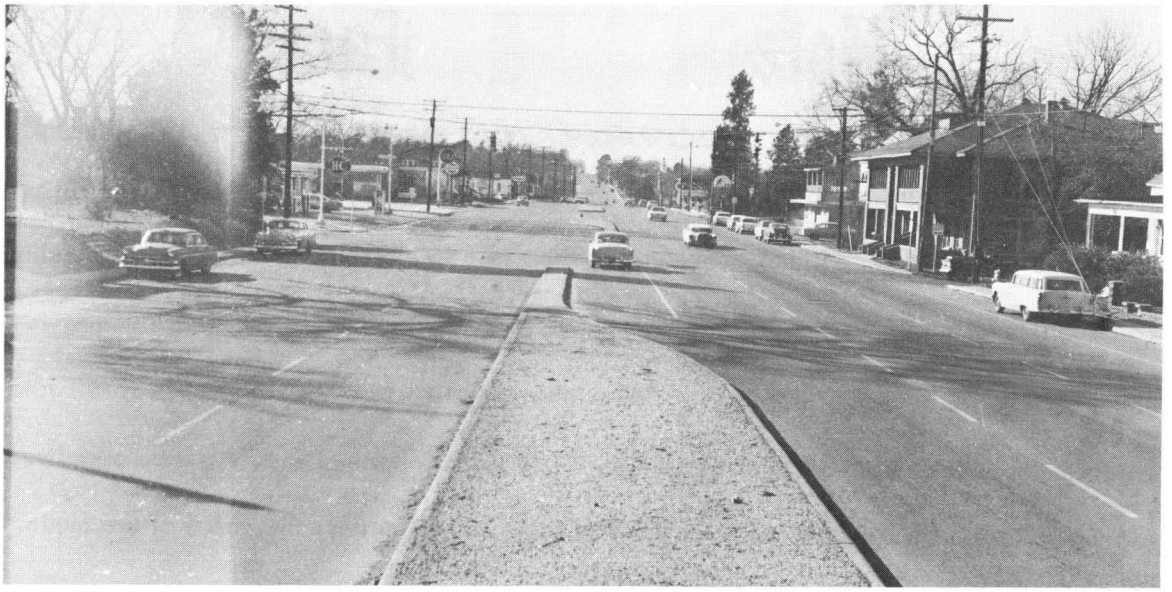


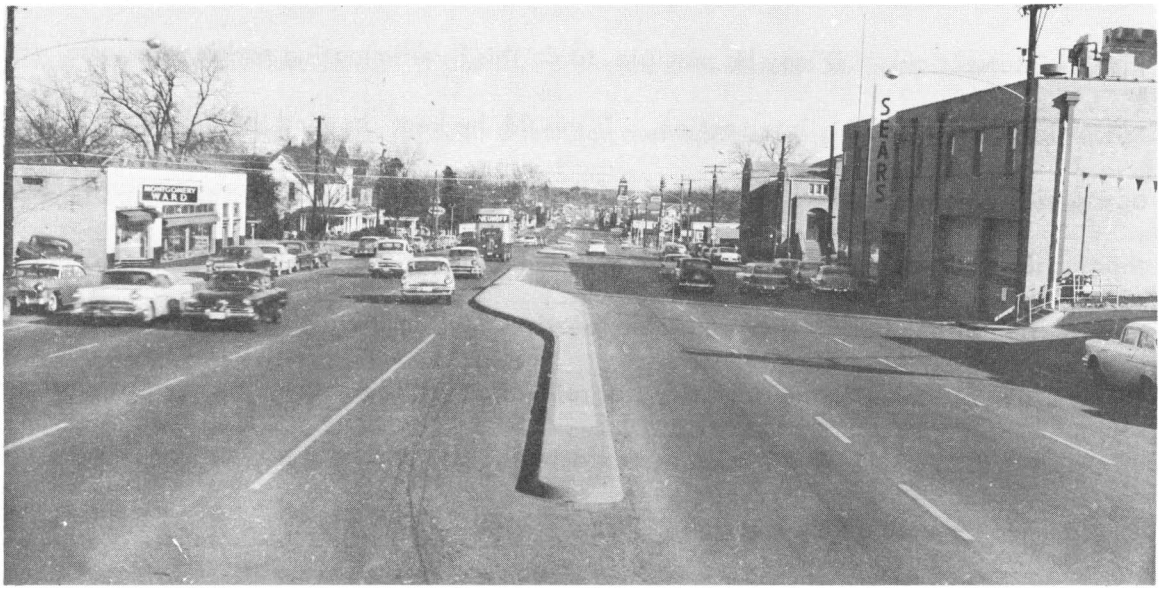


TYPICAL EXAMPLE
OF
WIDE MEDIAN INTERSECTION
WITH TURNING LANES

5. The median provides space for left turn storage at intersections. At intersections the median should be wide enough to accommodate an added lane for storing left turning vehicles. This left turn storage lane is one of the most important benefits of a median. When such a lane is provided, the efficiency and safety of the intersection is greatly improved. Left turning cars are separated from straight through traffic so that they do not impede the flow of the through traffic, thus increasing the capacity of the street. Also vehicles waiting to make a left turn are not in the path of the through traffic and are not likely to be hit from the rear.



