

REPORTING HIGHWAY TRAFFIC DATA

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Inasmuch as the reliability of any traffic report depends upon the accuracy of the data contained therein, any discussion of reporting traffic data must necessarily include some discussion of the methods used in acquiring these data.

REPORTING TRAFFIC VOLUMES

Our 1947 Texas traffic survey covers volume counts on 198,831 miles of rural roads. Both State and county systems are included. This means a total of 32,000 single 24-hour coverage counts. Our control counts consist of 208 count stations of a week's duration and 230 24-hour count stations. Both types of count stations are repeated seasonally. These repeat counts supplement the control data furnished by eighty-nine permanently installed automatic traffic recorders.

We recently received from the Public Roads Administration a discussion of the relative values in accuracy of the 24-, the 48-, and the 72-hr. coverage counts. The conclusions were in favor of the 48-hr. count, and it was suggested that we adopt the 48-hr. count in our survey of at least a section of the State. We have seriously considered this suggestion. Inasmuch as this would involve acquiring twice as many mechanical counters to permit a workable schedule, we believed that a more thorough investigation of this theory in our section of the country was justified.

A study was made to obtain information which would help determine the relative accuracy of the 24- and the 48-hr. counts at coverage stations. The immediate purpose of this study was to determine how single 24-hr. coverage counts and 48-hr. successive counts made on week days compared with the true average week day traffic during the month in Texas.

The methods used were identical in

part to those presented by Mr. Petroff in his paper, "Some Criteria for Scheduling Mechanical Traffic Counts," presented at the Twenty-Sixth Annual Meeting of the Highway Research Board, Washington, D. C., December 6, 1946.

We selected sixteen permanent automatic traffic recorder stations, with average daily volumes of less than 500 vehicles, which were representative of all sections of the State. Coefficients of variation were employed as the means of comparing the 24- and the 48-hr. counts with the average week day traffic. In the first study of one-day counts, the second and fourth Tuesday of each month were used. In the second study, the arithmetic mean of the second Tuesday and Wednesday, and of the fourth Tuesday and Wednesday was used. The differences were computed in percentages of variation from the known average week day traffic for each station for each month. Then the arithmetic means of the coefficient of variation were computed for all sixteen stations.

Table 1 shows the "Monthly Fluctuation of Coefficients of Variation": Figure 1 shows these data graphically. It also shows the annual mean coefficients of variations.

The improvement in accuracy of the 48-hr. count over the 24-hr. count at the stations used in our study is not as great in Texas as that indicated in Mr. Petroff's analysis for the country as a whole. We plan further investigation along this line, but we do not believe the slight improvement indicated in the study we have made warrants any change in the field procedure.

Our reports on traffic volumes consist of three sets of traffic maps. These are the State Traffic Map, the District Traffic Map, and the County Traffic Map. We use figures on a straight-line diagram for showing traffic volumes on the State Traffic Map. We have found that this type of map is preferred by our engineering department.

