

Changes in Land Value, Land Use, and Business Activity Along a Section of the Interstate Highway System in Temple, Texas

*An Interim Report on One of a Series of Studies of the Economic Impact
of the Interstate Highway System on Local Areas*

by

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the Texas Highway Department, the U. S. Bureau of Public Roads, and
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Looking north along the New Route from its intersection with State Highway 36. Temple business district is to the east. (Photo courtesy Texas Highway Department.)

Acknowledgement

The authors express appreciation to all those who helped in making this study possible. Advisory Committee members from both the Texas Highway Department and the U. S. Bureau of Public Roads are due special thanks for their efforts.

Special thanks are also extended to Mr. Ted Witlow of the Bell County Abstract Company who saved the authors considerable time by making his maps and records of property transactions available. Mrs. Ruby McKee, County Clerk of Bell County and Mr. Leland Duke, County Tax Assessor were also most patient in allowing access to their records.

The businessmen of Temple were most cooperative in answering the many questions about their operations and in revealing details of sales. Without their cooperation this study could not have been completed.

FOREWORD

In November of 1957, the U. S. Bureau of Public Roads and the Texas Highway Department authorized the Texas Transportation Institute to conduct an economic impact study along sections of the Interstate Highway System in Texas. This authorization called for joint financial support by the Bureau of Public Roads and the Texas Highway Department.

The study was to include an analysis of the economic impact on local areas of the Interstate Highway System. The specific objectives were to measure the changes in land value, land use, business activity, travel habits and general community development that could be associated with this new highway facility.

At the time the study was authorized, very little of the Interstate System had been constructed within the State. There were, however, several sections of expressway-type roadway which had already been constructed and which, with minimum alterations, would meet the Interstate construction standards. It was decided to select three sections of expressway-type roadway which had been completed for a minimum of two years as the starting point for this study. This would allow a "before-and-after" study to be conducted within these areas while basic data were being accumulated from other sites.

With the advice of the Project Advisory Committee, three such sites were selected: one each in or near the cities of Austin and Temple, and one in Rockwall County. Field work was initiated immediately in order to establish base period land value, land use, and business activity information as soon as possible.

At the time the study was authorized, it was requested that a preliminary report of findings be submitted to the Bureau of Public Roads by July 1, 1958. These findings were to be used by the Department of Commerce in its report to Congress on nonvehicular benefits as required under Section 210 of the Highway Revenue Act of 1956. This report includes much of the data included in the Temple section of that preliminary report.

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Summary

This is a report on the results of the second in a series of studies designed to measure and analyze the effects that the construction of sections of the Interstate System has had on local areas. These effects are measured in terms of changes in land values and land use in the study area and in the effect on business conditions along the old route and in the area as a whole. The influences being discussed here were caused by the construction of a new bypass route for U. S. 81 (Interstate 35) around Temple, Texas.

In general it can be said that the new bypass route has had significant impacts on this particular area. The plural term is used since more than one type of influence was measured. And, since few things are either all good or all bad, these influences were quite mixed.

In terms of land values, the influence was definitely positive. Land within the study area—a ½-to-1-mile strip on either side of the bypass route—has shown a phenomenal increase in price during the study period. In the base period (1941-48) before construction of the bypass was even announced, land in this area sold for an adjusted average price of \$58.00 per acre. In the last period (1955-57) after the bypass was opened, the average price had climbed to \$822.00 per acre. This was an increase of over 1,300 percent. By comparison, land in the control areas increased by only 40 percent over the same time period.

Location within the study area was also found to be very important as a determinant of value. Land which was located adjacent to the new highway was valued at over 4 times that which did not touch it. This was largely due to the desirability of the abutting lands as potential commercial sites. However, location with respect to the central business district of Temple did not appear to be significant.

The change in land use is perhaps the most obvious change. The new highway was built through an agricultural section. Prior to the building of this road the land was largely devoted to farming or grazing. Now, however, commercial and residential uses are becoming

established while much of the open land has been taken out of agricultural production and is being held for future use. It has, in other words, assumed a "use fluidity" that it had not previously had.

The variations in land value were found to depend to a considerable extent upon its use—that is, both its use at the time of sale and its potential use subsequent to sale. In general the price of land tended to increase more rapidly as the land was shifted to more intensive uses. The land held for future use did not follow the other use classes exactly. Since speculative activity was more apparent here, these properties could probably be said to reflect prospective use values rather than present ones.

Temple businesses were both helped and hurt by the new bypass route. The extent to which they were affected depended upon the particular type of business, its location and its management. Generally speaking, the strictly traffic oriented businesses located on the old route, such as motels, were the most severely affected by the new bypass route. The traffic serving businesses that were less dependent upon through traffic, such as service stations, were able to develop a certain amount of local replacement trade and were thus less severely affected. And, those businesses that did not especially cater to the through motorist actually appeared to receive some economic stimulus from the reduced traffic congestion in front of their stores.

In any event, individual businesses showed considerable variation in their reaction to the new facility. Consequently, the facility affected them in widely differing fashions. Many of the most severely affected businesses were those with a relatively short remaining economic life. Most of these would have soon required extensive remodeling to maintain their relative competitive positions even without the road change. With the new facility and increased competition from new businesses, the need for improved facilities came even more quickly. In speeding up the economic development of the area, the new road tended to shorten the economic life of the less progressive businesses.

TEMPLE AREA

General

Temple is located about 65 miles north and slightly east of Austin in the Blackland Prairies of Central Texas. It is an industrial and distribution center of approximately 30,000 population. The economy of the city is well balanced by farm income from surrounding crop and livestock areas and the growth of light industry within the city. In addition, Temple serves as the distribution center for a large area of central Texas, and is a major medical hospital center. The City of Temple has had a period of rapid growth within the last few years, with an estimated population increase of around 16 percent from 1950 to 1957. Some of this increase may be accounted for, however, by the fact that the city limits have been expanded considerably within recent years.

Temple is adequately served by a network of U. S. and State Highways. U. S. 190 carries east-west traffic through the city, while U. S. 81 serves the north-south traffic. In addition, State Highway 36 and 53 carry a large amount of traffic to and from nearby points. The major traffic artery, however is U. S. 81. It is one of Texas' major north-south highways, and has been designated as a part of the Interstate System of Highways.

Study Area

The Temple study area consists of almost the entire U. S. 81 bypass area around the main business district of Temple. It is a section of land approximately 3 miles long and from 1 to 1 $\frac{3}{4}$ miles in width. It extends from the intersection with State Highway 36 on the south to near the rejoinder with old U. S. 81 on the north (see Figure 1). The Eastern boundary of the study area was determined by the city limits which were in effect during the base and construction periods. The western boundary was a county road about a mile from the facility. There are about 2,380 acres of land included within this area.

Until the new bypass was opened in early 1955, U. S. 81 went through the main business district of Temple. Traffic congestion became quite heavy in the downtown area, and it was decided to relocate that section of the highway. This new location was to be north and west of the main business district.

The City of Temple began acquiring rights of way for this section in 1948. Purchases of rights of way were completed in 1952, and construction began in 1954. The 300-foot minimum width right of way was purchased at an estimated cost of \$195,000 by Bell County. Construction was completed and the facility was opened to traffic in April, 1955.

With the exception of one at-grade crossing near the north end, the facility meets all the Interstate construction standards. It has four divided traffic lanes over the entire length, and full frontage roads over all but one short stretch near the north end. Construction costs for the three-mile section were as follows:

| | |
|------------------------------|-------------|
| Engineering Costs (T.H.D.) | \$ 62,631 |
| Grading, Base and Structures | 987,057 |
| Illumination | 92,503 |
| | <hr/> |
| Total | \$1,142,191 |

Control Areas

The control area was selected for the Temple study by the same method that had been previously used in the Austin study. That is, entire land surveys were selected. These, in the opinion of the research staff, contained properties with base period characteristics similar to those in the study area. To assure a sufficient number of sales of comparable property, it was necessary to select ten rather small surveys. The surveys selected and the number of acres of land in each are listed below:

| Survey | Acres |
|-------------------------|--------|
| Henry Millard | 2,402 |
| William Gilmore | 2,392 |
| P. M. Mercer | 1,497 |
| C. S. Masters | 498 |
| Cris Adams, Jr. | 635 |
| Alex Smith | 331 |
| Sarah Christopher | 496 |
| Garnett S. Hardcastle | 372 |
| I. & G. N. Railroad Co. | 674 |
| Walter W. Davis | 1,721 |
| | <hr/> |
| Total | 11,018 |

The location of these surveys in relation to the City of Temple and the study area are shown in Figure 1. Since the land in the study area was outside the city limits until the last period of the study, the control areas were selected from surveys which were also outside the city limits. As a whole, however, the control areas are farther removed from the city than would be desired. This selection was dictated by the fact that most of the land closer in to the city was in one large survey which included the city itself. While control sections closer in to the city would have been preferred, these control areas are considered to reflect accurately the general land appreciation in the vicinity of Temple.

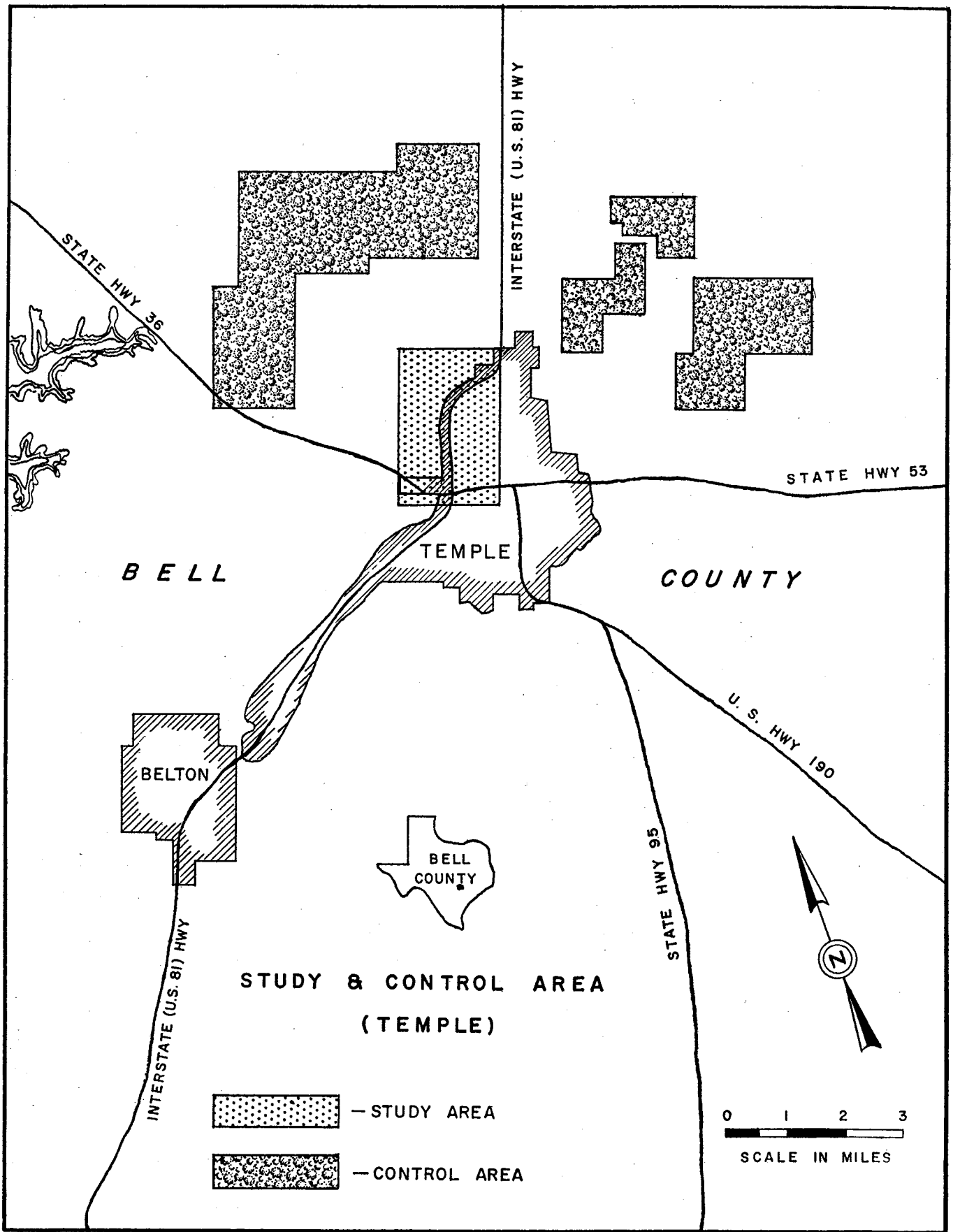


Figure 1.

Land Values

The comparative method of analysis was used to measure the changes in land prices between the three designated time periods for both the study and control areas. This method permits an analysis of both gross and net value changes between the periods.

The three time periods include a total of fourteen years. The first period, 1943-1948 inclusive, is used as the base period in determining subsequent changes in land values. The second period, years 1949-1954 inclusive is the period during which the right of way for the facility was acquired and the actual construction of the facility was performed. The third and last period, years 1955-1957, is regarded as the study period. This period covers the time that has lapsed since the bypass was first opened to through traffic movement. Changes in prices between the first and second periods largely measures the amount of early speculative interest in the area, while total changes through the third period will more nearly

reflect changes in land utility after completion of the facility.

The study area near Temple is divided into only two general classifications: "abutting" properties and "nonabutting" properties. Since the entire section is only about three miles in length and curves around the main business district of Temple, distance from the downtown area was not considered to be a major influencing factor. For this reason no attempt was made to divide the area into separate sections.

Two methods were employed in the analysis of the land value changes. The actual or unadjusted sales data were collected and presented in tabular form. Then, in order to remove the effect of the general price inflation during the 14-year period, the actual prices were adjusted to a common dollar base by application of the Bureau of Labor Statistics' Consumer Price Index (1947-49 = 100).