6. The median makes it possible for traffic to move smoothly and safety at higher operating speeds.



More Facts

Spacing of Crossovers

In general, the median should have openings or crossovers at cross street intersections. Where the space between cross streets is very long, it may be necessary to provide intermediate openings. These should be spaced equally between cross streets to provide equal service to adjacent property. These intermediate crossovers should not result in a spacing of less than 360' between openings. Additional openings should not be permitted for private or business entrances or exits. If these were permitted, the value of the median would be seriously impared, permitting traffic movements which cannot be accommodated in an orderly manner and reducing the safety and efficiency of the streets.

Medians on Existing Streets

When a road or street is being constructed on new location or when additional right of way is being secured to expand an existing thoroughfare, the principles set forth in this report should be followed. When the traffic demand is such that an improvement must be made on an existing street on which sufficient right of way cannot be secured, it may be necessary to accept a design which is an improvement but which is not as good as is needed. When this condition exists, every effort should be made to provide the added left turn lane at intersections. It may be possible to do this by eliminating parking for some distance in advance of the intersection. It should be kept in mind by all governmental agencies and by all individuals involved that the alternative to improving an existing thoroughfare to the point where it will satisfactorily accommodate traffic is usually the construction of another facility on a new location. By improving the existing facility to its maximum capabilities, the necessity for relocation will be delayed as long as possible. It is also usually possible to expand the existing facility cheaper and more quickly than it would be to develop a new location.