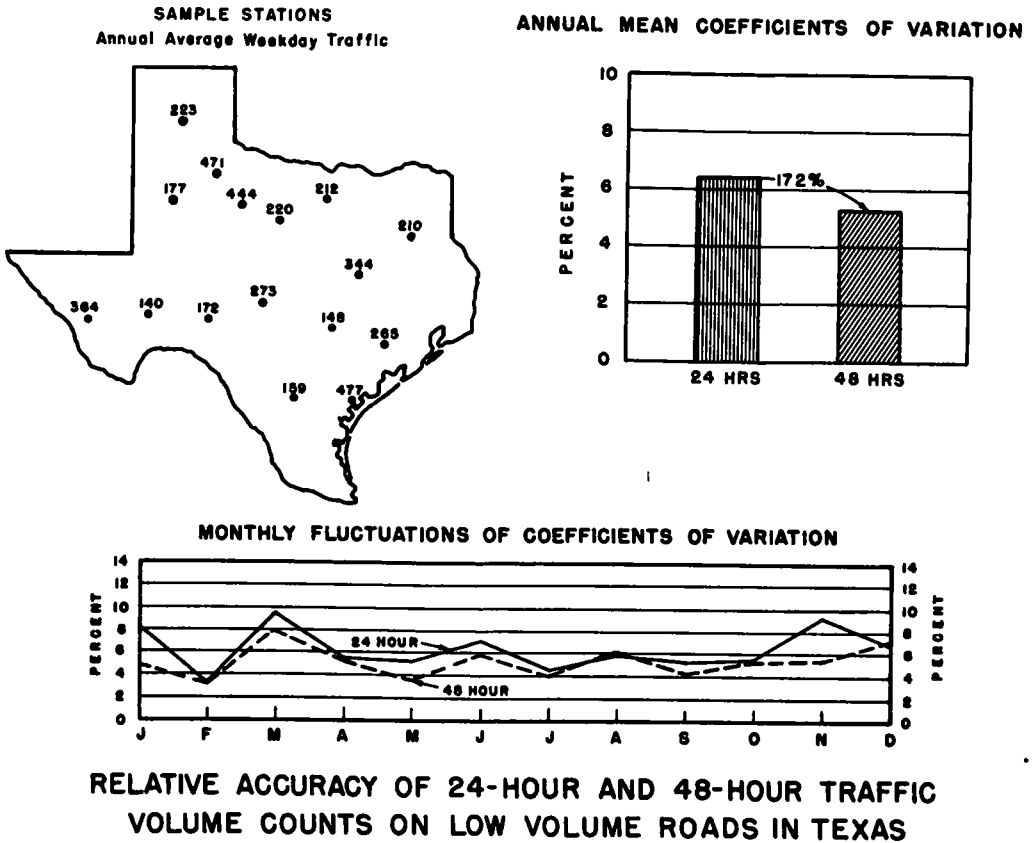


Figure 1

TABLE I
MONTHLY FLUCTUATIONS
OF COEFFICIENTS OF VARIATION

Months	24-Hour Percent	48-Hour Percent
January	8.2	4.8
February	3.3	3.4
March	9.5	8.0
April	5.5	5.3
May	5.1	3.6
June	7.1	5.9
July	4.6	4.0
August	5.9	6.1
September	5.3	4.3
October	5.5	5.3
November	9.3	5.4
December	6.9	7.2
Mean	6.4	5.3

The State highway system has expanded to the extent that it has become practically impossible to show all the roads with the traffic figures on one map. We have, therefore, left off the farm to market system on the State Traffic Map and prepared District Traffic Maps, which include the farm to market roads. This method permits us to issue maps which are more legible. The County Traffic Map is a general highway map with traffic volumes indicated by figures. Figure 2 is a sample of the District Traffic Map on which we are indicating the volume of commercial traffic by a flow band superimposed on the total volume flow band.

We also issue monthly graphs and tabulations indicating the variations in traffic volumes, the graphs showing the relation of commercial to total traffic and the variations in week day, Saturday and Sunday traffic. These graphs have apparently been found useful as we have quite a lengthy mailing list and are constantly receiving

We have prepared flow band maps of the State system for display purposes, but they have not been available for distribution.