Table 1
ADJUSTED LAND PRICES FOR TEMPLE AREA, STUDY AND CONTROL AREA

| Periods | Number Sales | Number Acres | Average Price Per Acre | Price Changes Per Acre | | Percentage Changes | |
|---------------------|--------------|--------------|------------------------|------------------------|-----------------------------|--------------------|-----------------------------|
| | | | | Between Periods | Between 1st and 3rd Periods | Between Periods | Between 1st and 3rd Periods |
| | (Number) | (Acres) | (Dollars) | (Dollars) | (Dollars) | (Percent) | (Percent) |
| STUDY AREA | | | | | | | |
| 1941-48 | 16 | 1,594 | \$ 58 | | | | |
| 1949-54 | 22 | 460 | 155 | \$ 97 | \$764 | 168% | 1,317% |
| 1955-57 | 12 | 72 | 822 | 667 | | 430 | |
| CONTROL AREA | | | | | | | |
| 1941-48 | 53 | 4,809 | 77 | | | | |
| 1949-54 | 29 | 2,170 | 112 | 35 | 31 | 45 | 40 |
| 1955-57 | 12 | 1,085 | 108 | -4 | | -4 | |

Table 1-A
ACTUAL LAND PRICES FOR TEMPLE STUDY AND CONTROL AREA

| Periods | Number Sales | Number Acres | Average Price Per Acre | Price Changes Per Acre | | Percentage Changes | |
|---------------------|--------------|--------------|------------------------|------------------------|-----------------------------|--------------------|-----------------------------|
| | | | | Between Periods | Between 1st and 3rd Periods | Between Periods | Between 1st and 3rd Periods |
| | (Number) | (Acres) | (Dollars) | (Dollars) | (Dollars) | (Percent) | (Percent) |
| STUDY AREA | | | | | | | |
| 1941-48 | 16 | 1,594 | \$ 45 | | | | |
| 1949-54 | 22 | 460 | 167 | \$122 | \$906 | 271% | 2,013% |
| 1955-57 | 12 | 72 | 951 | 784 | | 469 | |
| CONTROL AREA | | | | | | | |
| 1941-48 | 53 | 4,809 | 64 | | | | |
| 1949-54 | 29 | 2,170 | 124 | 60 | 63 | 94 | 98 |
| 1955-57 | 12 | 1,085 | 127 | 3 | | 2 | |

Total Land Values

The influence of the new highway on land prices near the facility is reflected by comparing real estate sales prices in the study area to those in the control area. Table 1 presents the adjusted land prices per acre for each of the three time periods used in the study and control areas. Table 1-A shows the actual land prices for the three periods. The per-acre prices are based upon fifty property transactions in the study area and ninety-four transactions in the control area.

Land within the study area increased from an average of \$58 per acre in the base period to \$822 per acre in the last period—an increase of \$764 per acre—while the control area land prices increased only \$31 per acre. In terms of percentage change, land prices in the study area increased 1317 percent as compared to a 40 percent increase in the control area.

Most of the \$764 per acre increase in land prices within the study area occurred between the last two pe-

riods. The increases between the first two periods, while less dramatic than those that followed were still substantial. Land values increased 168 percent during this time. This increase, since it occurred before construction of the new facility was completed, must be largely attributed to speculative interest by realtors and landowners. It was generally anticipated within the area that land would become more valuable after the facility was completed. Those expectations appear to have been fully justified by the additional 430 percent increase in land prices that occurred between the last two periods.

Abutting and Nonabutting Land

Land within the study area was classified as either "abutting" or "nonabutting" properties. All parcels of land that touched the frontage roads of the facility were classified as abutting properties, and the land not touching the facility right of way was classified as nonabutting. The depth to which the abutting property extended depended primarily upon existing property lines.

Table 2-A
ADJUSTED LAND PRICES FOR ABUTTING AND NONABUTTING PROPERTY IN TEMPLE STUDY AREA

| Periods | Number Sales | Number Acres | Average Price Per Acre | Price Changes Per Acre | | Percentage Changes | |
|-------------------------|--------------|--------------|------------------------|------------------------|-----------------------------|--------------------|-----------------------------|
| | | | | Between Periods | Between 1st and 3rd Periods | Between Periods | Between 1st and 3rd Periods |
| | (Number) | (Acres) | (Dollars) | (Dollars) | (Dollars) | (Percent) | (Percent) |
| ABUTTING LAND PRICES | | | | | | | |
| 1943-48* | 16* | 1,594 | \$ 58 | | | | |
| 1949-54 | 9 | 85 | 440 | \$382 | \$862 | 659% | 1,486% |
| 1955-57 | 9 | 62 | 920 | 480 | | 109 | |
| NONABUTTING LAND PRICES | | | | | | | |
| 1943-48* | 16* | 1,594 | 58 | | | | |
| 1949-54 | 13 | 375 | 91 | 33 | 156 | 57 | 269 |
| 1955-57 | 3 | 10 | 214 | 123 | | 135 | |

*Base period sales were not divided into abutting and nonabutting properties.

Table 2-A
ACTUAL LAND PRICES FOR ABUTTING AND NONABUTTING PROPERTY IN TEMPLE STUDY AREA

| Periods | Number Sales | Number Acres | Average Price Per Acre | Price Changes Per Acre | | Percentage Changes | |
|-------------------------|--------------|--------------|------------------------|------------------------|-----------------------------|--------------------|-----------------------------|
| | | | | Between Periods | Between 1st and 3rd Periods | Between Periods | Between 1st and 3rd Periods |
| | (Number) | (Acres) | (Dollars) | (Dollars) | (Dollars) | (Percent) | (Percent) |
| ABUTTING LAND PRICES | | | | | | | |
| 1943-48* | 16* | 1,594 | \$ 45 | | | | |
| 1949-54 | 9 | 85 | 478 | \$433 | \$1,021 | 96% | 2,267% |
| 1955-57 | 9 | 62 | 1,066 | 588 | | 123 | |
| NONABUTTING LAND PRICES | | | | | | | |
| 1943-48* | 16* | 1,594 | 45 | | | | |
| 1949-54 | 13 | 85 | 97 | 52 | 200 | 116 | 444 |
| 1955-57 | 3 | 10 | 245 | 148 | | 153 | |

*Base period sales were not divided into abutting and nonabutting properties.

The prices of abutting land increased substantially because of the relocations of the new facility. The non-abutting land prices increased also, but at a much slower rate than did the prices of the abutting properties. As shown in Table 2, the abutting property prices increased from an average of \$58 per acre in the base period to \$290 per acre in the last period—a net increase of \$862. The prices of nonabutting land increased on \$156 per acre during the same period. In terms of percentage increase, the abutting properties showed a price gain of 1486 percent as opposed to a 286 percent increase for the nonabutting land. Assuming that the 40 percent price increase in the control area lands reflects the gen-

eral increase in land prices around Temple, it may be assumed that the new facility had an influence of 1446 percent on abutting property values within the study area, and a 229 percent influence on nonabutting properties.

Table 2-A, showing the unadjusted data, presents an even more dramatic picture. Abutting land had a price increase of 2284 percent between the base and last periods. Such spectacular increases illustrate the combined effects of changes in basic land utility and the speculative interest that accompanies the construction of a new expressway-type facility.

Land Use

The analysis of land use change along the three-mile section of U. S. 81 near Temple was undertaken to supplement findings regarding changes in land values and to present a picture of land use changes within this study area. Land use maps are used to depict land use within the study area as of certain selected years. The "before" land use map shows the land use patterns as of 1948, the last year of the base period. The "after" map shows the land use pattern at the end of 1957.

The information used in determining land use in 1948 was obtained through interviews with local residents and realtors who were familiar with the study area in 1948. Visual inspection and interviews with property owners within the study area furnished the necessary information relative to land use pattern at the end of 1957.

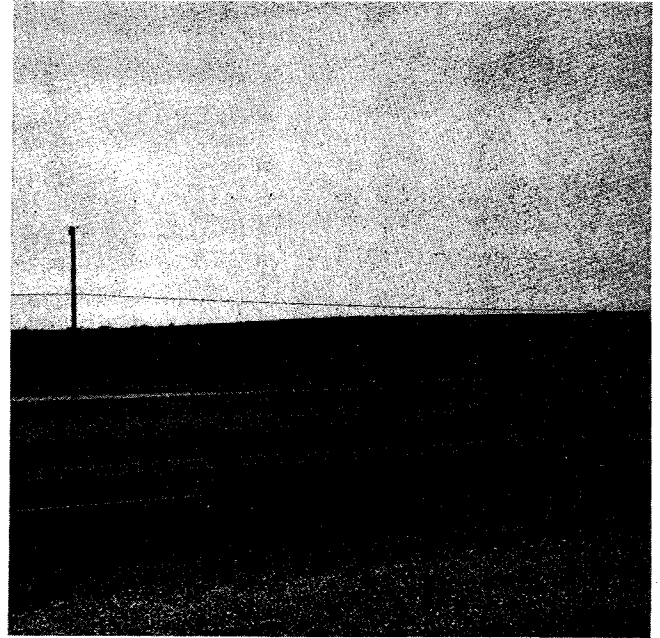
Land Use in 1948

The major portion of the total acreage lying within the study area boundaries was being used for agricultural purposes in 1948. The soil in this area is rich and fertile, thereby making it highly suitable for agricultural production in the absence of demands for more intensive use.

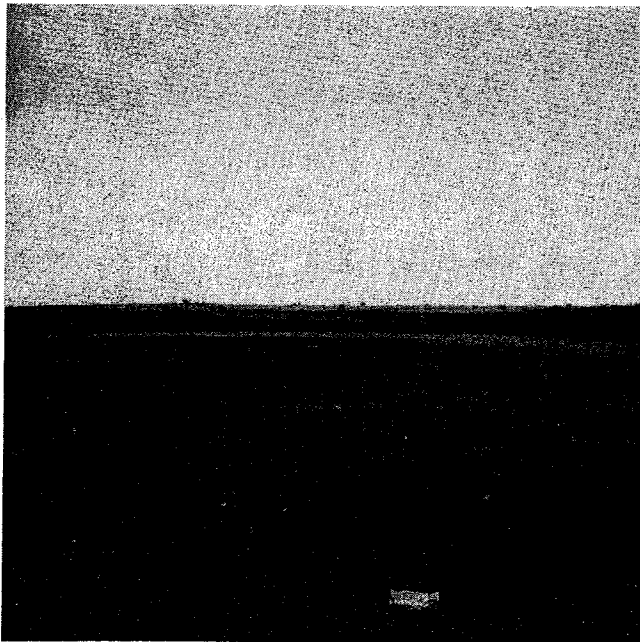
Even though the residential area of the City of Temple had expanded westward to the eastern boundary of the study area, the railroad line has acted as a curb to further expansion in that direction. The residential areas were expanding primarily to the north and south with some eastward expansion. However, there seemed to be no great tendency for these areas to expand west beyond the railroad. As a consequence, the land in the study area had little utility except for agricultural activity.

During 1948 there were only a few scattered tracts of land classifiable as "rural residential" land. These rural residences were located near the western boundary of the study area near a county road. The majority of the improvements on the farms within this area were below average in both appearance and condition.

The American Legion owned the tract of land shown on the "before" map as the "institution-municipal" land.



Much of the area is still undeveloped open land.



The new highway was built through a diversified agricultural section.



In addition to the farm land, a few rural residences were also located in the area.

Land Use in 1957

Agricultural activity was still the most prevalent land use in the Temple study area as late as 1957. Practically none of the nonabutting properties had changed land uses except for a small number of residential plots.

The most significant changes in land use patterns occurred within a relatively narrow strip on either side of the expressway. Much of this land changed to "land held for future use" or "commercial" land. A comparison of the two land use maps shows the various land use changes as well as the property divisions that occurred during the 1948-1957 period.

New construction activity within the study area has been fairly limited. The precise reason or reasons for this limited activity are difficult to determine. Perhaps the study was made too soon since the facility had been opened for only a two-year period.

Another possible explanation for the limited number of traffic-serving establishments locating along the new bypass is the fact that U. S. 81 follows its old location for a considerable distance just south of the study area. Numerous traffic serving establishments located along the old route were already in existence before construction of the new bypass. It is possible that the local businessmen feel that the area is already saturated with such previously established businesses. The next few

years should reveal more conclusive evidence regarding the cause of the limited development of traffic serving businesses.



However, many signs of development have now begun to appear.

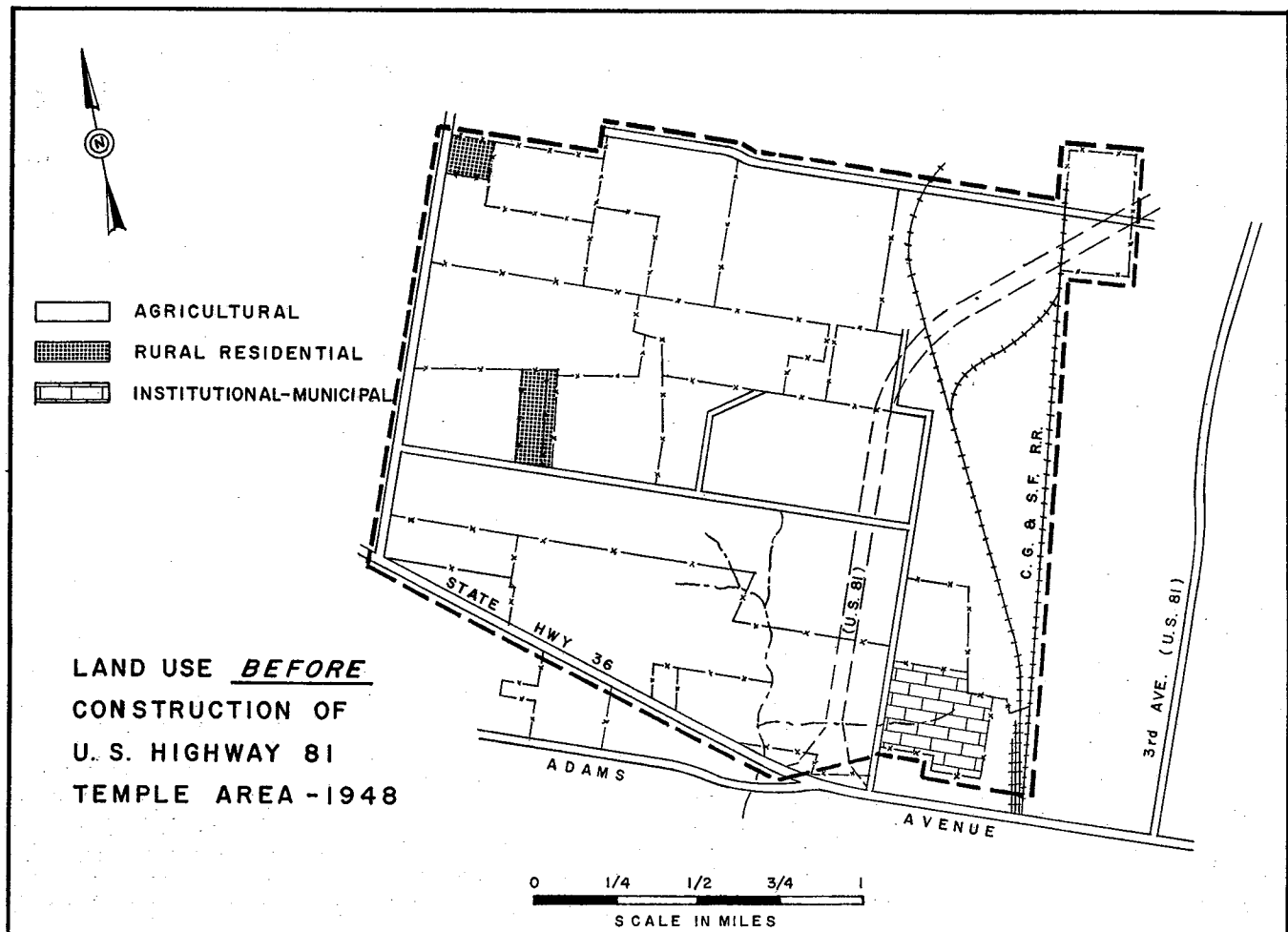


Figure 2.