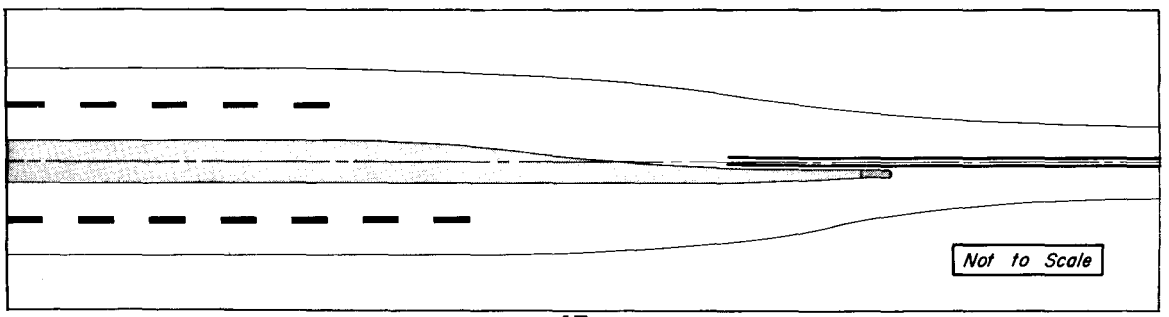
About Medians

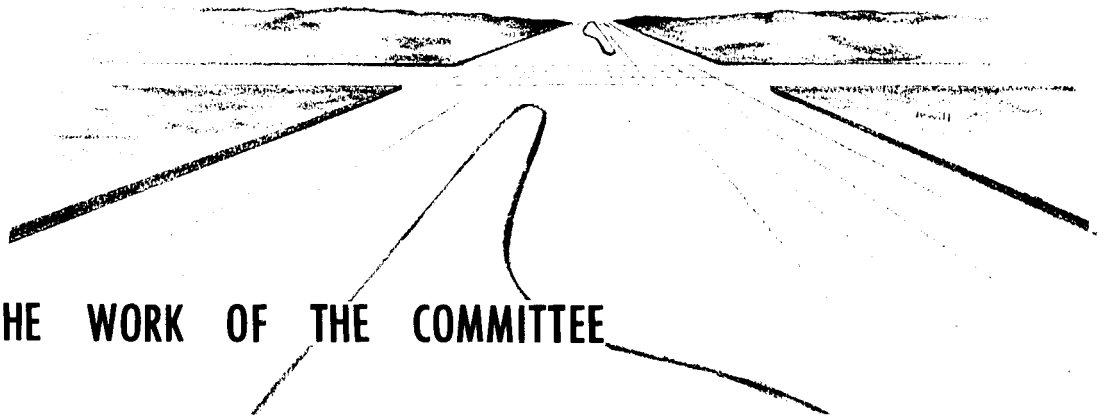
Non-Barrier Medians

In those cases where it is not possible, due to limited right of way or other considerations, to construct the type of median recommended, it may be that a median of lesser design should be considered. Median areas which are formed of a pavement which contrasts in color and texture with the traveled lane but which do not provide a physical barrier have been used with good results, and a low blister of asphalt may be suitable for some situations. This type treatment is not recommended where the warrants for a barrier type median are satisfied but it is recognized that there will be cases where a barrier median is not practical. It is also possible that a non-barrier median would work well on traffic arteries where volumes do not require a barrier median under the warrants set forth. Regardless of the type of median used, the provision of left turn lanes at intersections is very important.

Transition - Median to Non-Median Section

The transition from a pavement without a median to one with a median, particularly the transition from a rural high speed two lane road to a divided road, has been found to be an accident problem location in many instances. This part of the design should be given careful considerations. If possible, the median should be introduced on the left side of the approaching traffic in such a manner that approaching traffic is not required to change direction until it is beside the median. It can then be guided into a curved transition by the median.





THE WORK OF THE COMMITTEE

The committee first conducted a rather intensive study of available information on the subject of medians. A survey of the practices and policies of other States and Cities was made. Much data were available but little was of a factual nature of the type needed to establish a sound basis for design. This led to the development of two types of research.

The committee, with the aid of the Texas Transportation Institute, began an inventory of medians in use in Texas at this time. This inventory included approximately sixty median locations, each about one mile in length. The anlaysis of these studies provided the committee with much of the factual data needed.

The second type of research was the initiation of three very detailed "before" and "after" studies on current median projects. The "before" studies on these have been completed but as yet the "after" studies have not been made due to the time required for construction of the projects. These each included complete traffic and economic studies. The committee feels that it is justified in releasing this report at this time without the benefit of the results of these studies because of the considerable amount of data secured in the shorter studies, the urgent need for guidance in this field and the complete unanimity of feeling among the committee members on the points covered. The committee does feel that these studies should be completed and the results reported at the time of their completion.

CLASSIFICATION OF MEDIANS

Traversable Median - is one which consists of paint stripes, buttons, an area of pavement of contrasting color or texture or a combination of any of these. Its purpose should be obvious to the driver but it does not present a physical barrier to traffic movements.

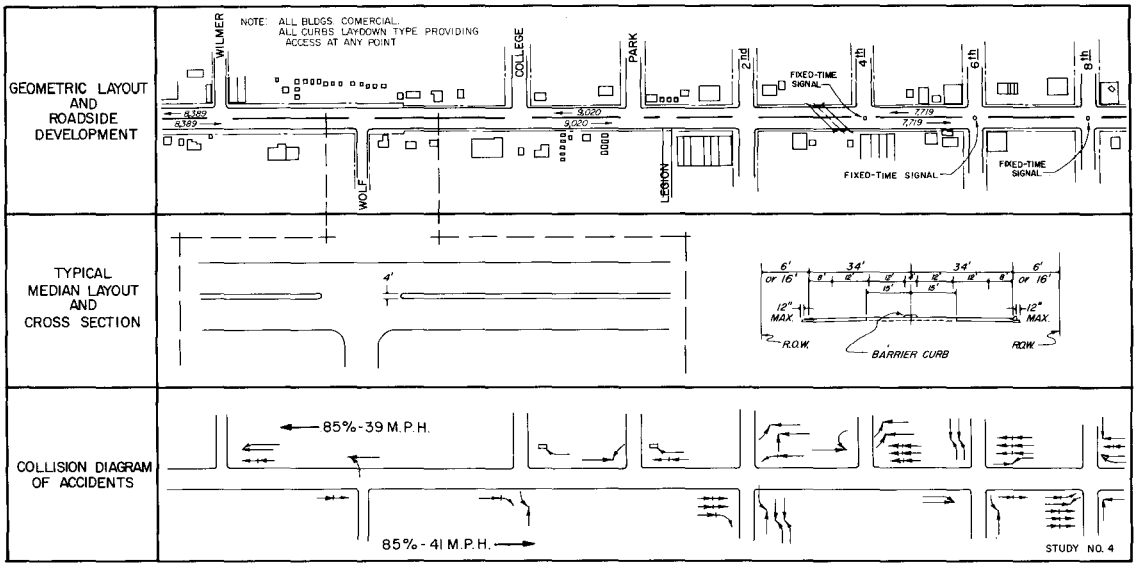
Deterring Median - is one which may incorporate any of the features of a Traversable Median plus a minor physical barrier such as a rolled asphalt curb, bars or corrugations, or a mountable curb.