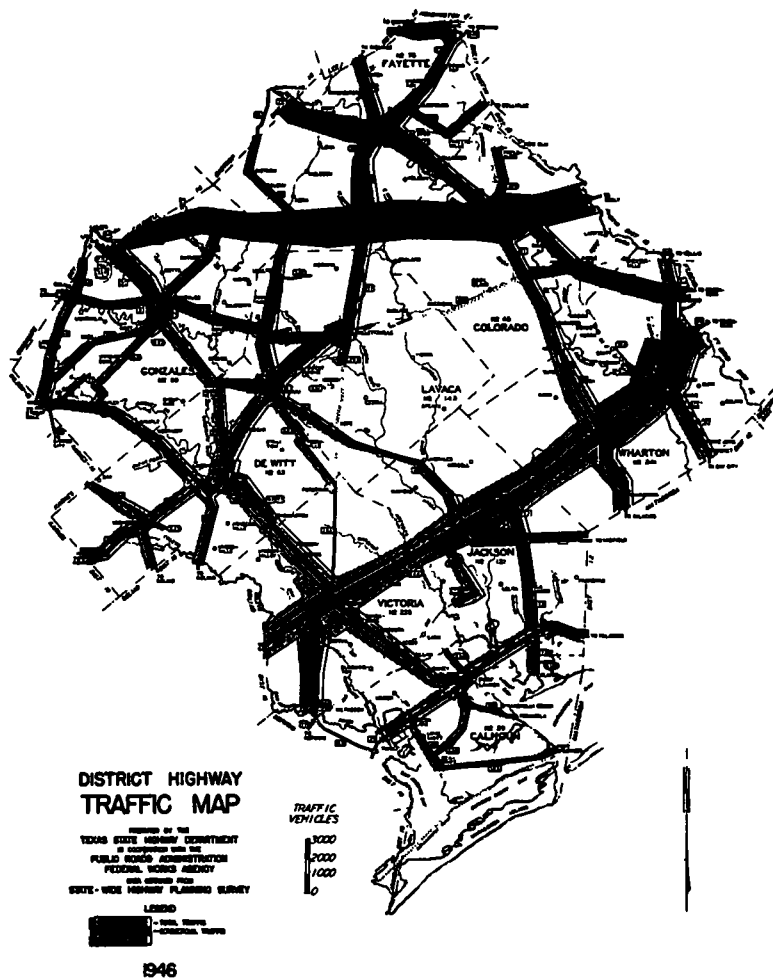


Figure 2

new requests for this type of information.

REPORTING CLASSIFICATION AND WEIGHT DATA

We have kept current on traffic volumes on our State highways and we are bringing up to date the data on our county roads, but I do not think we have paid sufficient attention to the classification of traffic and the loads our roads are carrying. We are now in the process of expanding our State system by the addition of approximately 25,000 miles of low traffic roads. We have practically no knowledge of the loads that these roads will carry. Figure 3 indicates that this is a condition that we should well

consider. Due to change in load limit regulations and lack of enforcement, the loads have increased at an alarming rate. We are reviving our 1937 loadometer study and are now operating sixty stations monthly. The schedules are arranged to include night operations.

It has been suggested by the Public Roads Administration that we can determine from our loadometer study the typical weights and dimensional characteristics of the various classes of commercial vehicles. This would indicate that we may assume that a specific type of truck or combination loaded with a known commodity can be classified within a known weight grouping.

We are now giving careful study to the

idea, recently discussed with Mr. O'Flaherty of the Public Roads Administration, of extending this study by establishing interview stations where one recorder would obtain data as to the origin and destination of the trip, the route traveled and the commodity carried. At such a station the recorder could obtain most of the pertinent data except the actual weight and measurements. We believe this procedure would economically expand our weight study.

definite information as to the frequency of critical axle loads to be anticipated. In Figure 4 we have attempted to illustrate the frequency of axle loads by weight groups on various types of roads as determined by our present survey. I believe this or a similar method of bringing to the attention of our designing engineers the axle loads to be expected on the various types of roads can be developed into a very useful factor in design.

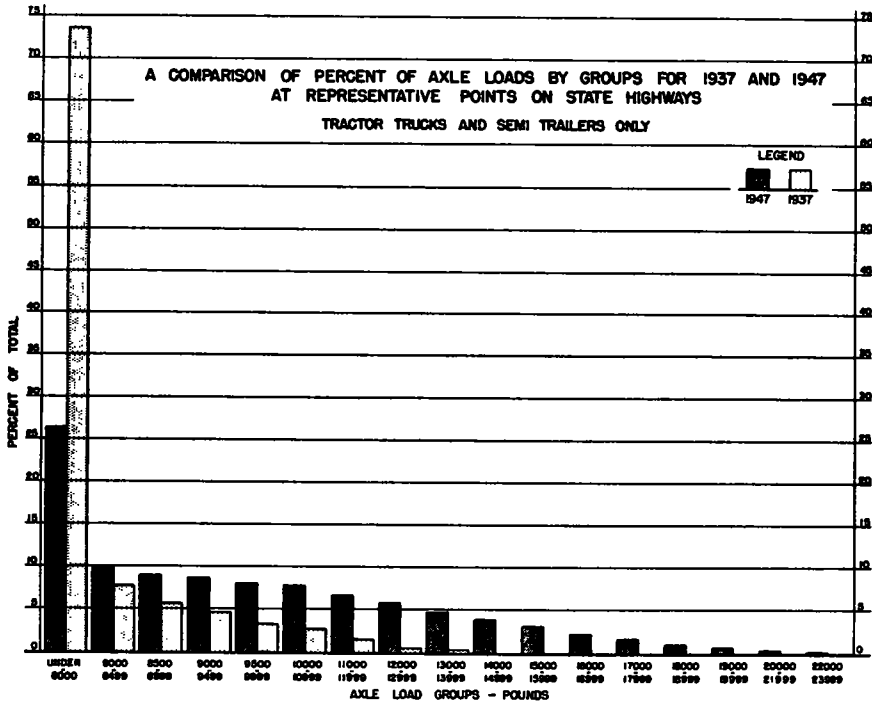


Figure 3

Before this plan is put into execution a careful analysis of our loadometer reports will have to be made to determine the range of weights by type of vehicle as well as by commodity carried. A superficial study does indicate that there exists a similarity in loaded weights of such commodities as motor fuel, citrus fruits and produce. The mere classification report as a method of estimating loads is deficient in that it does not distinguish between empty or loaded trucks or specify the commodity carried.