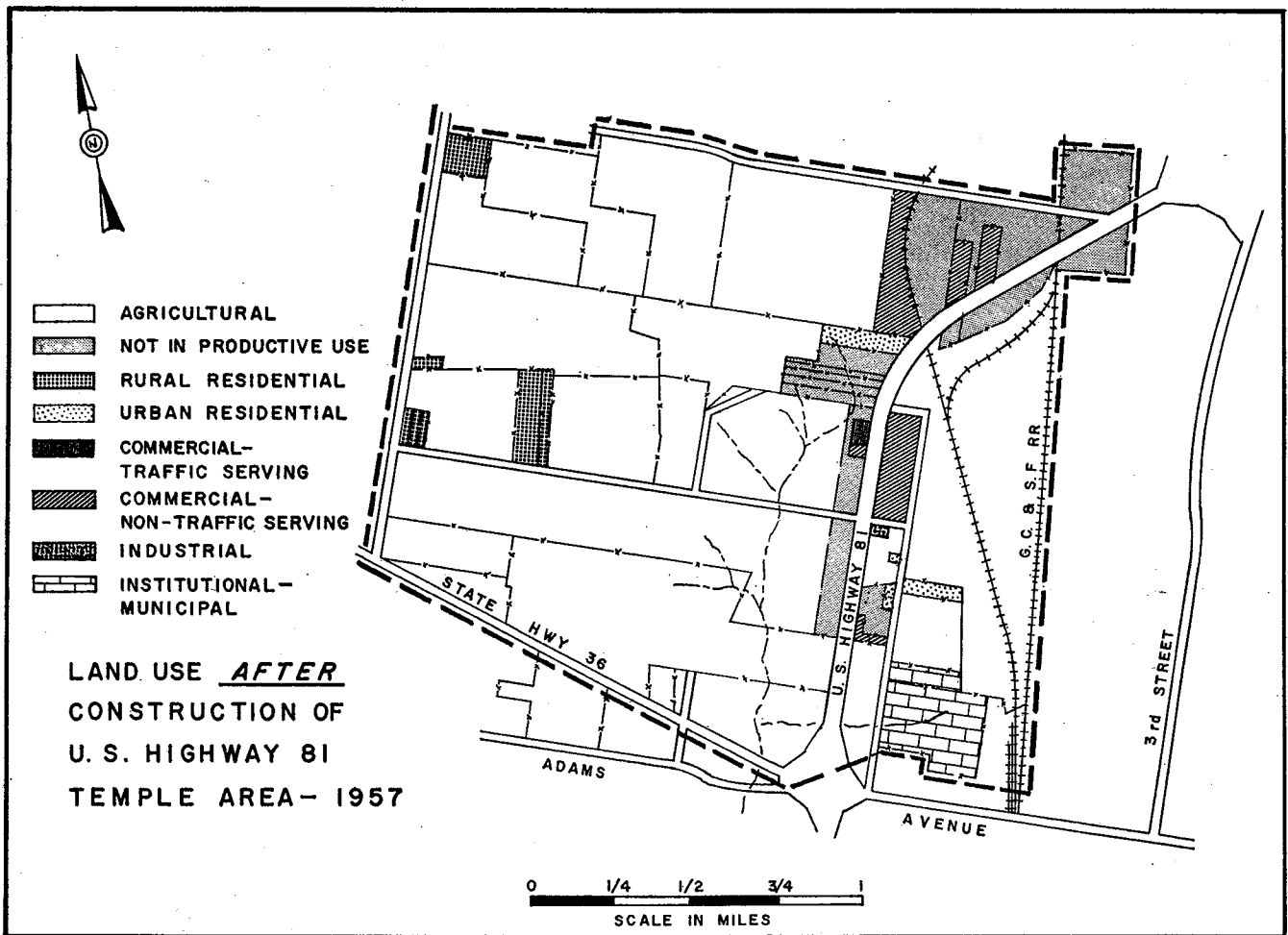


Figure 3.

It will be noticed on the "after" land use map (Figure 3) that several nontraffic serving enterprises have begun to move into the area. These include one air conditioning firm, one general wholesale firm, two soft drink beverage warehouses, one grain storage firm with several large storage buildings, and one general merchandise warehouse.

In terms of frontage area, the abutting land along the bypass has a good potential for land use changes during the future. Activity during the first half of 1958 revealed additional commercial establishments locating within this area.

Relationship Between Changes in Land Use and Land Values

The methods used in gathering and assembling data to show the relationships between changes in land use and land value were essentially the same as those used in the Austin study.

The study of land value in relation to its use in this study is based on 50 property transactions involving sales from three major land use classes. These three major land use classes were: (1) agricultural land, (2) land held for future use, and (3) rural residential land. During the period under study all properties that sold within this area were classed in one of these three categories

at the time of sale. Their use subsequent to sale could have remained unchanged or have changed to any one of the eight use classes listed below:

1. Agricultural land.
2. Land held for future use.
3. Rural residential.
4. Urban residential.
5. Commercial—traffic serving.
6. Commercial—nontraffic serving.
7. Industrial.
8. Municipal.

Perhaps the most significant information to be seen by comparing prices paid for land in different use classes by periods (as shown in Figures 4, 5, 6, and 7) is that as the area as a whole ripened, prices for all types of uses advanced materially. The differences in the timing and extent of the advances are also revealed to a certain extent. Prices of land in use for agricultural purposes, for example, advanced by only \$65 per acre between the base and construction periods and then jumped over \$1,400 after the facility was completed. Class 2 land (that being held for future use) on the other hand, revealed significant speculative increases at a much earlier date. The increases here were almost

evenly split between the different time periods. Rural residential lands (Class 3) had a much slower turnover and more sedate price advances than did either of the other two classes.

Not all land sales were transfers into a "higher and better" use class. For example, of the 27 transactions involving agricultural land during the 15-year study period, only 10 parcels were transferred to "higher and better" land use classes. The 17 remaining sales of agricultural land were merely transfers in ownership which involved no change in basic use. It is also interesting to note, however, that all of these land sales occurred during the first and second periods (1944-48 and 1949-51). All agricultural land tracts selling in the third study period (1952-54) were transferred to a "higher" use class. This would seem to indicate that the ripening process had reached the point where agricultural use had been forced out of the market as an active participant in land purchases.

Of the sales of agricultural land to other use classes, the transfers to rural residential uses (Class 3) were most common. During the study periods, sales of seven such parcels of land were recorded. The prices paid for land destined for this use, while considerably higher than those paid for land for agricultural purposes, were modest when compared to prices paid for other uses (Figure 5). Each parcel of this class of land is, by definition, destined for a rural home site. As such, it is basically nonproductive in nature and must compete price-wise,

with other rural and, to some extent, urban sites, which in most areas of Texas are still plentiful. Consequently, rural residential uses are able to compete for land during the later stages when higher alternative uses begin to appear.

Since the land in the Temple study area is good farm land, some of the owners continue to farm the land until such time as they can sell it directly for commercial or industrial uses. This is not true in all cases, however, since a few parcels of agricultural land have been sold to speculators and land developing firms with a resulting change in its use to Class 2. As can be seen, the highest price paid for agricultural land in each of the last two time periods was for this purpose (Figure 5).

In many cases, too, land does not necessarily have to change ownership in order to change in use. This fact is reflected in tracts of land which have been retired from agricultural production by the original owners. Such acts according to the definitions on which these studies are based, automatically transfer these tracts to the class of land "held for future use." In most instances, such properties abut the facility and are desirable locations. One owner, for instance, has erected a "for sale" sign on his originally farmed land abutting the facility. He offered small tracts of land for sale as commercial or industrial sites. When these tracts are sold, they will be recorded as sales from Class 2.

In one instance, a tract of agricultural land was transferred directly to a commercial use. This sale re-

SALES OF PROPERTIES FROM THREE MAJOR LAND USE CLASSES TO ALL USES COMBINED, BY PERIODS

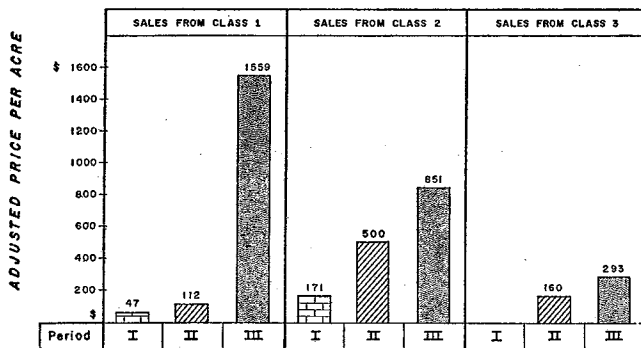


Figure 4.

SALES OF CLASS 1 PROPERTIES IN ACCORDANCE WITH SUBSEQUENT USES, BY PERIODS

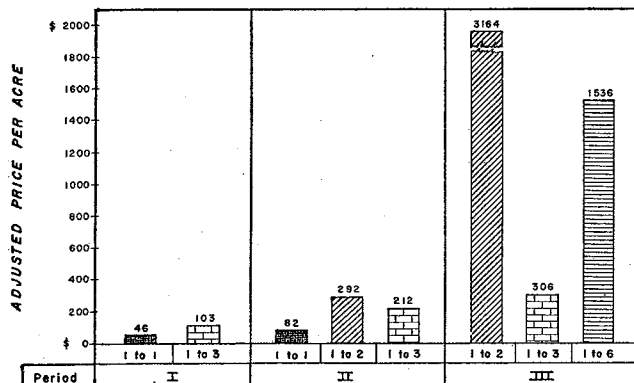


Figure 5.

SALES OF CLASS 2 and CLASS 3 PROPERTIES IN ACCORDANCE WITH SUBSEQUENT USES, BY PERIODS

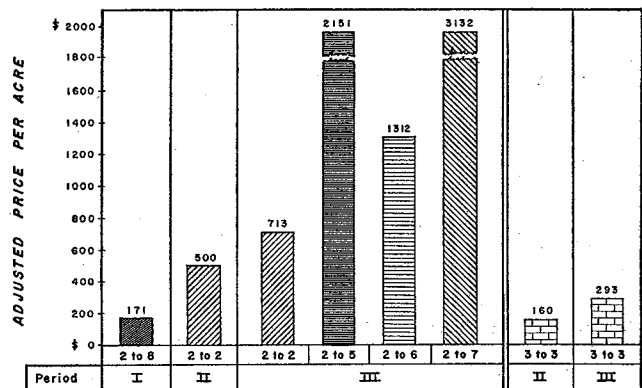


Figure 6.

SALES OF PROPERTIES FROM ALL USE CLASSES TO SPECIFIC USE CLASSES, BY PERIODS

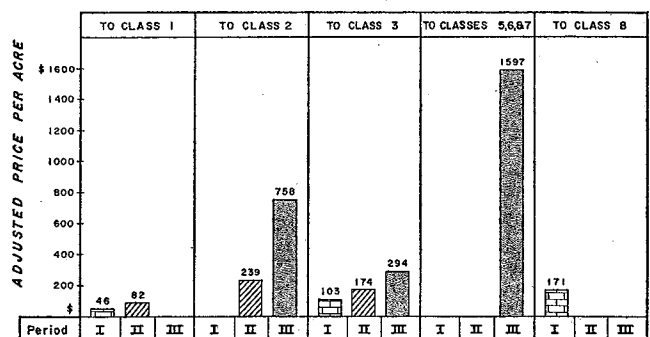


Figure 7.

sulted in a much higher price per acre than was the case for the agricultural lands sold for rural residential purposes (the only other direct use to which agricultural land was put). However, this particular tract happened to abut the new facility. Because of its economic potential such land is ideally suited to commercial use and may be expected to command a premium price when assigned to this use. Had it been sold for a rural residence, it would have had practically no economic potential in a productive sense, and would probably have brought a much lower price.

Sales prices of "land held for future use" (Class 2) increased substantially during the 15-year period (Figure 6). It is also very interesting to notice the development and distribution of sales from Class 2 during the different periods. In the period before news of the location of the new facility was released, the economic development of this area progressed at a very slow rate. As a consequence, there was little incentive to take land out of agricultural production in the hopes of later selling it for a different use. The only sales of Class 2 land occurring in the first period were sales for institution-municipal use.

During the second study period interest in land development quickened considerably. Because the area was still relatively inaccessible during this period, however, sales to industrial or commercial firms were still non-existent. All of the sales of Class 2 land during this period were to other realtors or speculators and resulted in no change in land use. It is assumed that these sales were between speculators or realtors who were aware of the potential for appreciation of these tracts. This also assumes that the buyers were willing to assume the risks incidental to the waiting or "ripening" period, while the sellers were satisfied with the gains they had earned as their part of the holding and developing process.

Only in the last period did the sales of Class 2 land result in change in use. During this period sales resulted in changes to three other land use classes in addition to the sales within use Class 2. This reflects, to a certain extent, the stage of development present within the area during this period. Land that had been bought or otherwise acquired earlier and held for future use was now being sold to its final use. These sales were also made at a much higher price per acre than were any other sales. It is difficult to draw conclusions from the limited number of sales available here, but from these data it appears that land sold for industrial use brought a sub-

stantial premium over that sold for commercial purposes. Furthermore, land use for traffic serving commercial purposes appeared to demand a higher price than that used for nontraffic serving establishments. This could be explained by the practical necessity for a traffic serving business being located adjacent to the facility.

Figure 6 also shows sales from Class 3—rural residential land to other uses. This was the only remaining land use from which sales were made in the Temple study. It is also interesting to note that all rural residences that sold retained their original land use. Through 1957, no rural residences had been sold to a higher use class. This would seem to indicate that the demand for land, or sites, had not developed to the point that rural home sites were being bid out of the market. Or, to put it another way, that the demands for land by higher type uses were still being adequately filled by properties of an even lower use class. This too, would infer that the development of this particular area is still in its early stages.

In addition to the sales from specific uses to other uses, the shift to specific uses was also examined. Figure 7 shows a summary of the sales from all use classes to each specific use class by time periods. Two general conclusions can be drawn from these comparisons. First, that the price per acre increased consistently and substantially from one time period to the next even within the same use class. Secondly, it can be concluded that as the land is put to more intensive uses, the price increases accordingly.

From the standpoint of the over-all analysis, it is perhaps unfortunate that sales were not made to each land use during each time period of the study. On the other hand, the fact that sales were made to certain uses only during certain time periods is in itself indicative of the development of land use. For instance, the fact that no land was sold for agricultural use during the last period is evidence that the demand from other uses was pricing agriculture out of the land use market. The same type of reasoning can be applied to sales to Class 2. The fact that no sales were made during the first period to buyers whose only purpose was to hold the property for use at a later date, is a strong indication of the lack of land development during that period. Not until after the location of the new facility had been announced was there evidence of buying land only with the purpose of reselling it at a later date. And, not until the facility was completed was there interest in the newly created sites for commercial and industrial purposes.

Business Activity

An attempt was made to determine the effects of the Temple bypass on Temple area businesses. Procedures were essentially the same as those used in the other studies of this series. Business data for the year 1954, the year "before" the opening of the bypass to traffic, was compared with similar data for the year 1957, the "after" period. Comparative findings were then related to the general business index for the Temple area.