Barrier Median - is one which traffic will not cross intentionally. It may be a barrier curb, a guard rail or some type of wall.

This report is the result of a considerable amount of work by the committee and by the various agencies assisting the committee. It is not possible to present all of the information collected but it was felt that the following examples serve to illustrate the findings and are representative of the material assembled.

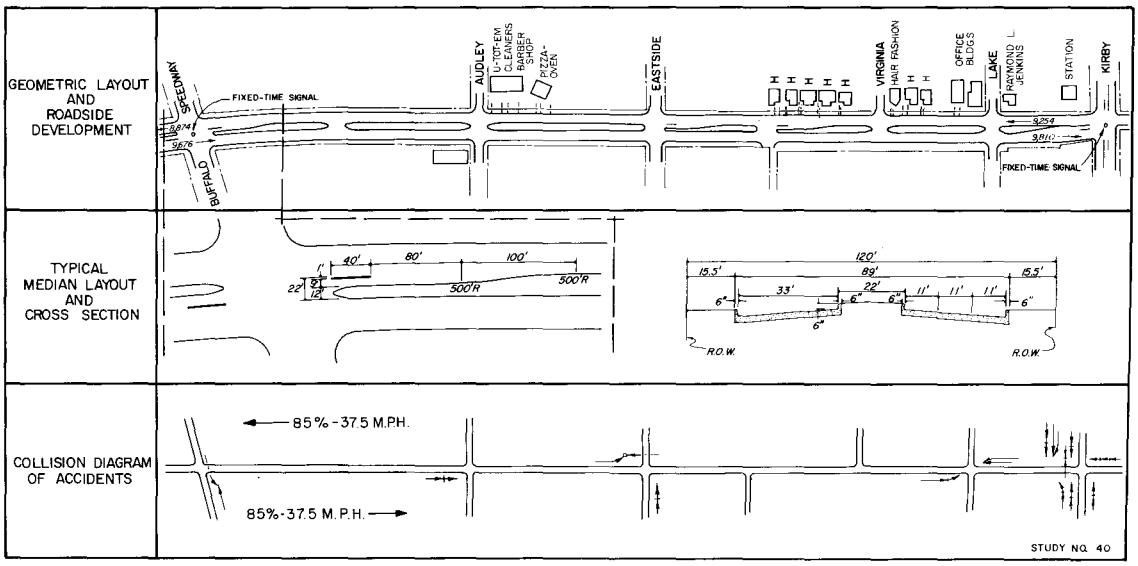
Example 1.....

This example is a comparison of traffic operations on facilities with different median designs. Figure 11 illustrates a section of roadway designed with a narrow (4 foot) median and Figure 12 shows a similar section which utilizes a wide median with turning lanes. The average volume on each of these facilities is approximately 18,000 vehicles per day. The accident collision diagrams shown on these examples illustrate how the median can be expected to affect the safety of a facility. The example shown in Figure 11 has considerably more accidents than the one shown in Figure 12.