The damage to our roads during the war years, caused by unrestricted loading, clearly demonstrated the need for more

COUNTY ROAD IMPROVEMENT PLAN

One of the most useful and progressive methods of reporting traffic data that we have undertaken is in the preparation of county road improvement plans. We have made 44 such plans, all of which were requested by county officials. The response to this service provided by the planning survey has been most gratifying. This sort of report really includes more than traffic data in that it actually embraces an economic study of the various sections of the county, the cultural features and in some counties the costs of improvements. In some counties we borrowed the services

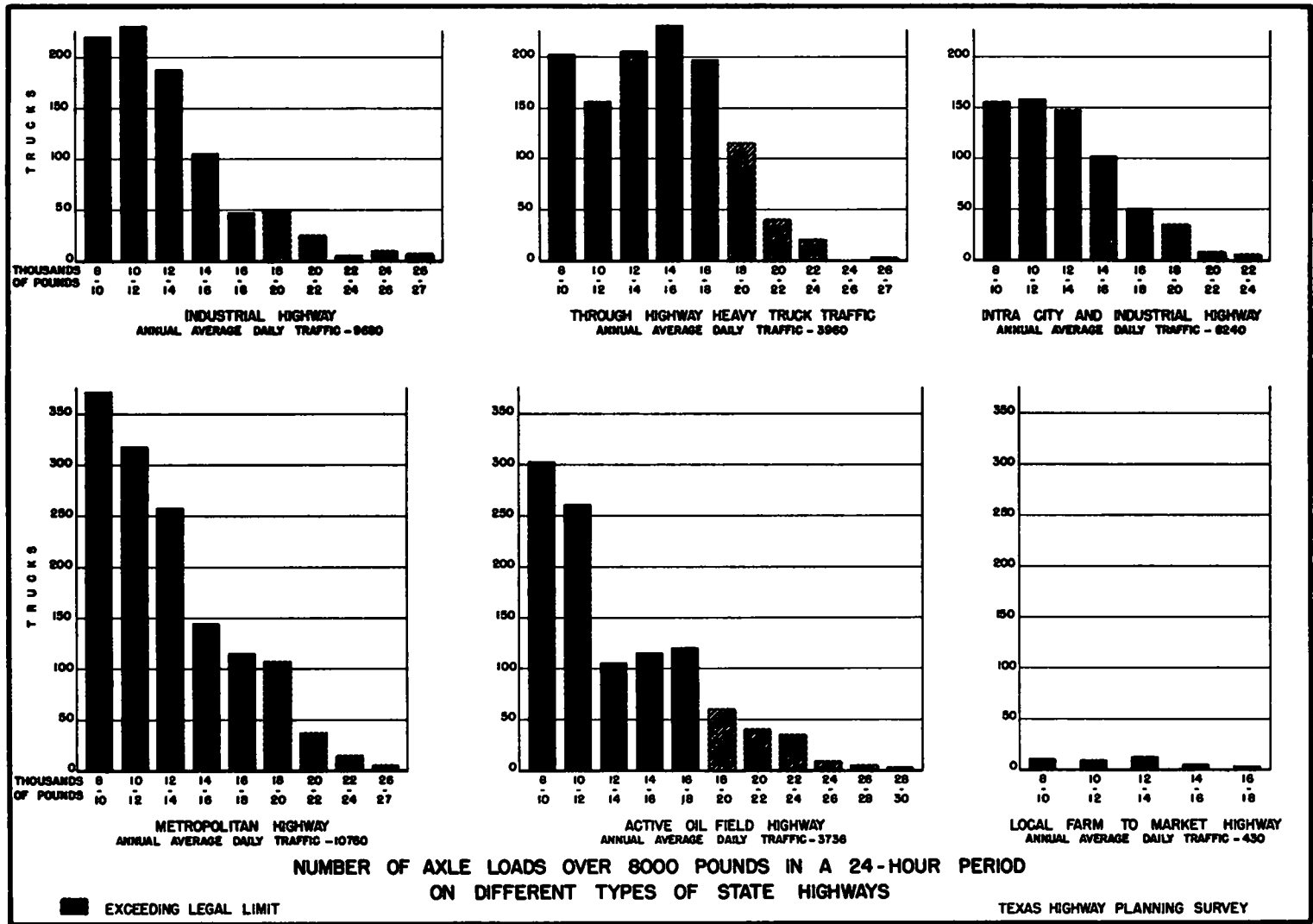


Figure 4

of personnel from the engineering department, to make a physical, on the ground, study of the existing road system and to make recommendations as to types of improvements with cost estimates.