The two areas used in the survey of business activity were the old and new routes of U. S. 81 through Temple. More specifically, businesses along the new route (General Bruce Drive) from its intersection with Avenue H south of Highway 36 to its intersection with North Third Street, north of Highway 36 were considered to be in the new area. Those abutting the old route were considered to be in the old study area. The old route proceeds east along Avenue H from its intersection with General Bruce Drive south of Highway 36, thence north along South Twenty-fifth Street to its intersection with West Adams Avenue, thence east along West Adams Avenue to its intersection with North Third Street, thence north along North Third Street to rejoin General Bruce Drive (Figure 8).

Businesses in the two areas of study were classified as "traffic serving businesses" and "nontraffic serving businesses." Changes in business activity was largely measured by changes in dollar volumes of sales for the years 1954 and 1957. Other factors were evaluated for some of the subclassifications of businesses when data was sufficient to warrant such evaluations.

In order to learn as much as possible about the factors which might influence retail sales of study area firms in Temple, information was sought pertaining to

total retail sales for the city. The Bureau of Business Research in Austin gathers retail sales information from a large number of cities in Texas. While this information was sketchy, an index constructed from it indicated a decline in sales of over 11 percent for the period 1954-1957 (see Table 15).

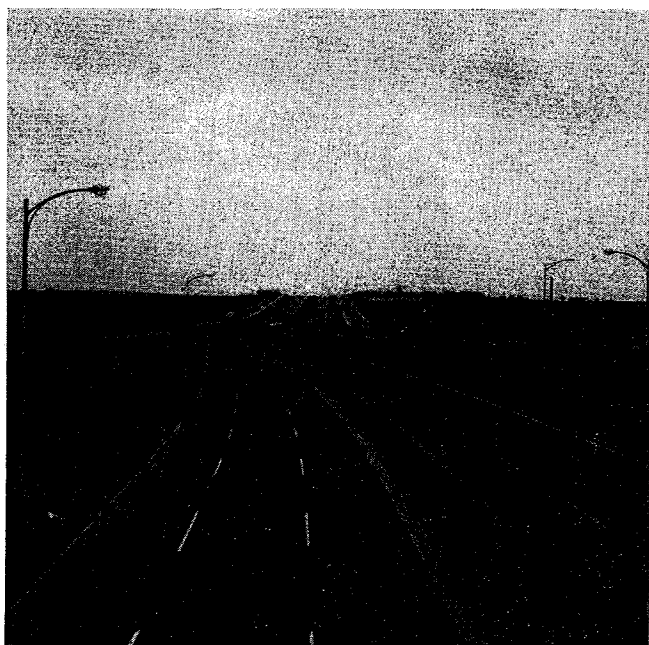
One of the most concrete factors which could be considered as contributing to this loss in sales is the reduction of manpower at nearby Ft. Hood. Over the past 4-year period their manpower has fluctuated as shown below:

| Year | Military | Civilian | Total | Percent Change From 1954 |
|------|----------|----------|--------|--------------------------|
| 1954 | 21,820 | 1,759 | 23,579 | -0- |
| 1955 | 35,590 | 2,037 | 37,627 | +59.6 |
| 1956 | 24,658 | 2,103 | 26,761 | +13.5 |
| 1957 | 17,385 | 1,882 | 19,267 | -18.3 |

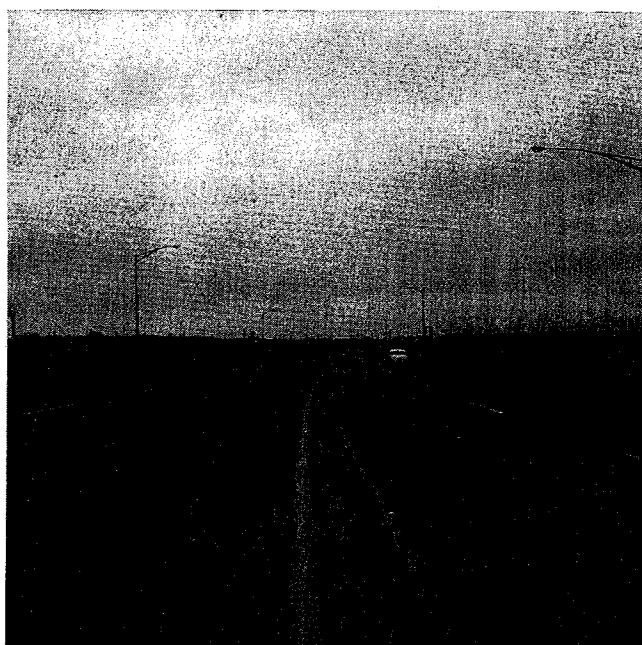
The 18.3 percent decrease in manpower between 1954 and 1957 should not necessarily be considered as the only or even major factor responsible for the 11 percent decline in sales. It is, however, probably a contributing factor and should be kept in mind as the reports from study area businesses are analyzed.

Businesses Interviewed

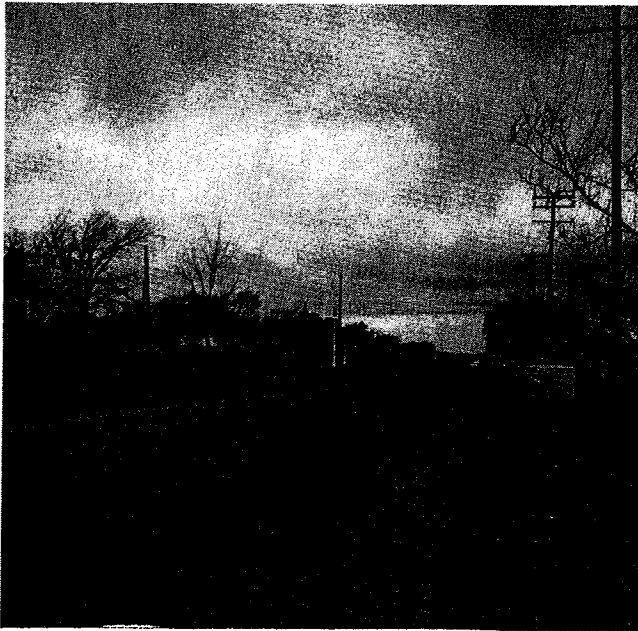
As can be seen from Figure 8, the old route of U. S. 81 went through the main downtown business area of Temple. There were, therefore, a considerable number of business establishments located on this route. Within the previously outlined limits of the study area there were a total of 123 businesses abutting old U. S. 81. Of these, 39 were considered to be outside the scope of this study because of the nonretailing nature of the business



A view of the New Route (General Bruce Drive) from the southern boundary of the study area.



Commercial activity has not yet been well established on the New Route.

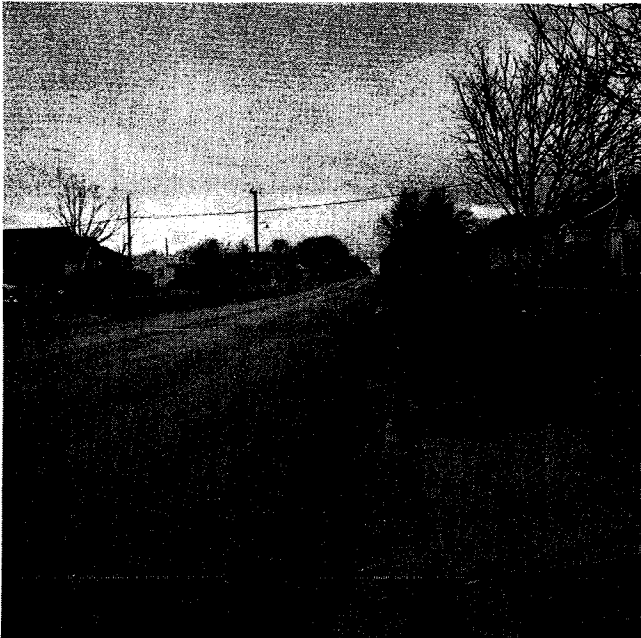


The Old Route entered the business district from the southwest on Avenue H.

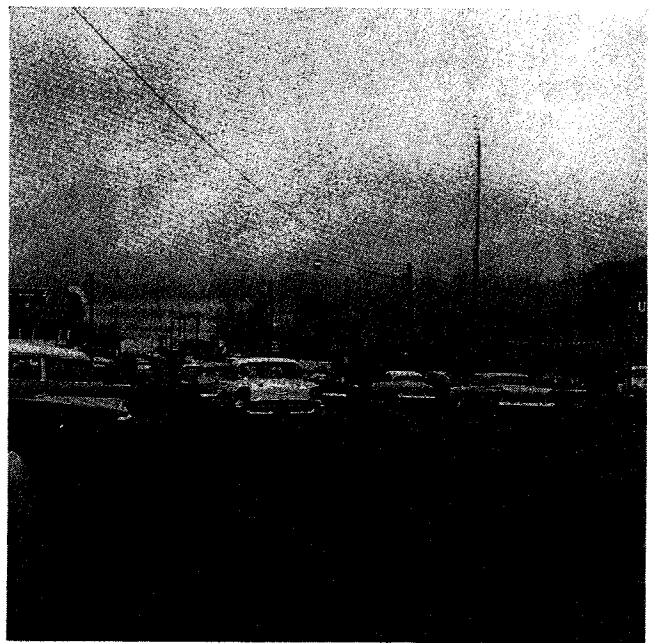
carried on. They were not included in the group of businesses to be interviewed. An additional 13 businesses were considered "marginal" to the study because of the divergent natures of their businesses (late hour taverns, frozen food lockers, etc.). They were not interviewed.

A total of 71 businesses along the old route of U. S. 81 were considered to be suitable for inclusion in a study of retail businesses and each of these businesses was called on by a staff member. In 18 cases, however, it was impossible to conduct an interview due to the uncooperativeness of the owner or the lack of sufficient data.

A total of 53 interviews were actually conducted. Most were relatively complete, but a few yielded only



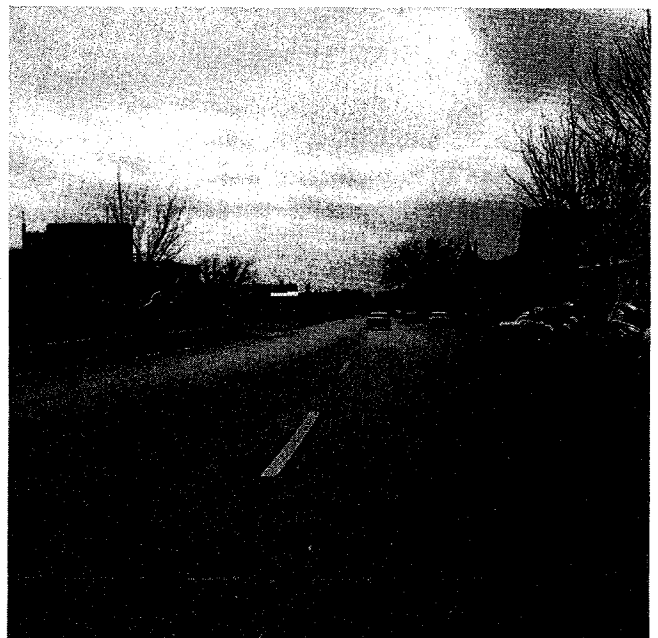
It then turned north on South 25th Street.



Turned again onto Adams Street.

partially complete data because of lack of available information, unwillingness of owners to release data, etc. All data judged to be relatively complete is included in the tabular presentations.

Along the new route of U. S. 81 there are ten businesses located within the study area. All of these businesses were called on for interviews, but in two instances interviews could not be made. Of the eight interviews completed, only one was of a traffic serving establishment. Data from these eight completed interviews is included in the tabular presentations; however, it might be noted that only three establishments of the eight interviewed could furnish complete dollar volume figures for 1957.



And finally turned North out of Temple on North 3rd Street.

STUDY AREAS

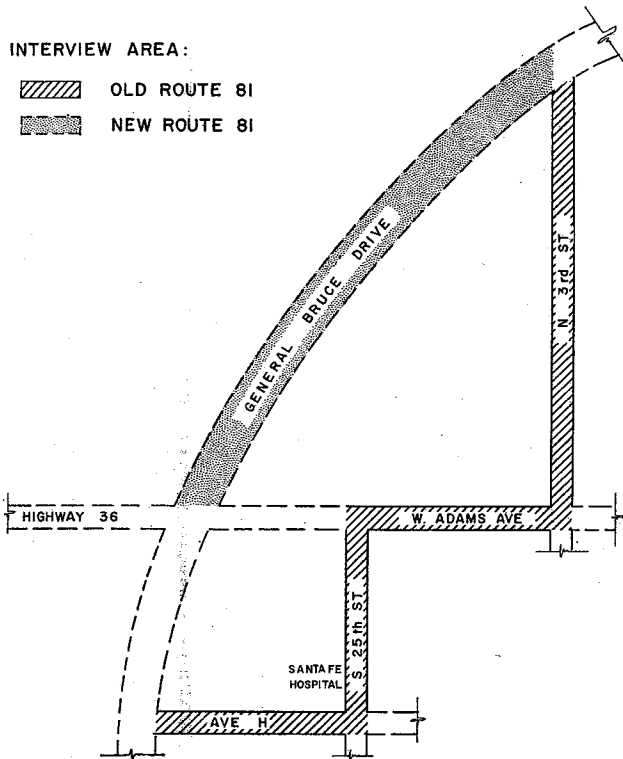


Figure 8.

TRAFFIC SERVING BUSINESSES

Service Stations (Old Route)

A total of 23 service stations are located on old route U. S. 81. Of these four were closed at the time of the survey, and five had been constructed along old U. S. 81 since the opening of the new highway facility in 1955. Of the four stations not in operation at the time of the survey, two had been constructed since the opening of the new facility. This may be seen more clearly as follows:

Old Stations (Built prior to 1954) that were:

| | |
|--------------------------|----|
| Operating at end of 1957 | 16 |
| Closed at end of 1957 | 2 |

Total Old Stations 18

New Stations (Built after 1954) that were:

| | |
|--------------------------|---|
| Operating at end of 1957 | 3 |
| Closed at end of 1957 | 2 |

Total New Stations 5

Total Stations Operating
at end of 1957 19

Total Stations 23

A total of 19 interviews were made with service station operators between June 4 and July 10, 1958. Dollar volume of business figures were reported by 15 of the operators, 13 of whom were able to report dollar volume figures for both 1954 and 1957. Dollar volume of business figures for 1957 only were reported by the

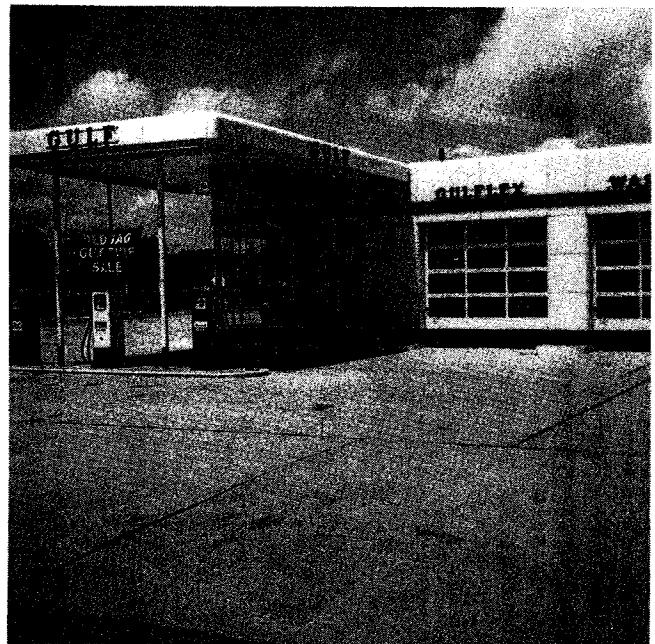
operators of the two reporting stations which had been constructed since 1955.