TYPICAL EXAMPLE
OF
NARROW MEDIAN

FIGURE 11

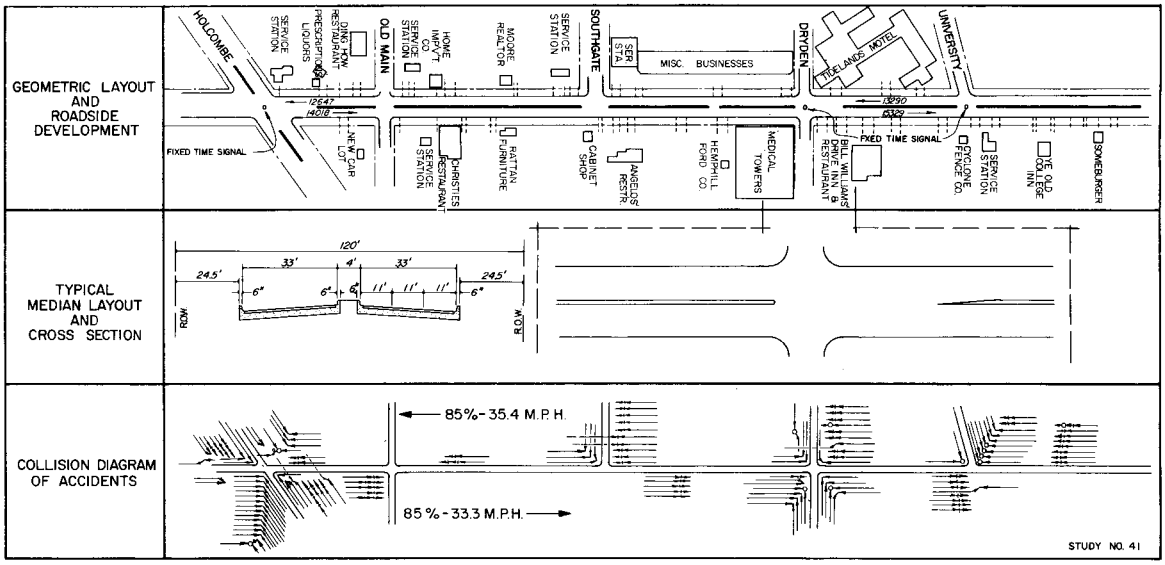


TYPICAL EXAMPLE
OF
MEDIAN WITH TURNING LANE

FIGURE 12

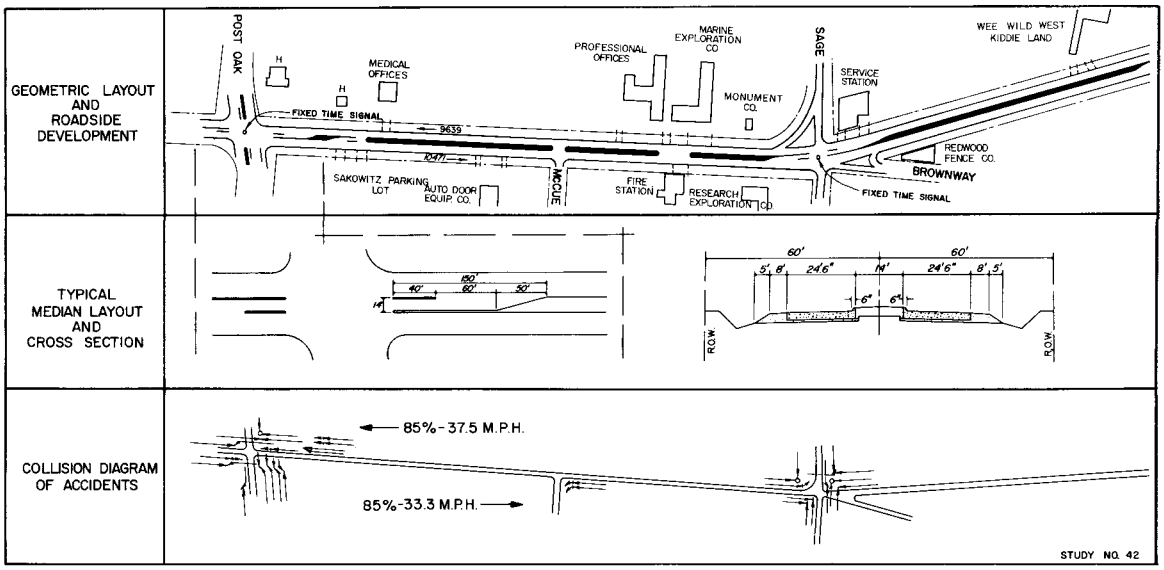
Example 2.....

This example is similar to Example 1 with the exception that the average volumes on the facilities are in the range of 21,000 to 27,000 vehicles per day. Figure 13 shows a narrow median and Figure 14 indicates a wide median. A comparison of the accident collision diagrams on these examples shows far fewer accidents where an adequate median is provided.