For the most part, traffic volume or road usage has been the deciding factor in selecting the roads for improvement. Special attention was given to providing all-weather roads from isolated communities to trading centers, and, whenever feasible, to provide facilities for intercommunication between these communities. Consideration was also given to connections with the road systems in adjacent counties. Most of these counties have reported that they are using the plan as the guide for their road construction and maintenance programs. We learn that they have also been found very useful by the county officials as a defense against small pressure groups demanding improvement of roads of very minor importance.

THE FARM TO MARKET SYSTEM

Another method of reporting traffic data is in the application of traffic volumes in the selection of roads for the farm to market system. The task of selecting an 18,000-mi. addition to the State system was assigned to the traffic section of the planning survey. This, as in the preparation of the county road plans, involved more than the study of traffic volumes. An equable area distribution, economy of construction, and cultural development were all factors. However, in the final analysis, road usage was generally the deciding factor in the selection and in the assignment of priorities.

No arbitrary minimum traffic volume for the State as a whole could be used for eligibility of a road for inclusion. Different areas of the State varied so widely in road usage that in some of the sparsely settled counties of West Texas a much lower minimum traffic volume was used as a basis for selection than in the more densely populated areas. In making these selections, consideration was given to the service that the existing State system was providing to the county under study. This service was measured in terms of the ratio of vehicle miles on the State highways to the total vehicle miles traveled on all the rural roads in the county. In general, the allot-

ment of mileage to the counties was based on the rural population, the area, and the vehicle mileage traveled on both State and county systems, excluding the primary Federal-aid system.

Our selection of these roads has met with general approval. However, as is true whenever a plan embraces so great a coverage, we have received some criticism and requests for substitutions. Our lack of intimate knowledge of local conditions, such as potentially good agricultural sections but poorly developed because of the lack of roads, caused us to neglect or overlook some roads which we would have selected had we been more familiar with these facts. Situations like this bring home the fact that while traffic volume is a major consideration, it is not the sole criterion.

SPECIAL STUDIES AND REPORTS

We have made thirty-eight external urban origin and destination studies, three internal traffic studies using the license tag method, and one parking study combined with the external origin and destination study. When these surveys were requested by the design department or the district engineers, we are confident that the information furnished has been of value and has been used to advantage. The response to the studies which were requested by city administrators has not been particularly gratifying. This may be due to several causes. Perhaps we have not presented our reports in such a manner as to awaken the interest of the local officials. Perhaps the study was made where no real need for this type of survey existed, but which was requested because it was a free service provided by the Highway Department. I believe that had we made a more thorough study of the problem in each case before making the origin and destination survey, we would have been better equipped to offer a solution. As a matter of fact, we have apparently been too hesitant in offering any solution. We have with some exceptions been content to show the results of our fact-finding survey without attempting any application of these facts to the needs of the city under study.

As an example, we often find that the

through traffic generated by the highways forms a relatively minor part of the traffic on the highway routes through the city. Had we extended our survey to include data on traffic volumes, classification, and where needed, turning movement counts on the highway routes and adjacent streets through the congested area, we would have been better prepared to supplement our reports with recommendations which would have been helpful. We have adopted this policy in the recent urban studies that we have made.

Occasionally we find that city officials will request an origin and destination survey with only a vague idea as to what the term implies. They are aware of the traffic congestion in their business district and

Some of our studies have clearly shown that if the volume of through traffic were diverted from the center of the business district, considerable relief would be provided to the traffic congestion. Figure 5 is representative of our usual method of graphically showing the movement of traffic into and through the city. Figure 6 shows the percent of through traffic in towns of varying populations. We should, before long, be able to make a fairly accurate estimate of the amount of through traffic by a careful study of the type of town and the type of highways that pass through it.