Gasoline gallonage figures were reported by 18 of the 19 operators interviewed. These figures were checked against jobber records, and sharp discrepancies were noted. For purposes of the study, jobber records of gasoline gallonage for 1954 and 1957 were utilized as basic data, rather than the operators' estimates of gasoline gallonages retailed.

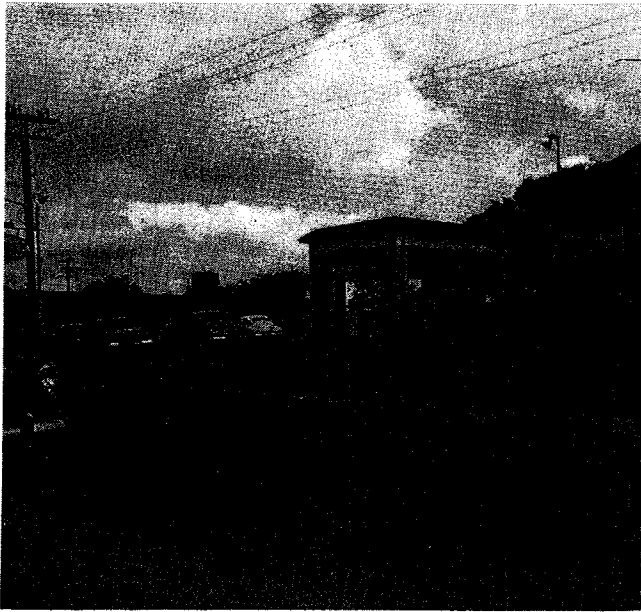
Dollar Volume of Business (1954 and 1957) — Table 3 presents the dollar volume of business figures reported by the 13 service station operators who had data available for both the years 1954 and 1957.



One of the newer service stations located on the Old Route.



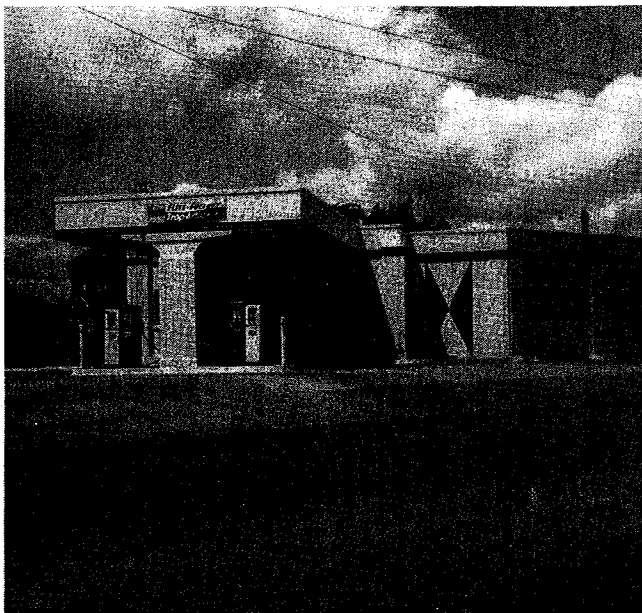
A new-type station that is being opened on the Old Route.



Some of the stations along the Old Route had been in operation for a long time.

It may be noted that most of the reporting operators indicated decreases in dollar volumes of business in 1957, as compared with the volumes of business done in 1954. Ten of the 13 reporting operators reported such decreases. Percentage of decreases ranged from 4.4 percent to 83.3 percent.

However, not all operators reported decreases in over-all dollar volumes of business. Three operators who were in business during both of the years under study reported increases in dollar volumes of business ranging from a low of 5.7 percent to a high of 204 percent. The operator of this last station, it may be noted, attributed this sharp increase partly to a new building and partly to more aggressive management methods.



This service station has been closed and then remodeled since the New Route was opened.

Of primary significance is the fact that in 1954 the dollar volume of the 13 reporting service stations located on the old route was \$876,400. In 1957, the dollar volume of business for these same stations along the same route was \$637,900. A comparison of these figures reveals an over-all decrease of 27.2 percent in dollar volume of business done by these 13 service stations in 1957, as compared to the total dollar volume of business done in 1954.

When this comparison is extended to cover all 23 service stations which were located along the old route, the picture changes somewhat. Five of the stations that were in operation in 1954 could not furnish dollar sales information for 1957. Two were closed during the year of 1957 and the other three did not have reliable data available. In order to compare the changes in these stations as a group, dollar volumes were estimated for these five stations as shown in Table 4. The estimated volumes for these stations showed a considerably larger decline over the study period than did the group as a whole. The volume of the three nonreporting old businesses declined by over 50 percent while that of the two old stations which closed during 1957, dropped almost 88 percent. The 18 old stations as a whole lost about 32 percent of their gross dollar sales during the three-year study period.

During this period, however, five new stations were built along this route. Three of these were still in operation at the end of 1957, while two, because of insufficient volumes, closed before the year was over. When their volume is added to that of the stations already established, the total should represent the over-all effect on service station business along the old route. The net effect of the five new stations was to add some \$233,300 to the 1957 gross sales of the area. This in turn reduced the decline shown for all service stations along the old route to less than 11 percent. As will be explained in more detail later, the retail sales for all Temple retail business declined by about this same amount from 1954 to 1957.

Various explanations for the decrease in dollar volume of business were offered by service station operators, but in almost all instances the existence of the new bypass facility (General Bruce Drive) was mentioned as a significant factor. They felt that its diversion of much of the previous flow of traffic from the old route of U. S. 81 was one of the major reasons for their loss of business.

In order to determine just how severe this loss in traffic had been, a record of average daily traffic was obtained from the Highway Planning Survey Division of the Texas Highway Department for the years after 1954. These records show the normal average daily traffic load carried by the old route of U. S. 81, by the new route, and by both routes together.

| Year | Old Route | New Route | Total |
|------|-----------|--------------------|-------|
| | U. S. 81 | U. S. 81 | |
| | ADT | ADT | |
| 1954 | 6,550 | Under Construction | 6,550 |
| 1955 | 3,190 | 3,570 | 6,776 |
| 1956 | 3,650 | 4,000 | 7,650 |
| 1957 | 3,220 | 4,360 | 7,580 |
| 1958 | 3,410 | 4,410 | 7,820 |
| 1959 | 3,910 | 4,750 | 8,660 |

Table 3
CHANGES IN REPORTED DOLLAR VOLUME OF 13 SERVICE STATIONS LOCATED ON OLD U. S. 81 IN TEMPLE BETWEEN 1954 AND 1957

| Stations* | 1954 | 1957 | Dollar Change | Percent Change |
|---------------------|-----------|-----------|---------------|----------------|
| | (Dollars) | (Dollars) | (Dollars) | (Percent) |
| 1 | \$140,900 | \$ 72,300 | \$- 68,600 | - 48.7% |
| 2 | 81,000 | 34,000 | - 47,000 | - 58.0 |
| 3 | 97,500 | 81,000 | - 16,500 | - 16.9 |
| 4 | 27,000 | 14,000 | - 13,000 | - 48.1 |
| 5 | 45,000 | 36,000 | - 9,000 | - 20.0 |
| 6 | 108,000 | 54,000 | - 54,000 | - 50.0 |
| 7 | 25,000 | 76,000 | + 51,000 | +204.0 |
| 8 | 35,000 | 37,000 | + 2,000 | + 5.7 |
| 9 | 45,000 | 43,000 | - 2,000 | - 4.4 |
| 10 | 72,000 | 12,000 | - 60,000 | - 83.3 |
| 11 | 25,000 | 16,600 | - 8,400 | - 33.6 |
| 12 | 72,000 | 89,000 | + 17,000 | + 23.6 |
| 13 | 103,000 | 73,000 | - 30,000 | - 29.1 |
| Total 13 Stations | \$876,400 | \$637,900 | \$-238,500 | |
| Average Per Station | \$ 67,415 | \$ 49,069 | \$- 18,346 | - 27.2% |

*Numbers are used rather than station names in order to prevent identification of individual stations. The numbers are changed from table to table for the same reason.

As can be seen by these figures, the average daily traffic flow along the old route was cut approximately in half when the new route was opened. Also, the traffic rate on the old route had not appeared to build back toward its previous level through 1957. Traffic on the new route, however, has continually increased each year so that the total traffic for the area in 1957 was substantially above the 1954 level.

Several operators complained of loss of truck traffic because of the bypass facility. On the other hand, some indicated that increased business from local traffic appeared to have replaced that from traffic diverted to the bypass to some extent, and that better management methods might further balance out losses attributable to the loss of through traffic. A few operators mentioned other factors, such as the loss of trade incidental to a reduction in personnel at nearby Fort Hood, and that 1957 was a bad year for all businesses in Temple.

Both Tables 3 and 4, however, would seem to indicate that the diversion of traffic to the new bypass had a definite negative effect on the dollar volume of business done by the service stations along the old route of U. S. 81.

Table 5, on the other hand, shows that the loss in volume has been accompanied by corresponding decreases in the hours of operation of most of the stations. The significance of these reductions in operational times is twofold. First, they corroborate and confirm the previously shown dollar and gallonage sales data which show a general decline in service station business. Secondly, they show the manner in which the operators have been meeting or adjusting to the losses in their business operations. It is outside the scope of this study to attempt to determine the possible effect on sales if such reductions in working hours had not been made. It is obvious,

however, that the majority of operators in this group have considered that the possibilities for cost savings through reduced working hours outweigh the possibilities for greater sales volume that may be brought about through longer operational hours.

Gasoline Gallonages Retailed—The possible negative effect of the new bypass facility on the business done by service stations on old route U. S. 81 is apparently borne out by a study of Table 6. It presents data concerning the gasoline gallonages retailed by these stations during the years 1954 and 1957. The data presented are based on jobber records of gasoline sales and are considered to be an accurate measure of the actual business level of the particular businesses.

Of 18 stations in operation in both 1954 and 1957 along the old route of U. S. 81, 16 showed decreases in the amount of gasoline retailed in 1957 as compared to 1954. Percentages of decrease ranged from 1.2 percent to 88.9 percent, with an average decrease for the 18 stations of 30.2 percent over the study period. Of the 18 stations, however, two showed increases of 9.1 percent and 89.3 percent in 1957 over 1954.

About two-thirds of the volume lost by the 18 old firms can be accounted for by internal competition from new businesses. The five new stations which were opened between 1954 and 1957 sold a total of 560,839 gallons of gasoline in 1957. This meant that the total

Table 4
CHANGE IN CALCULATED DOLLAR VOLUMES OF ALL STATIONS ON OLD U. S. 81 IN TEMPLE FOR PERIOD 1954-57

| Stations | Year 1954 | Year 1957 | Percent Change |
|--|-------------|-----------|----------------|
| | (Dollars) | (Dollars) | (Percent) |
| Thirteen Reporting Old Stations—Actual | \$ 876,400 | \$637,900 | -27.2% |
| Three Nonreporting Old Stations—Calculated* | 147,000 | 72,200 | -50.9 |
| Two Old Stations that closed during 1957** | 40,300 | 4,900 | -87.8 |
| Total 18 Old Stations | \$1,063,700 | \$715,000 | -32.8% |
| Three Operating New Stations*** | -0- | 208,100 | |
| Two New Stations that Closed during 1957**** | -0- | 25,200 | |
| Total 5 New Stations on Old Route | -0- | \$233,300 | |
| Total 23 Stations on Old Route | \$1,063,700 | \$948,300 | -10.8% |

*Estimates based on volumes of gasoline sold by these three stations and the average dollar return per gallon of gasoline sold for all reporting stations during 1954 and 1957.

**Estimates based on jobber records of gasoline volume and average returns per gallon as above.

***Dollar sale figures were not available for one station. Estimate based on gasoline volume and average return per gallon for 1957.

****Estimates for both stations based on gasoline volume and average return per gallon for 1957. Both stations were in operation during a part of 1957.

Table 5
COMPARISON OF OPERATING TIME PERIODS IN RELATION TO CHANGES IN BUSINESS VOLUME

| Station | Daily Hrs. of Operation 1954 | Days of Operation Per Week 1954 | Annual Hrs. of Operation 1954 | Daily Hrs. of Operation 1957 | Days of Operation Per Week 1957 | Annual Hrs. of Operation 1957 | Percent Change in Annual Hrs. of Operation | Percent Change in Volume of Hrs. 1954-57 |
|-------------------|------------------------------|---------------------------------|-------------------------------|------------------------------|---------------------------------|-------------------------------|--|--|
| | (Hours) | (Days) | (Hours) | (Hours) | (Days) | (Hours) | (Percent) | (Percent) |
| 1 | 24 | 7 | 8,736 | 13 | 7 | 4,732 | -45.8% | -16.8% |
| 2 | 15 | 7 | 5,460 | 12 | 6 | 3,744 | -31.4 | -87.5 |
| 3 | 24 | 7 | 8,736 | 14 | 7 | 5,096 | -41.7 | -30.8 |
| 4 | 14 | 7 | 5,096 | 13 | 7 | 4,732 | -7.1 | -62.6 |
| 5 | 14 | 7 | 5,096 | 14 | 7 | 5,096 | | +89.3 |
| 6 | 16 | 7 | 5,824 | 13 | 7 | 4,732 | -18.8 | -1.2 |
| 7 | 18 | 7 | 6,552 | 14 | 7 | 5,096 | -22.2 | -26.9 |
| 8 | 24 | 7 | 8,736 | 15 | 7 | 5,460 | -37.5 | -10.2 |
| 9 | 24 | 7 | 8,736 | 14 | 7 | 5,096 | -41.7 | -55.1 |
| 10 | 13 | 6 | 4,056 | 13 | 6 | 4,056 | | +9.1 |
| 11 | 16 | 7 | 5,824 | 13 | 6 | 4,056 | -30.4 | -79.1 |
| 12 | 15 | 7 | 5,460 | 14 | 7 | 5,096 | -6.7 | -1.4 |
| 13 | 24 | 7 | 8,736 | 24 | 7 | 8,736 | | -28.8 |
| 14 | 14 | 6 | 4,368 | 14 | 6 | 4,368 | | -14.7 |
| 15 | 14 | 7 | 5,096 | 13 | 7 | 4,732 | -7.1 | -34.5 |
| 16 | 15 | 7 | 5,460 | 12 | 6 | 3,744 | -31.4 | -40.0 |
| 17 | 16 | 7 | 5,824 | 16 | 7 | 5,824 | | -46.7 |
| 18 | 15 | 7 | 5,460 | 16 | 7 | 5,824 | +6.7 | -67.5 |
| Total 18 Stations | | | 113,256 | | | 90,222 | -20.3% | -10.8% |

sales along the old route were brought up to over 2 1/2 million gallons during 1957. This was about 10.3 percent less than the total sales for 1954 (see Table 7).