TYPICAL EXAMPLE
OF
NARROW MEDIAN

FIGURE 13

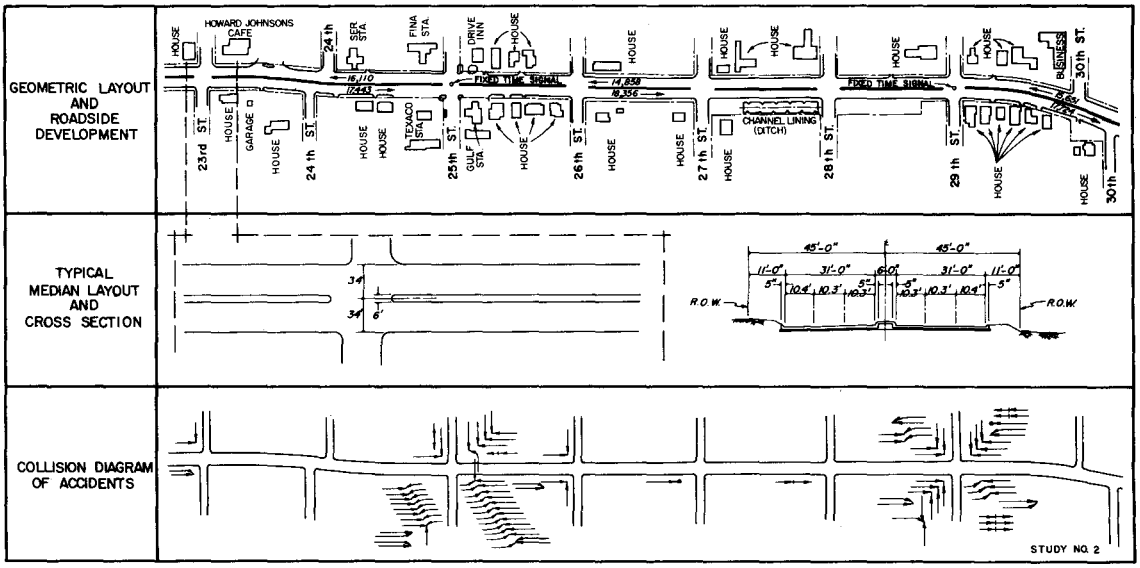


TYPICAL EXAMPLE
OF
WIDE MEDIAN WITH TURNING LANE

FIGURE 14

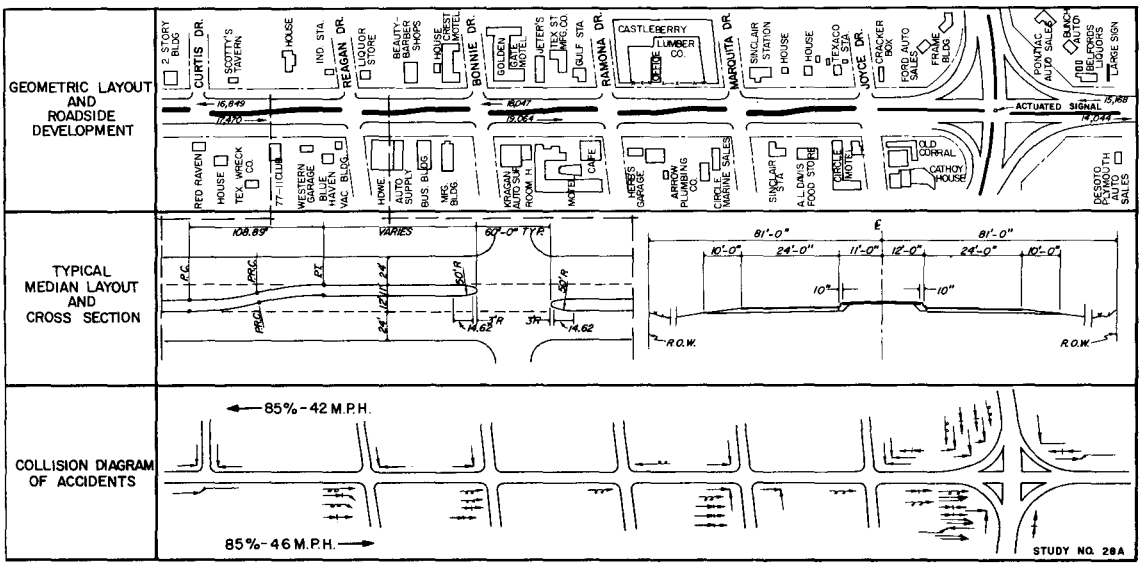
Example 3.....

This example is similar to Example 1 with the exception that the volume on the facilities is in the range of 33,000 to 37,000 vehicles per day. Figure 15 shows a narrow median and Figure 16 shows a wide median. These examples show many more accidents where a narrow four foot median is provided as compared with a wide median with left turn lanes.