In preparing a report on traffic data, the knowledge as to who will use the report should govern to some extent the manner in which the data are presented. We re-

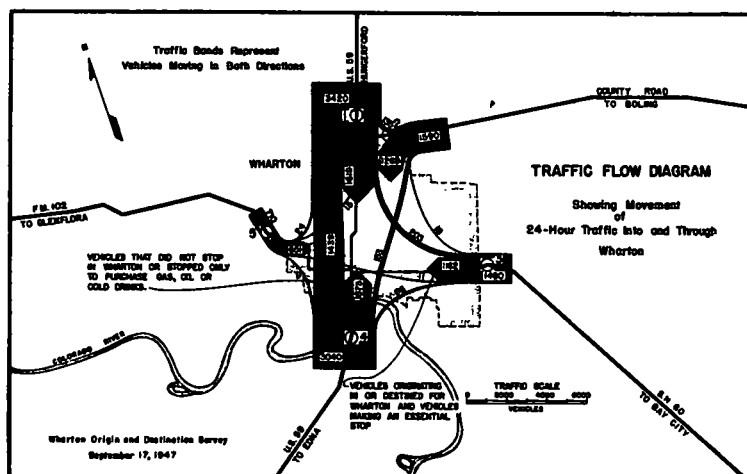


Figure 5

having learned that the Highway Department will provide this service, request it with the hope that it will in some miraculous manner solve all their problems. In many cases, what is actually needed is the elimination of curb or center street parking in the business district. This is not the answer they want; it is one they will eventually be compelled to accept. It may take several years of an educational program and a more critical traffic congestion to bring this type of relief about. To the extent that city and county governments become traffic conscious and informed as to the real causes of their traffic problems, to that extent may we expect to receive their cooperation in working out solutions to these problems.

cently made a rather extensive origin and destination study in the Rio Grande Valley. The situation here is rather unique in that our study included ten towns, on an average of 3.2 miles apart, all located on one highway. There are numerous business establishments between the towns on one side of the highway and a railroad on the other side. The existing facility is a three-lane road with daily traffic volumes from 4,500 to 10,000 vehicles. The situation is not at present extremely critical, but the increasing accident rate has alarmed the public spirited citizens and they are calling for advance planning for relief from a situation which they anticipate will soon become intolerable. These towns range in population from two

thousand to twenty-five thousand, and the highway actually serves as a forty-mile-long main street of a highly developed industrial and agricultural area with a population of about two hundred thousand. The field work for the survey consisted of the operation of an interview station near the city limits of each of the towns. The stations were operated on successive week days. The analysis while somewhat complicated was not particularly difficult. The method of showing graphically the results of the study presented quite a problem. Keeping in mind that the survey was requested by the Chamber of Commerce, we were anxious to make it as easy to interpret as possible. We tried several methods. We first in-

The procedure followed in this study was quite similar to that described in the parking survey manual issued by the Public Roads Administration in 1946. The report is now being prepared. We believe that we have obtained sufficient field data to enable us to offer suitable recommendations to the city. We have more confidence in this type of survey than in any we have made in that it does provide more complete information. Figure 9 indicates the traffic movements between Corpus Christi and the external zones of the trade area. Figure 10 shows the number of cars parked, the number of available spaces, and the parking demand in each block of the central business district of Corpus Christi.

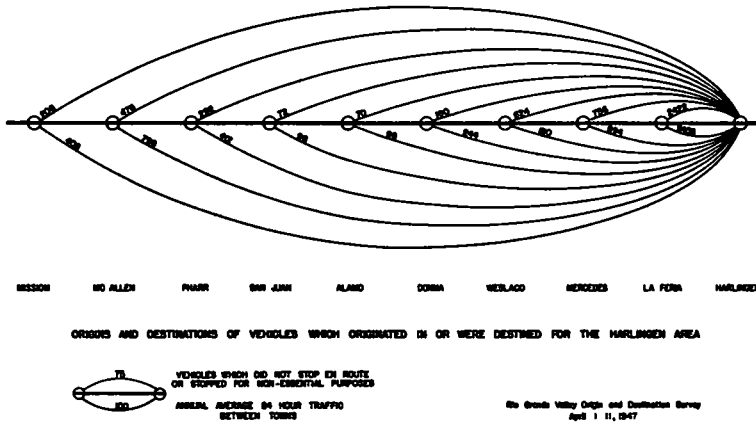


Figure 7

dicated by flow bands the travel, through and local, from Harlingen to the east end of the area through McAllen at the west end. We found this display difficult to interpret. We then attempted a graphic presentation of the travel by trip lengths. This also became somewhat complicated. We finally adopted the method shown in Figures 7 and 8. (Similar sketches were shown for each of the cities.) We are not entirely satisfied with this manner of presenting the traffic data and it has met with some criticism.