This loss in total gasoline gallonages retailed compares very well with the percentage loss in gross dollar volume of business (10.8 percent) previously presented. It also indicates that the new bypass facility, through its diversion of traffic from old route U. S. 81, has probably produced a definite negative effect on the service station business done along the old route.

Table 6
CHANGES IN GASOLINE GALLONAGE SALES OF 18 SERVICE STATIONS IN OPERATION ALONG OLD U. S. 81 IN TEMPLE DURING 1954 AND 1957

| Station | Gasoline Volume 1954 | Gasoline Volume 1957 | Gasoline Volume Change 1954 to 1957 | Percent Change 1954-1957 |
|---------------------|----------------------|----------------------|-------------------------------------|--------------------------|
| | (Gallons) | (Gallons) | (Gallons) | (Percent) |
| 1 | 228,156 | 157,956 | -70,200 | -30.8% |
| 2 | 93,000 | 34,797 | -58,203 | -62.6 |
| 3 | 84,566 | 70,363 | -14,203 | -16.8 |
| 4 | 144,000 | 18,000 | -126,000 | -87.5 |
| 5 | 87,095 | 9,513 | -77,582 | -88.9 |
| 6 | 180,600 | 131,388 | -49,212 | -22.7 |
| 7 | 187,172 | 184,995 | -2,177 | -1.2 |
| 8 | 103,680 | 196,344 | +92,664 | +89.3 |
| 9 | 6,658 | 1,429 | -5,229 | -78.5 |
| 10 | 264,595 | 188,395 | -76,200 | -28.8 |
| 11 | 231,771 | 208,193 | -23,578 | -10.2 |
| 12 | 411,672 | 184,968 | -226,704 | -55.1 |
| 13 | 203,052 | 200,148 | -2,904 | -1.4 |
| 14 | 128,675 | 109,736 | -18,939 | -14.7 |
| 15 | 171,884 | 35,961 | -135,923 | -79.1 |
| 16 | 105,734 | 115,310 | +9,576 | +9.1 |
| 17 | 76,832 | 50,310 | -26,522 | -34.5 |
| 18 | 113,658 | 72,785 | -40,873 | -40.0 |
| Total 18 Stations | 2,822,800 | 1,970,551 | -852,209 | -30.2% |
| Average Per Station | 156,822 | 109,475 | -47,347 | -30.2 |

Service Stations (New Route)

Only one service station was established on the new bypass facility on U. S. 81 within the study area by the end of 1957. This station was built in anticipation of a heavy traffic flow along the new facility. The operator of this station furnished an estimate of the dollar volume of his business, but in order to preserve individual information it will not be revealed. It was felt by the operator that if a crossover were located in front of the present site of the station, the volume of business might be doubled.

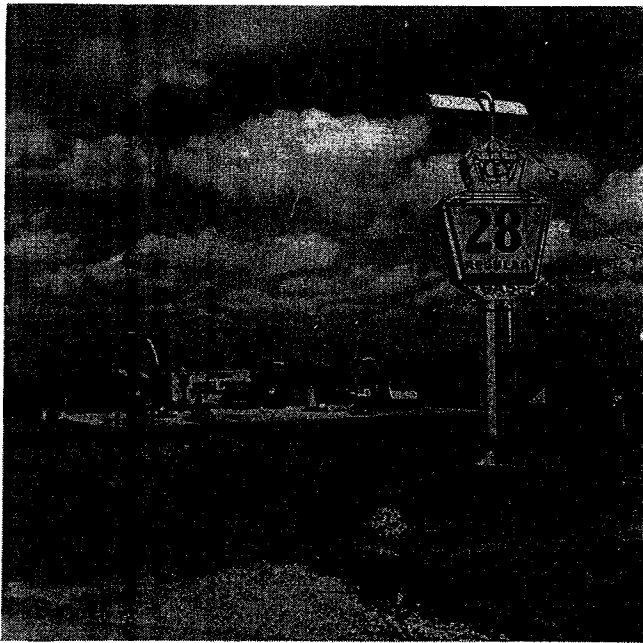
Service Stations (New Route and Old Route)

Since only one service station has been constructed on the new route, and since a comparison of the net effect of the bypass on the area as a whole would entail revealing this figure, such a comparison will not be made. A few general statements, however, may be in order.

One of the major problems in a study such as this is to assign the proper casual factors in the proper amounts to the measured changes that have been isolated. This study is no exception. For example, the factors which have affected the over-all retail sales activity of Temple could be expected to influence the service station operators along old U. S. 81 as well. Whether these

Table 7
CHANGE IN CALCULATED GASOLINE GALLONAGE, SALES OF ALL STATIONS ON OLD U. S. 81 FOR PERIOD 1954-1957

| Item | Year 1953 | Year 1957 | Percent Change |
|-----------------------|-----------|-----------|----------------|
| | (Gallons) | (Gallons) | (Percent) |
| Eighteen Old Stations | 2,822,800 | 1,970,551 | -30.2% |
| Five New Stations | | 560,839 | |
| Total 23 Stations | 2,822,800 | 2,531,390 | -10.3% |



This independent service station was located on the new bypass after it was opened to traffic.

factors would affect these stations to a greater or lesser degree than other retail businesses of the city, however, is very difficult to determine. It is perhaps significant, however, that in the face of steadily rising travel, automobile sales and gasoline sales over the rest of the State, gasoline sales along both routes of U. S. 81 in Temple declined about 10 percent. Total retail sales in the city declined about 11 percent during the same period* (see Table 15).

It must be remembered, however, that 10 of the 13 stations along the old route of U. S. 81 did report definite losses in business after the construction of the bypass. Some loss must, obviously, be attributed to the diversion of traffic to the facility. Operator opinion, as has been noted, holds to this line of reasoning.

Motels (Old Route)

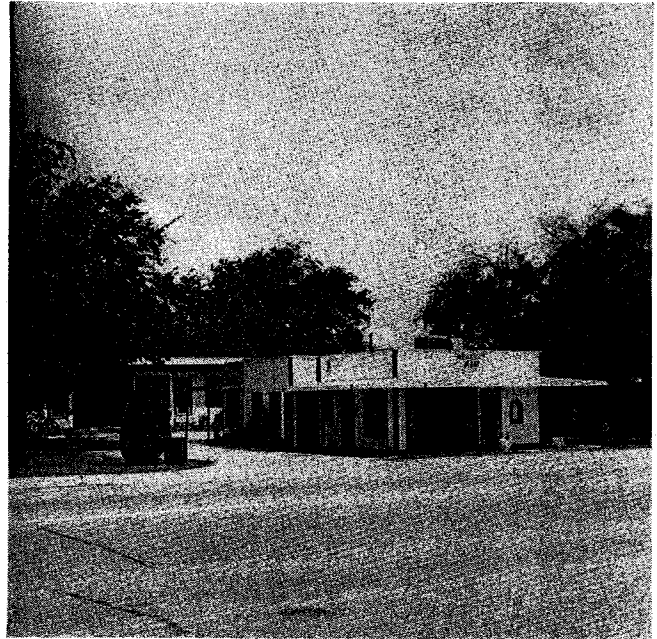
Five motels were located within the study area on old route U. S. 81. All were called upon for interviews, but complete data were available from only four of these. Of the four motels, one might be classified as "average," and three as "below average." None of the motels located within the study area could be considered a "luxury" type motel. It may be generalized that lodging facilities along old route U. S. 81 are somewhat lower in quality than the general public has come to expect, with current rates ranging from \$2.50 to \$4.00 for a single room.

During the interviews, statistical data regarding dollar volumes of business for 1954 and 1957, change (if any) in relative property values for the two years under study, and change in clientele and occupancy rate were requested.

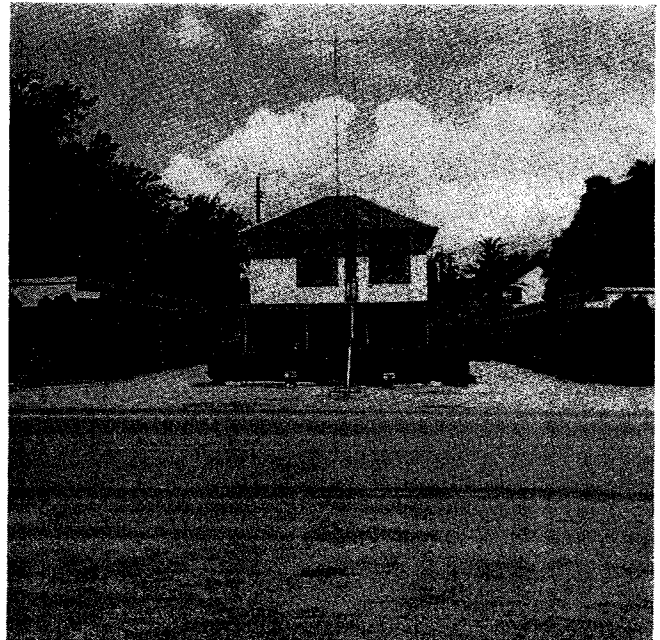
*Based on information supplied by Bureau of Business Research, University of Texas, Austin, Texas (see Table 15).

Dollar Volume of Business (1954 and 1957)—Table 8 presents comparisons of the dollar volumes of business reported by the four motel operators from whom data were available. Of significance is the fact that, as in the Austin area, the motels along old route U. S. 81 suffered a very sharp decrease in over-all dollar volume of business in 1957 following the opening of the new bypass facility.

In 1954, the four reporting operators reported gross motel business of \$53,900, or an average of \$13,475 per motel. The same four operators reported for 1957 only \$24,600, an average of \$6,150 per motel. These figures indicate a decrease of 54.4 percent in dollar volume of business in 1957, as opposed to 1954.



One of the motels on North 3rd Street—Old Route.



Another motel located within the study area.

As has been noted, motels, unlike service stations, have little or no opportunity to make up losses caused by diversion of transient traffic through increased "local" trade. Hence the diversion of transient traffic caused by the construction of the new bypass facility on new route U. S. 81 evidently had a very significant effect upon area motel business. This conclusion is borne out of the fact that of the three classes of traffic-serving establishments (service stations, motels, and restaurant and food service facilities), motels suffered the greatest relative losses in dollar volumes of business in each instance.

Property Values (1954 and 1957)—As might be expected, the property values of these motels also declined sharply between 1954 and 1957. The four reporting motel operators estimated the gross over-all value of their properties at \$232,000 in 1954 (see Table

Table 8
CHANGES IN DOLLAR VOLUME OF FOUR MOTELS ALONG OLD U. S. 81 IN TEMPLE DURING PERIOD 1954-1957

| Motel Number | Dollar Volume 1954 | Dollar Volume 1957 | Change in Dollar Volume 1953-1957 |
|-------------------|--------------------|--------------------|-----------------------------------|
| | (Dollars) | (Dollars) | (Percent) |
| 1 | * | * | -44.3% |
| 2 | * | * | -72.4 |
| 3 | * | * | -57.1 |
| 4 | * | * | -28.8 |
| Total | \$53,900 | \$24,600 | -54.4% |
| Average Per Motel | \$13,475 | \$ 6,150 | |

Table 9
CHANGES IN ESTIMATED PROPERTY VALUE OF FOUR MOTELS LOCATED ALONG OLD U. S. 81 IN TEMPLE DURING THE PERIOD 1954-1957

| Motel Number | Property Value 1954 | Property Value 1957 | Changes in Property Value 1954-1957 |
|-------------------|---------------------|---------------------|-------------------------------------|
| | (Dollars) | (Dollars) | (Percent) |
| 1 | * | * | -50.0% |
| 2 | * | * | -50.0 |
| 3 | * | * | -45.0 |
| 4 | * | * | -18.2 |
| Total | \$232,000 | \$128,000 | -44.8% |
| Average Per Motel | \$ 58,000 | \$ 32,000 | |

Table 10
CHANGES IN OCCUPANCY OF FIVE MOTELS ALONG OLD U. S. 81 IN TEMPLE DURING PERIOD 1954-1957

| Motel Number | 1954 | | | 1957 | | | 1954-1957 |
|--------------|-----------------|-----------------------------|-----------------------------|-----------------|-----------------------------|-----------------------------|-----------------------|
| | Normal Capacity | Avg. Nightly Occupancy Rate | Avg. Nightly Occupancy Rate | Normal Capacity | Avg. Nightly Occupancy Rate | Avg. Nightly Occupancy Rate | Change From 1954-1957 |
| | (Number) | (Percent) | (Number) | (Number) | (Percent) | (Number) | (Percent) |
| 1 | 18 | 85% | 15 | 18 | 60% | 11 | -26.7% |
| 2 | 36 | 90 | 32 | 36 | 60 | 22 | -43.8 |
| 3 | 36 | 100 | 36 | 36 | 50 | 18 | -50.0 |
| 4 | 16 | 90 | 14 | 16 | 25 | 4 | -71.4 |
| 5 | 48 | 90 | 43 | 18 | 50 | 24 | -44.2 |



A modern new motel is presently under construction at the northern end of the New Route study area.

9), but at only \$128,000 in 1957. These figures represent a drop in average estimated property value of from \$58,000 per motel in 1954 to \$32,000 per motel in 1957, or a gross decline of 44.8 percent.

Such operator opinion as was obtainable from the operators of the motels along old route U. S. 81 held the bypass directly responsible for the sharp decrease in tourist trade. They also held that the decrease in business was directly responsible for the decline in the estimated value of their properties.

Occupancy—Table 10 indicates a 61 percent drop in the relative occupancy rate of the motel units in 1957 as compared with occupancy in 1954. This bears out the picture presented by the decrease in business volume of the motels, and corresponds with the decline in their property values.

Motels (New Route)

No motels were located within the study area along the new route of U. S. 81.

It should be noted, however, that several motels have been constructed on new route U. S. 81 south of

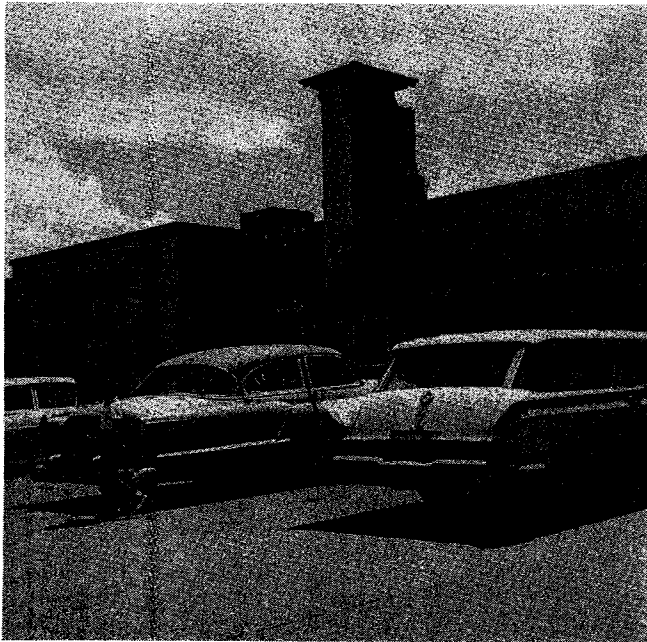
the study area. Some of these were in operation before and during 1957, and without doubt attracted a good portion of the overnight transient traffic which might otherwise have done business with the four reporting motels along old U. S. 81.