TYPICAL EXAMPLE
OF
NARROW MEDIAN

FIGURE 15

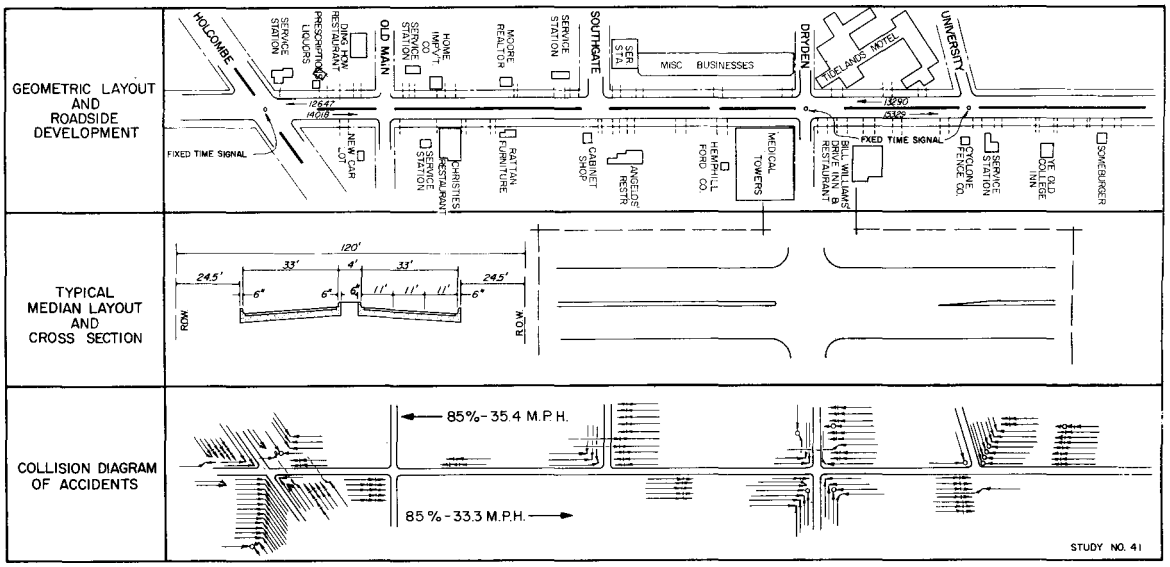


TYPICAL EXAMPLE
OF
WIDE MEDIAN WITH TURNING LANE

FIGURE 16

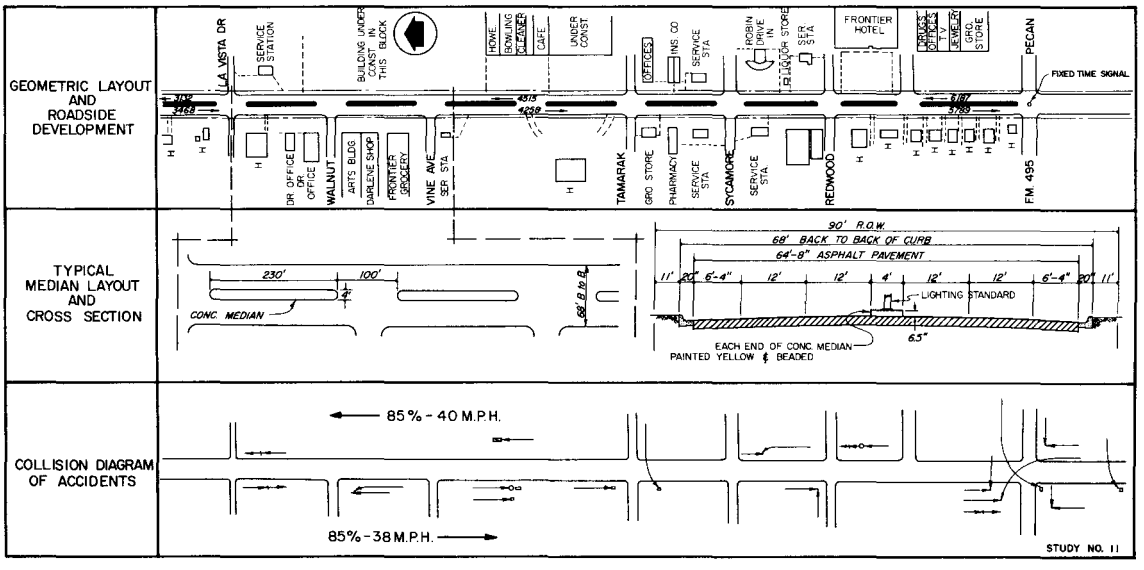
Example 4.....

This example illustrates typical traffic operation on facilities which have similar design but carry different volumes of traffic. A majority of the studies indicated that very little operational difficulties were encountered when the volume was below 9,000 vehicles. However, when daily traffic volumes exceeded this amount, serious accident and operational problems became obvious. Figure 18 illustrates operation below 9,000 vehicles per day and Figure 17 illustrates operation with volumes over 9,000 vehicles per day.