We have just completed an origin and destination survey in the City of Corpus Christi. This study included an external origin and destination survey, and an internal origin and destination survey in which interviews were obtained from the operators of vehicles which parked in the central business district.

In the City of Amarillo two routes through the city had been proposed for U.S. Highway 66. We were assigned the task of estimating the amount of both through and local traffic which could logically use each route. We had made an external origin and destination survey and an internal survey, using the license tag method. Figures 11 and 12 show the method of indicating graphically the use that could be made of each of the competing routes. This display is subject to criticism. We were handicapped by the data obtained from the survey to this extent. We were able to estimate the volume of traffic which desired to go from each zone to each other zone, but we did not know just where on the proposed route this traffic would enter or leave. We therefore had to divide the route into sections and break our flow bands at the section boundaries. At best it is only indicative and

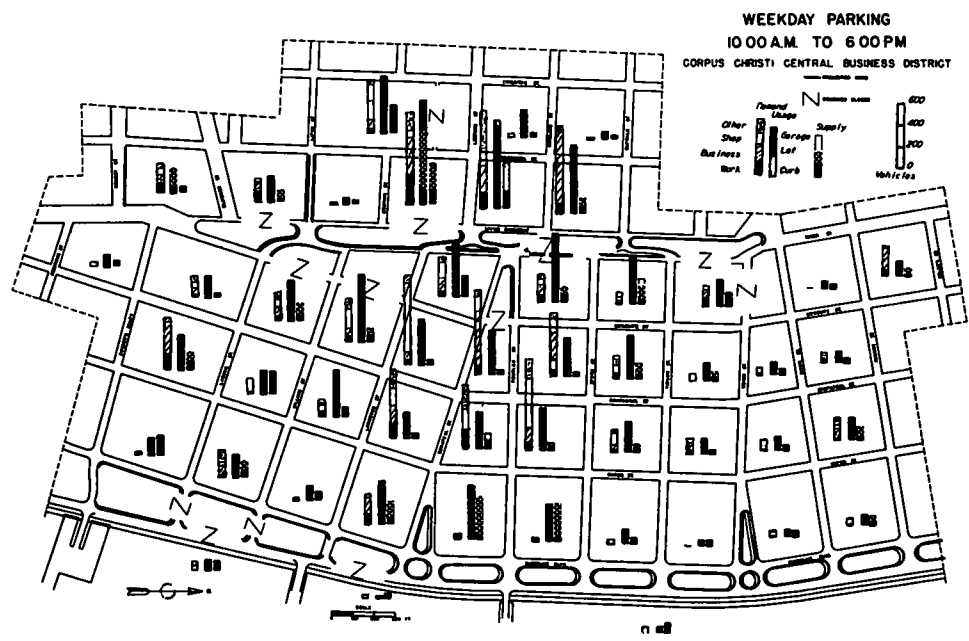


Figure 10

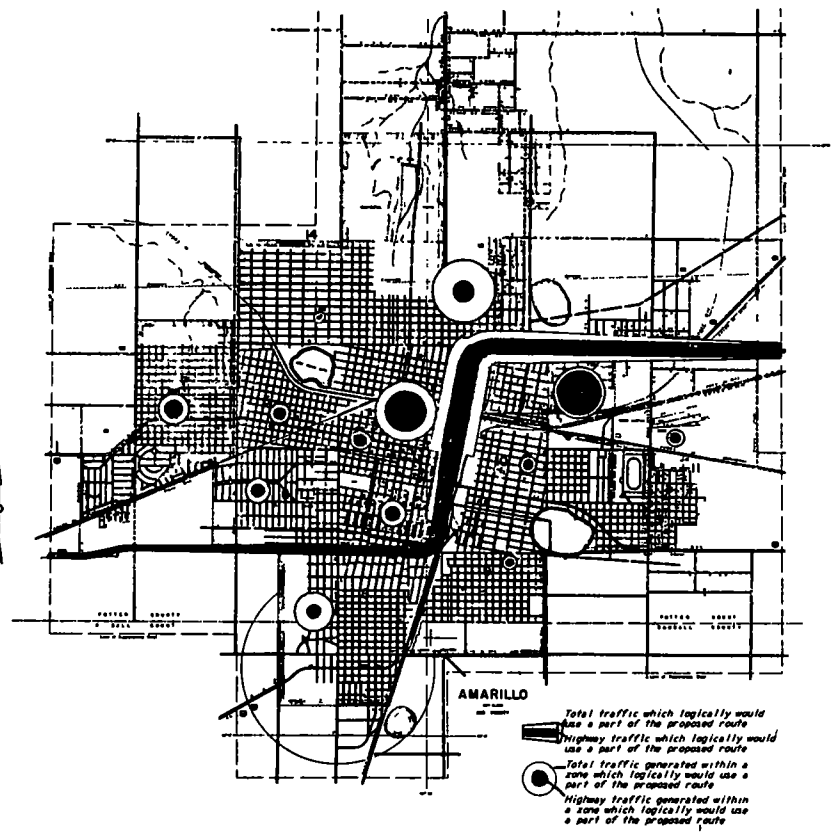


Figure 11

letter size section from the General Highway County Map showing the area of the desired information and indicating in red figures the traffic volumes.

In view of the increasing interest the Federal and State governments are taking in urban traffic problems, it behooves us to take stock of our past performance and become alert to the projects that will be assigned to us. The easy way out is to contract the large urban survey or the