Restaurants and Food Service Establishments (Old Route)

Thirteen restaurant and food service establishments were located within the study area on old U. S. 81. Two of these were closed at the time the study was made and the interviewer's repeated efforts to contact the operators were unsuccessful. Operators of the remaining 11 establishments were interviewed, but two refused to cooperate and three were unable, because of recent changes in management, to furnish much useful information. No new restaurants had been established in this area after 1954.

Of the 11 establishments interviewed, four were primarily restaurants, six combined restaurant and drive-in service and one combined drive-in food service and tavern facilities. Two of the six completed interviews were of restaurants, while the other four were of restaurant-drive-in combinations. In the interviews data were requested concerning both the dollar volume of business for 1954 and 1957 and variations in clientele for the same period.

Dollar Volume of Business (1953 and 1957)—Table 11 presents comparisons of the changes in dollar volumes of business reported by the six operators of restaurants and food service establishments who furnished data. It will be noted that all operators indicated losses in business in 1957, as compared to business done in 1954. These losses ranged from \$1,000 to \$30,000 dollar-wise and from 1.5 percent to 55.6 percent. Over-all dollar volumes of business were reported as \$369,500 in 1954, and \$315,500 in 1957, representing an over-all decline



One of the restaurants located on the Old Route. No restaurants have yet been located on the New Route.

Table 11
CHANGES IN DOLLAR VOLUME OF RESTAURANTS
ON OLD U. S. 81 IN TEMPLE 1954-1957

| Restaurant Number | Year 1954 | Year 1957 | Change From 1954-1957 |
|-------------------|------------------|------------------|-----------------------|
| | (Dollars) | (Dollars) | (Percent) |
| 1 | * | * | - 1.5% |
| 2 | * | * | -55.6 |
| 3 | * | * | - 2.1 |
| 4 | * | * | -16.9 |
| 5 | * | * | - 1.8 |
| 6 | * | * | -10.0 |
| Total | \$369,500 | \$315,500 | -14.6% |

in business of 14.6 percent in 1957, as compared with business done in 1954.

Operator opinion in general held the construction of the new bypass and the movement of a large number of troops out of Fort Hood to be the two factors most directly responsible for the decline in their dollar volumes of business. It is of significance that a restaurant which was a major center of attraction for troops from Fort Hood suffered one of the sharpest declines in dollar volume of business. The operator of this restaurant believed that the troop movement and the bypass construction, were jointly responsible for the sharp decline in this business. He was unable to estimate, however, which of the factors had the greater effect. One of the establishments showing a minimum decline relied heavily on local trade. Its operator reported that he was "glad to see the heavy traffic on the old route relieved."

From the information gathered from these operators, it seems reasonable to conclude that the bypass on new route U. S. 81 had the greatest negative effect upon those restaurants and food service establishments which relied primarily on heavy traffic flow, or tourist trade, and least upon these which relied primarily on local trade. This conclusion correlates satisfactorily with findings concerning the same types of establishments along the old route of U. S. 81 in the Austin area, and with the information shown in Table 12.

Changes in Clientele (1953 and 1957)—Table 12 presents information concerning variations in type of clientele reported by operators of the six restaurants and food service establishments furnishing data.

Of chief significance is the fact that the average weekly patronage of the seven reporting establishments declined 24.8 percent in 1957, as opposed to 1954. This figure, of course, is substantially in line with the corresponding drop in dollar volume of over-all business over the same period.

The change in type of clientele from transient to local clients was marked, as was the gross decline in clientele. In 1954, the percentage of weekly patrons was estimated by operators to be approximately 77 percent local and 23 percent transient. In 1957, the percentage estimated by operators was almost 96 percent local and less than 5 percent transient. If the operators are correct in their estimates, these figures would clearly indicate the negative effect that the diversion of traffic to the bypass has had on the restaurants and food service establishments along old route U. S. 81.

Table 12
CHANGES IN PROPORTION OF LOCAL AND TRANSIENT CUSTOMERS SERVED BY TEMPLE STUDY AREA
RESTAURANTS IN 1954 AND 1957

| Restaurant Number | 1954 | | | 1957 | | | Change From 1954 to 1957 | | |
|-------------------|------------------------|---------------|-------------------|------------------------|---------------|-------------------|--------------------------|---------------------------|-------------------------------|
| | Total Weekly Customers | Percent Local | Percent Transient | Total Weekly Customers | Percent Local | Percent Transient | Total Weekly Customers | Number of Local Customers | Number of Transient Customers |
| | (Number) | (Percent) | (Percent) | (Number) | (Percent) | (Percent) | (Number) | (Percent) | (Percent) |
| 1 | 1,150 | 70 % | 30 % | 800 | 90 % | 10 % | -30.4 | -10.6% | -76.8% |
| 2 | 1,500 | 70 | 30 | 900 | 95 | 5 | -40.0 | -18.6 | -90.0 |
| 3 | 1,200 | 75 | 25 | 1,050 | 95 | 5 | -12.5 | +10.8 | -82.7 |
| 4 | 1,300 | 65 | 35 | 700 | 95 | 5 | -46.2 | -21.3 | -92.3 |
| 5 | 1,500 | 98 | 2 | 1,500 | 99 | 1 | - 0.0 | + 1.0 | -50.0 |
| 6 | 660 | 80 | 20 | 550 | 99 | 1 | -16.6 | + 3.2 | -96.2 |
| TOTAL | 7,310 | 76.6% | 23.4% | 5,500 | 95.8% | 4.2% | -24.8 | - 5.9% | -86.4% |

Restaurants and Food Service Establishments (New Route)—No restaurants and food service establishments were located within the study area along the new route of U. S. 81.

NONTRAFFIC SERVING BUSINESSES

Nontraffic Serving Businesses (Old Route)

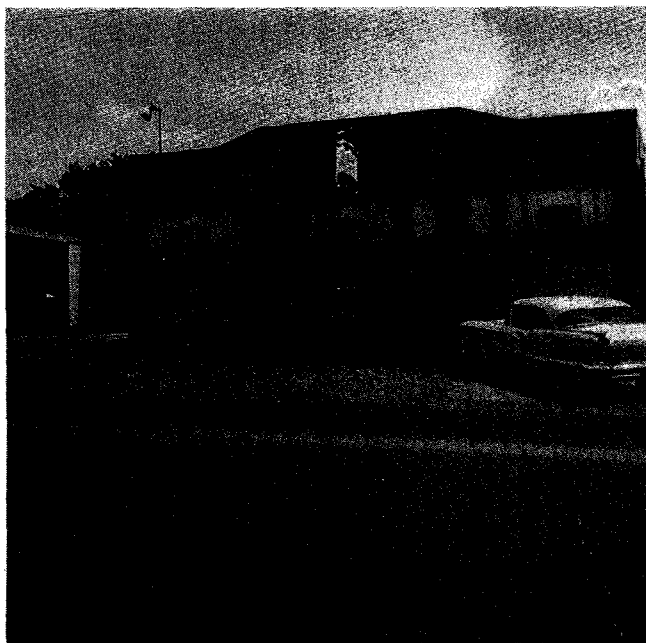
All of the nontraffic serving retail businesses along the old route of U. S. 81 through Temple were contacted. Only 15 interviews were completed, however, and of these only 11 were able to furnish complete dollar volume information for both 1954 and 1957. Operator uncooperativeness, inability to contact past owners, and lack of adequate records kept the rate of response low. One firm was just recently established and had no record of sales for 1954.

Table 13 presents the business volume information obtained from the 11 cooperating businesses. Since the businesses within this area are quite heterogeneous, no attempt has been made to estimate either business vol-

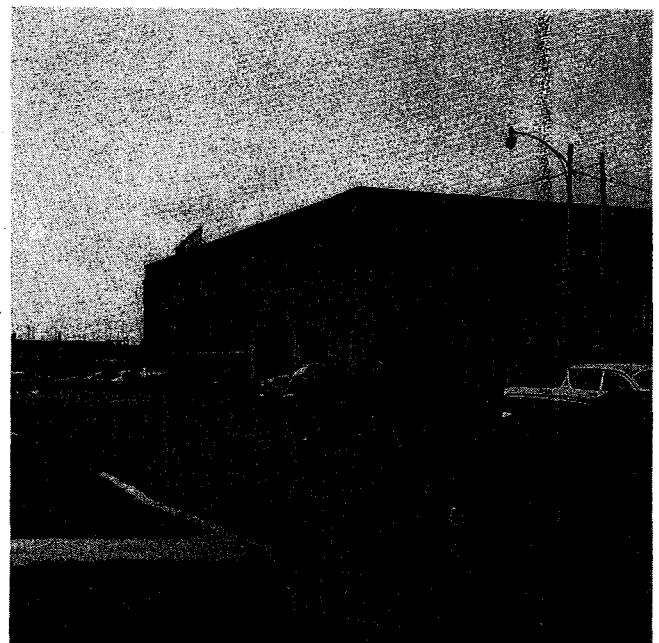
ume or changes in volume from this nonrepresentative sample of firms. Rather, the data in Table 13 is presented as being representative only of the firms included.

It is interesting to note, however, that of these 11 firms, six lost business while five showed an increase. It is also interesting to see that the losses and gain were almost exactly offset dollar wise. The net change for the 11 firms was a small 1.3 percent increase. This increase, though small, takes on greater significance in view of the fact that total estimated retail sales in the Temple area declined over 11 percent during the same period. And, if of no other import, this small increase would indicate that these businesses were unaffected by the construction of the new facility. In fact, it is quite possible that they received an economic stimulant.

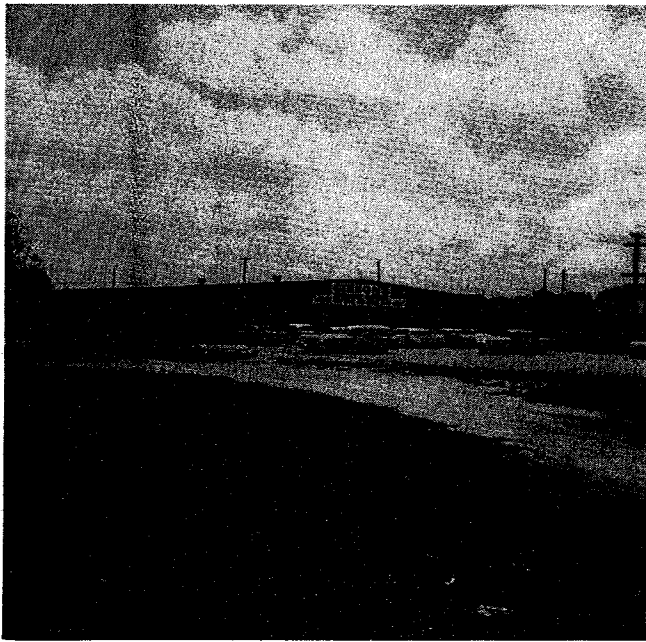
Operator opinion would tend to bear out this belief. The opinions expressed by operators of the nontraffic serving businesses toward the new route generally indicated either indifference or favor. Several felt that the new facility had no particular effect on their operations or on the volume of business done by their firms. A



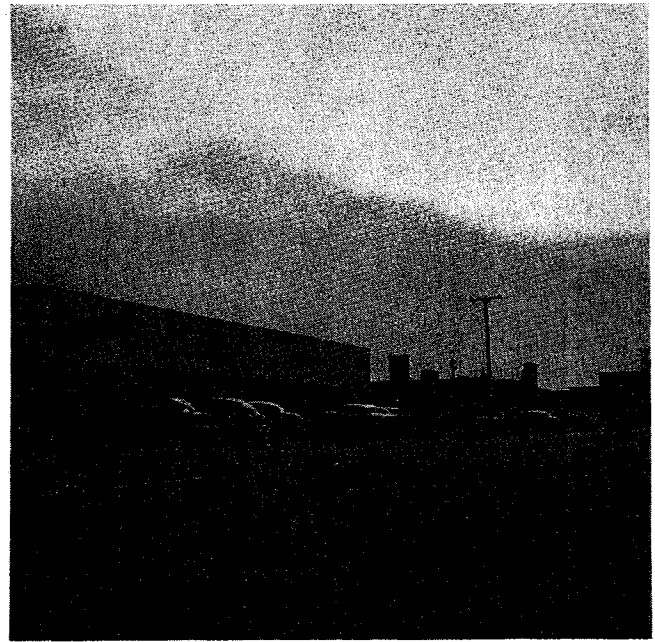
A variety of nontraffic serving retail businesses were located on the Old Route.



These businesses at the corner of Adams and North 3rd were in the downtown area.



This particular business was recently opened near the north end of the Old Route.



A small shopping center had been built further out on North 3rd Street.

Table 13
CHANGE IN DOLLAR VOLUME OF 11 NONTRAFFIC SERVING BUSINESSES LOCATED ALONG THE OLD ROUTE OF U. S. 81 IN TEMPLE FROM 1954 TO 1957

| Business | Dollar Volume 1954 | Dollar Volume 1957 | Percent Change 1954-1957 |
|-----------------------------|--------------------|--------------------|--------------------------|
| | (Dollars) | (Dollars) | (Percent) |
| 1 | \$ 100,000 | \$ 150,000 | +50.0% |
| 2 | 300,000 | 250,000 | -16.7 |
| 3 | 140,000 | 167,000 | +19.3 |
| 4 | 87,400 | 55,800 | -36.2 |
| 5 | 203,000 | 186,000 | - 8.4 |
| 6 | 142,000 | 143,000 | + .7 |
| 7 | 400,000 | 500,000 | +25.0 |
| 8 | 130,500 | 90,200 | -30.9 |
| 9 | 142,000 | 94,200 | -33.7 |
| 10 | 550,000 | 675,000 | +22.7 |
| 11 | 150,000 | 65,000 | -56.7 |
| Total | \$2,344,900 | \$2,376,200 | + 1.3% |
| Average Per Business | 213,173 | 216,018 | |

number of the operators reported that they were glad to see the heavy truck traffic rerouted. Still others mentioned relief of traffic congestion as a desirable result of the new route. In only one case did an operator of a nontraffic serving enterprise feel that his business had been hurt by the new route, and this operator could offer no relation between the drop in his business volume (a drop of 5 percent) and the existence of the new facility. Methods of business operation and lease terms which were also obtained, were felt to have no particular significance in the study.

Nontraffic Serving Businesses (New Route)

By the end of 1957 some 10 nontraffic serving businesses had located on the bypass within the city limits of the study area. These were interviewed, but only two could furnish complete dollar volume of business figures

for 1957. Of the eight operating businesses, two have been in their present locations for less than one year, five have been in their locations for from one to two years, and one has been established in its location for eight years. Two of the businesses are primarily used as storage facilities, and no constructive data was obtained.

Operator opinion as to the desirability of the location on the Interstate Highway was relatively consistent. Among the factors mentioned were the relative price and availability of large size tracts, the accessibility to heavy trucks, the accessibility to customers and employees, the probability of increased commercial development with



Livestock auction barn located on east side of bypass.