TYPICAL EXAMPLE
OF
NARROW MEDIAN

FIGURE 17

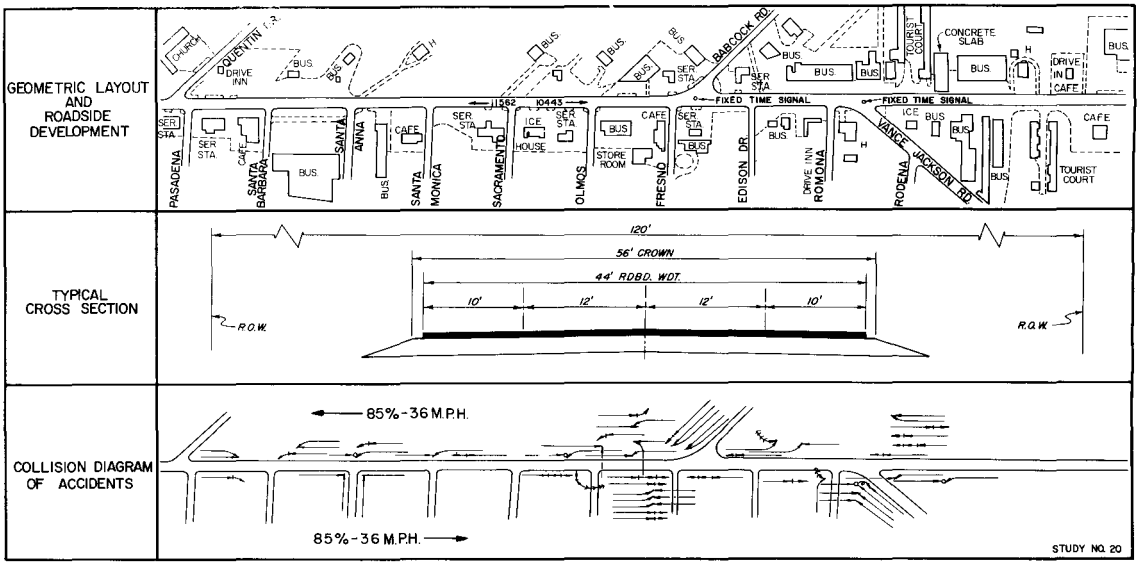


TYPICAL EXAMPLE
OF
NARROW MEDIAN

FIGURE 18

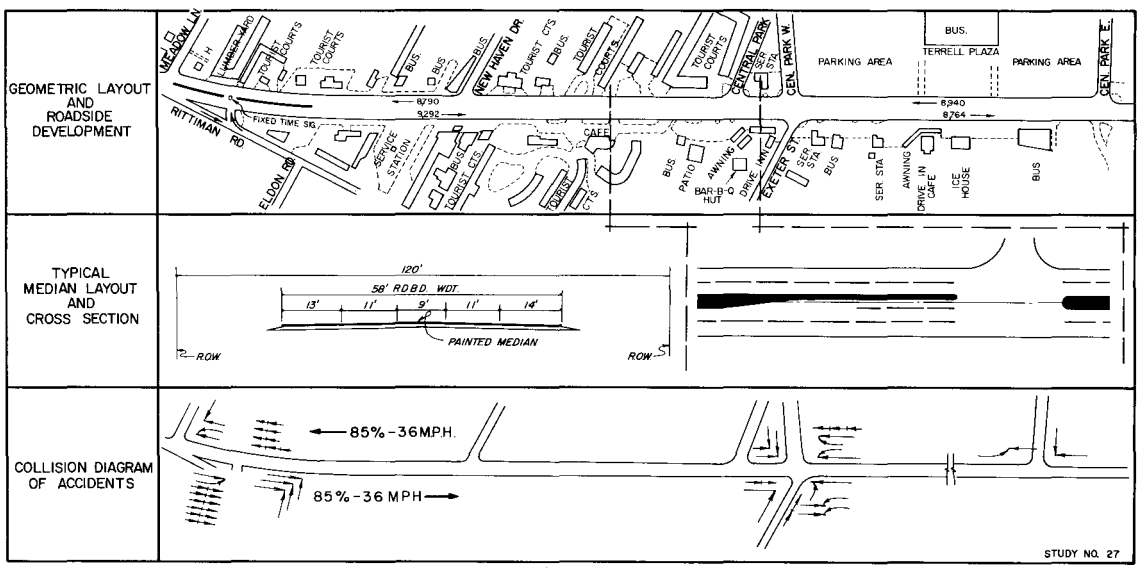
Example 5.....

This example illustrates typical operation on facilities which have no median or traversable median designs. Figure 19 shows a typical no median study and Figure 20 shows a typical traversable median.



TYPICAL EXAMPLE
OF
NO MEDIAN ARTERIAL

FIGURE 19



TYPICAL EXAMPLE
OF
NARROW TRAVERSABLE MEDIAN

FIGURE 20

References

A Policy on Geometric Design of Rural Highways; Washington, D. C.; American Association of State Highway Officials; 1954.

A Policy on Arterial Highways in Urban Areas; Washington, D. C.; American Association of State Highway Officials; 1957.

Traffic Engineering Handbook; New Haven, Connecticut; Institute of Traffic Engineers; 1950.