and the analysis. It has been done; the Jacksonville, Florida Report is a good example. The Public Roads Administration has issued complete outlines for procedure in all phases of the surveys and their representatives are always willing and ready to assist us when called on. We have found their cooperative assistance very valuable. An exchange of original ideas in reporting and graphically showing traffic data would be a stimulant to the various

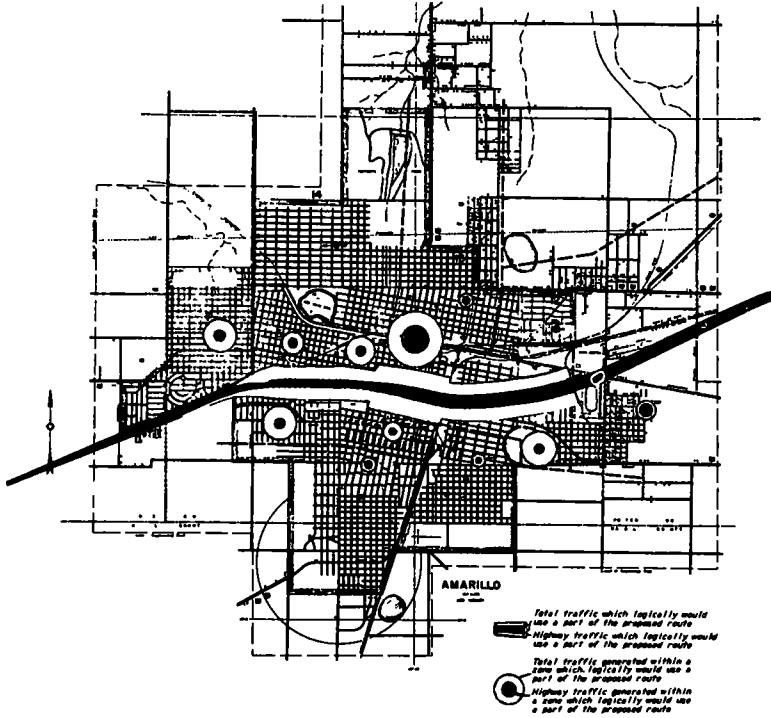


Figure 12

analysis, or both, to an engineering firm which makes a specialty of this type of work. However, taking this easy way out does not tend to enhance the usefulness of the planning survey. As long as we are content to permit others to undertake these more difficult or complicated projects, just so long will our commissioners and chief engineers or directors judge us to be incapable of their execution and will look for outside help.

It is my opinion that the planning surveys can carry through these more complicated projects from start to finish. It will take careful and detailed planning and very close supervision of both field operations

traffic reporting agencies. This could be handled through the medium of the Public Roads Administration.

The planning surveys should all be alert to the increasing interest that is being taken by outside agencies and other governmental departments. We recently received a request from one of our State colleges to explain to the senior and graduate students majoring in highway design, the technique of traffic surveys, analyses, and reports. This is definitely a progressive step. When our young engineers become aware of the important part that traffic plays in the location and design of the highways, many mistakes will be avoided.

(Note: In the interest of economy and ease of reproduction the illustrations accompanying this report have been reduced in size and reproduced in one color only. The original illustrations prepared

by the Texas Highway Planning Survey were much larger and consequently easier to read. Liberal use of color also enhanced their appearance and legibility. Ed.)