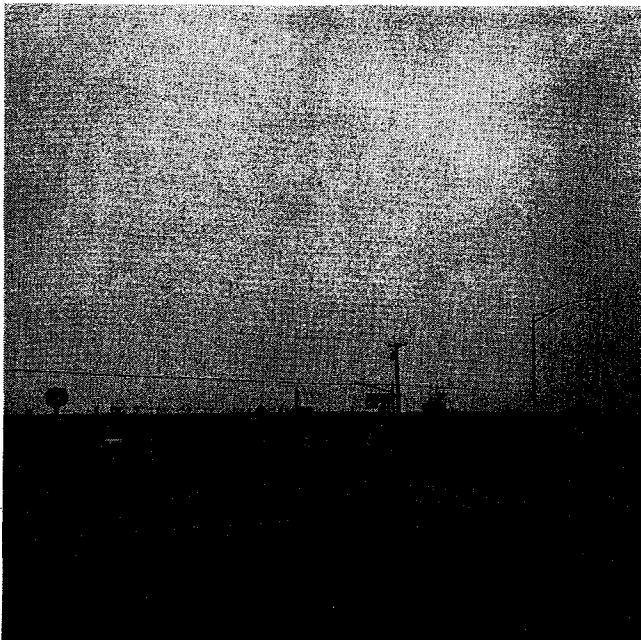


Grain storage warehouse located on west side of bypass near railroad.

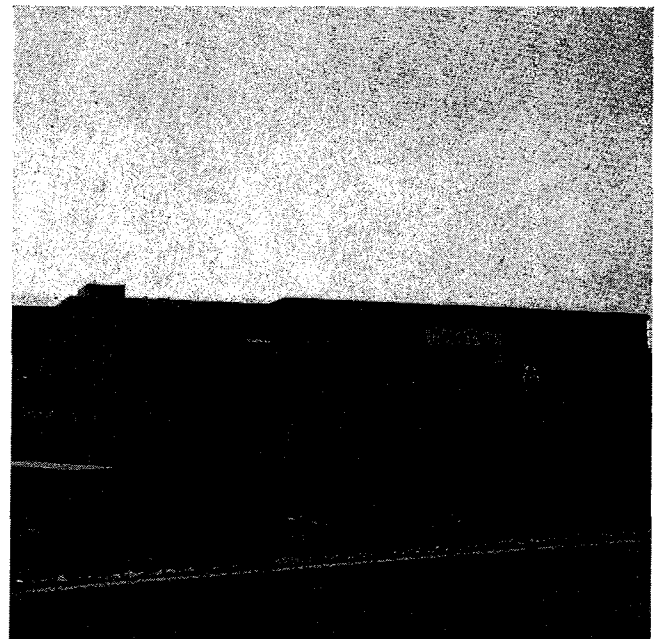
corresponding increases in property values, and the ease of direct routing to other major cities and towns. No particular complaints about the location were made by any operator on the new route. Most of the operators felt that the sites were as good or better than they had expected them to be.

AREA BUSINESS

Since the data on nontraffic serving firms were not considered to be adequate samples, they could not be combined with those of traffic serving businesses into an area total. Table 14 shows all the traffic serving business



Service station on west side of bypass.



Commercial firm located on east side of bypass.

in the area combined into such a total, however. Perhaps the most important figure in this table is the percentage change of total traffic serving business from 1954 to 1957. This shows a decline of 11.8 percent.

Of the three types of traffic serving establishments studied, motels with a drop of 54 percent, suffered the

Table 14
CHANGES IN TOTAL DOLLAR VOLUME OF ALL TRAFFIC SERVING BUSINESSES IN THE TEMPLE STUDY AREA 1954-1957

| Item | Year 1954 | Year 1957 | Change From 1954 to 1957 |
|-------------------|-------------|-------------|--------------------------|
| | (Dollars) | (Dollars) | (Percent) |
| Service Stations* | \$1,063,700 | \$ 989,500 | - 7.0% |
| Motels** | 67,375 | 30,750 | -54.0 |
| Restaurants*** | 800,613 | 683,583 | -14.6 |
| TOTAL | \$1,931,688 | \$1,703,833 | -11.8% |

*To avoid revealing individual data, the station on the new route was estimated at the same volume level as the average for all other stations during 1957.

**Expanded to include one motel for which data was unavailable. Percentage change remains constant.

***Nonreporting restaurants were estimated to be operating at same level as the average for reporting restaurants in both 1954 and 1957.

Table 15
INDEX OF RETAIL SALES*, TEMPLE, 1954 THROUGH 1957

| Year | Index | Percent Change From 1954 |
|------|--------|--------------------------|
| 1954 | 100.00 | |
| 1955 | 104.00 | + 4.00% |
| 1956 | 89.45 | -10.55 |
| 1957 | 88.55 | -11.45 |

*Constructed from data supplied by the Bureau of Business Research, Austin, Texas.

greatest proportionate decline in over-all dollar volume of business. Restaurants and food service establishments were next hardest hit with an indicated over-all decline of 14.6 percent while service stations with a decline of 7.0 percent were least affected. The nontraffic serving establishments as a whole did not appear to be greatly affected by the new bypass facility during the study period. The ones interviewed showed an over-all increase in dollar volume of 1.3 percent.

These facts are all of more significance if considered in relation to the Temple area retail sales index for

the years 1954-1957. Over-all Temple retail sales, based on total dollar volumes, showed a decline of 11.45 percent in 1957 as compared to 1954 (see Table 15). Thus the over-all traffic serving business within the study areas would appear to have been affected no more than the City of Temple as a whole. Nontraffic serving business, on the other hand, may have fared much better than Temple retail sales as a whole. If so, this would seem to indicate that the new bypass facility had no large measurable over-all effect upon the total business of its area.

Conclusion

There can be no doubt that the construction of Interstate 35 around Temple has created significant changes in the area. The exact measurement and precise classification of these changes, however, is quite difficult.

In terms of land values there is no question of the influence of the facility. Land prices within the study area increased at an extremely rapid rate after the location of the new highway was established. This increase began while the road was being constructed and continued throughout the study period. Land prices increased by more than 1300 percent in the study area compared to an increase of only 40 percent in the control properties.

Changes in land use are not as readily apparent as the changes in values would seem to indicate. Actually a considerable amount of the price increase was due to the speculative activity on the part of realtors and anticipatory buying by businessmen in an attempt to secure desirable sites for business expansion or relocation. In most instances these building plans were of a longer range nature and had not been actually carried out during the limited time period covered in this study. For this reason the visible or apparent land use was not greatly changed between 1948 and 1957. In terms of type of ownership, availability, and strength of holding, however, land use had changed considerably.

Commercial development along the new route has been fairly slow. This is particularly true of traffic-oriented establishments. This can probably be explained at least in part by the economic conditions of Temple as a whole during the study period. The declining retail sales volume and generally poor economic climate of the city during the period 1954-1957 has not stimulated rapid capital expansion in the area. The loss in manpower at nearby Fort Hood has also probably influenced

the rate of new development as well as the level of retail sales.

Since this study was completed the rate of commercial development within the areas has increased tremendously. In addition present building plans call for a continued rapid development of this area.

The old route of U. S. 81 went through downtown Temple. The businesses which had been established along this route were primarily traffic serving in nature and in general had been in operation for a considerable period of time. The diversion of through traffic to the new route was considered by operators of these traffic serving businesses to have decreased their total sales volume. Our interviews indicated an over-all decrease in excess of 12 percent for all the traffic serving firms on the old route.

It is not possible to determine with a high degree of certainty the extent to which this loss was caused by the diversion in traffic and the extent to which it reflected the over-all decline in Temple business activity. It was believed, however, that the large decline in specific types of traffic-oriented businesses such as motels and restaurants was largely brought about by the diversion of through traffic to the new route.

Nontraffic serving businesses on the other hand, appeared to have received an economic stimulant from the reduced traffic flow. The firms that were willing to reveal their sales records showed a small increase in sales while the sales in the city as a whole declined.

Over-all, then, it could be said of businesses on the old route that certain types of traffic serving businesses such as motels and restaurants were adversely affected by the new route. Other traffic serving businesses such as service stations were largely unaffected and the non-traffic oriented businesses received some benefits from the route change.

APPENDIX

Objectives and Procedures

Objectives:

One of the principal objectives of this study was to measure any changes in land values that occurred during a specified period of time within given areas near the Interstate Highway System. A second part of this objective was to determine the extent to which these changes might be attributed to or associated with the construction and operation of that facility. Another principal objective was to determine the changes in land use that may have occurred within these same areas, and to attempt to explain these changes in terms of influence by the facility. Still another objective was to determine the relationship of land use to land values, as land in the area of the highway facilities progresses through sequential uses. A final objective was to determine the effect of the highway facility upon over-all business activity in the areas which were served by it.

Procedures:

A uniform set of procedures was developed for use in each of the study areas. Except where local conditions made deviations necessary, the same procedures were followed in each area.

A. The procedures followed in developing and analyzing the land value information were as follows:

1. Area Selection:

A general area was first selected for study. The Interstate Highway facilities in this area had in the opinion of the Project Advisory Committee, been constructed long enough for changes in land use and land values to become apparent and for variation in over-all area business activity to be discernible. This area was located in and around Temple. It extended along the new route from its intersection with State Highway 36 north to near the point where it rejoined Old U. S. 81.

2. Boundary Selection:

- a. Exterior boundaries of the area were carefully selected to permit the inclusion of the major expected influence zone and still keep the area to a manageable size.
- b. Interior boundaries were drawn so that properties were divided into two classes for analytical purposes—abutting and nonabutting.
- c. Such additional interior divisions as seemed feasible were made in each area.

3. Time Periods:

To measure changes in land value, three time periods were chosen for the study. The

length of each period was determined by the construction schedule for the area. The periods were selected as follows:

- a. Study Period — The study period was the length of time from the completion of construction through 1957 (1955-1957).
- b. Construction Period — The construction period was the time from the announcement of location through completion of construction (1949-1954).
- c. Base Period — The base period was a 6-year period preceding the announcement of construction of the facility (1943-1948). The length of the base period was partially determined by the availability of sales information.

4. Property Identification:

Through use of city records, county maps, A.S.C. aerial photos and State right-of-way strip maps, each piece of property within each study area was identified and the owner recorded.

5. Land Sales:

Through the use of ownership maps, each property transaction was traced through the deed records in the County Clerk's office. Sales prices were recorded from each legitimate sale. In cases where the actual consideration was not revealed, the median of the range as revealed by Federal Revenue Stamps was used. (These stamps are affixed in multiples of \$.55 per \$500.) Since most of the study area properties were located outside the city limits, city tax records, showing evaluations for land and improvements separately, were not available for use. This meant that it was not possible to deduct improvement valuations from total sales prices in most instances. For this reason only unimproved properties were used outside the city limits. Fortunately most of the sales had been made without improvements.

6. Control Areas:

Specific control areas were selected for the Temple study area. These control areas were selected to represent properties similar to those prevalent in the study area prior to construction of the Interstate System. Entire land surveys were used as control areas, and all land sales within each survey were recorded.

7. Statistical Treatment of Sales:

- a. To remove the effect of general inflation over the large number of years studied, each sale was deflated by the Bureau of Labor Statistics' Consumer Price Index (1947 - 1949 = 100). This reduced all sales prices to a common dollar value base.
- b. The sales were next converted to a common price per acre so that comparisons could be made from a common unit base.
- c. All sales were then grouped according to the various classifications being considered.
- d. Changes were shown as both actual and percentage changes.

B. The procedures followed in the analysis of land use changes were as follows:

1. Land use for the last year in the base period was investigated and recorded for each piece of property within the study areas. This use was then compared to the present land use as shown by determinations for 1957.
2. Properties were grouped into eight classes according to the following system of land uses.

a. Agricultural Land

- (1) Used primarily for agricultural purposes.
- (2) Minimum size 10 acres. (Exception: Truck or other intensive type farm minimum size 2 acres.)

b. Land Held for Future Use

- (1) Generally considered to be held for future use rather than its utility at present.
- (2) May be farmed or grazed or used for other agricultural purposes during interim period.
- (3) May be either inside or outside city limits.

c. Rural Residence

- (1) Used primarily as a dwelling place. Must have occupiable house but need not necessarily be occupied.
- (2) Outside city limits.
- (3) Maximum size 10 acres: Larger size becomes either a or b above, depending on whether farming activity is carried on. (Exception: Truck or other intensive type farm maximum size 2 acres.)

d. Urban Residence

- (1) Dwelling unit inside city limits.
- (2) Subdivisions outside city limits.

- (3) Maximum size 5 acres (larger plots will be classed as b above).

e. Commercial-Traffic-Serving

- (1) Any commercial firm deriving more than 50 percent of its income from traffic.

- (2) Primarily nonmanufacturing.

f. Commercial-Nontraffic-Serving

- (1) Any commercial firm deriving less than 50 percent of its income from traffic.

- (2) Primarily nonmanufacturing.

g. Industrial

- (1) Manufacturing firm.

h. Institutional-Municipal

- (1) Any publicly owned property (City, County, State or Federally owned property).

- (2) Any group owned or operated property (churches, schools, cemeteries, etc.).

3. Changes in land use are shown graphically by means of before and after land use maps.

C. The procedures followed in relating changes in land value to changes in land use were as follows:

1. Land use at time of sale was determined according to the classifications in B above for each piece of property that sold. Post sale use was also determined for each property.

2. Each sales card was classified in accordance with the changes in land use attendant to the sale.

3. Analyses were run on each land use classification change. All sales were grouped by use changes and the analysis was made on the basis of relative changes in price.

4. The relationship between the changes in land use and land value are shown both graphically and in tabular form.

D. The procedures followed in determining the effects of the new facilities on retail business activity were as follows:

1. It was decided to use the gross sales figures of retail businesses as the most practical measure of business activity.

2. A complete inventory of businesses along both the old and new routes was made.

3. All retail businesses located on the old route within the study area were personally interviewed by members of the research staff. A concerted effort was made to obtain gross sales figures for both the last year of the study period (1957) and the last year prior to opening the new facility (1954). Addi-

tional information concerning the operation of each business was also obtained.

4. All retail businesses located on the new route were interviewed and a record of 1957 sales was obtained. Since the new route was located on a new location, few businesses were established on them until after the new highway had been opened for business.
5. All businesses were classified into homogeneous groups such as service stations, motels, etc. These groups were then classed as traffic serving or nontraffic serving businesses in accordance with their dependence on traffic for their revenue.
6. In analyzing the effect of the new facility on business activity, as many as six combinations of businesses were used for comparison of each group of businesses. The number of comparisons used depended upon the availability of data in each case. These comparisons are:
 - a. Business Comparisons
 - (1) Cooperating old businesses — old route.
 - (2) Total old businesses — old route (derived by adding in the calculated volumes for noncooperating businesses).

- (3) New businesses — old route (those established after the new facility had opened).
- (4) All businesses — old route.
- (5) New businesses — new route.
- (6) All businesses — both routes.

b. Business Grouping

The purpose in grouping the businesses in this manner was to allow an inspection of the effects on businesses from several viewpoints. We are interested in the influences of the new facility from the following standpoints.

- (1) As it influences particular groups of old firms located on the old route.
- (2) As it influences traffic serving as opposed to nontraffic serving old businesses on the old route.
- (3) As it influences activity of the old route as a whole (old plus new firms).
- (4) As it influences the development within the entire area under study (both old and new routes).

