Economic Impact Study

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WAXAHACHIE, TEXAS

TEXAS TRANSPORTATION INSTITUTE

Bulletin No. 35

(Research Report No. 4-6)

March, 1966

An Economic Impact Study of Interstate Highway 35E On Waxahachie, Texas

by

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Research Report Number 4-6

Economic Impact of the Interstate System
on Selected Areas in Texas

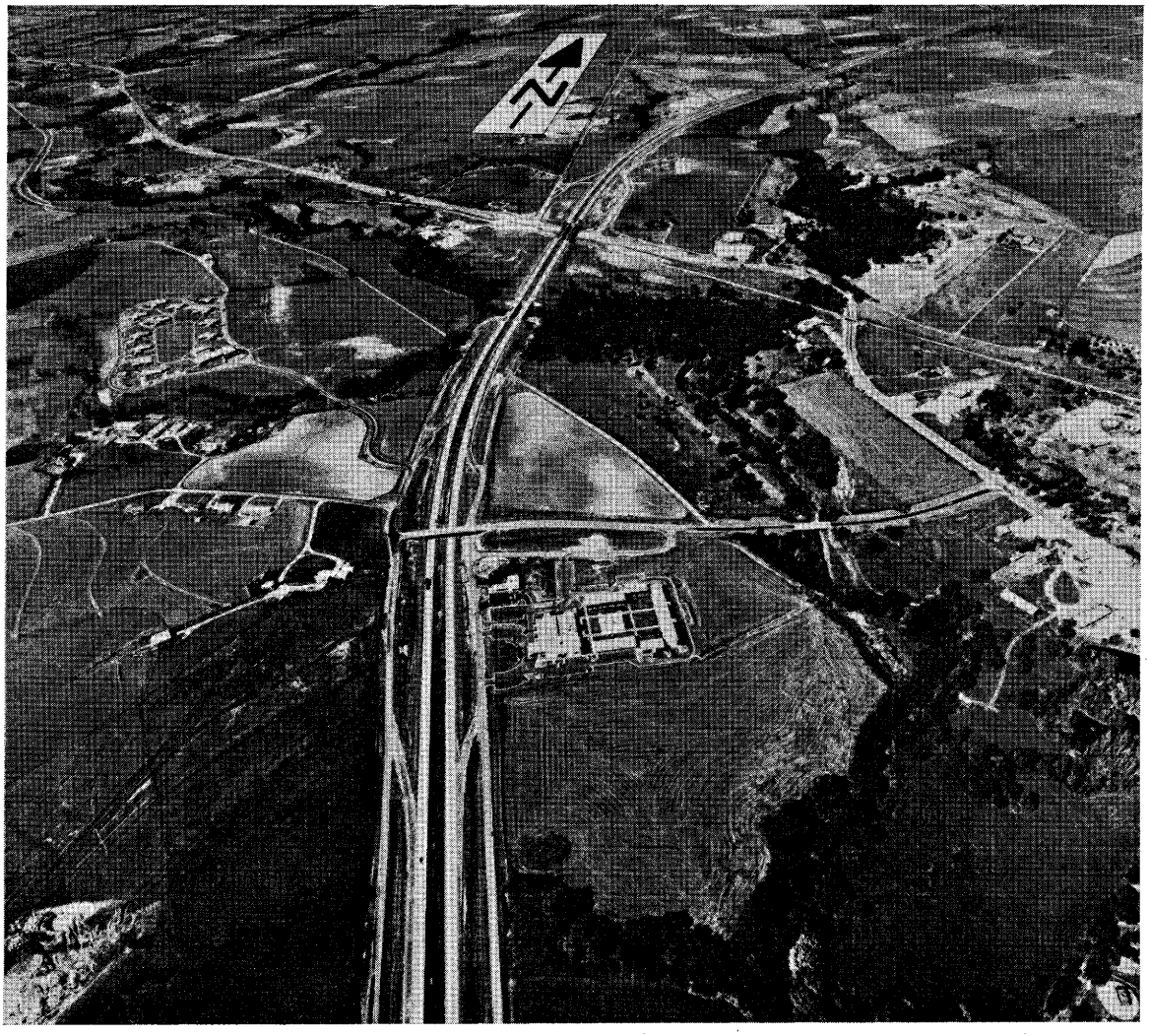
Research Study Number 2-10-57-4

Sponsored by

The Texas Highway Department
in Cooperation with the
U. S. Department of Commerce, Bureau of Public Roads

March, 1966

TEXAS TRANSPORTATION INSTITUTE
Texas A&M University
College Station, Texas



IH 35E Passes Through Agricultural Land In The Waxahachie Study Area

Acknowledgment

The author wishes to express appreciation to all those who helped in both formulating and conducting this study. Special thanks are due to the two sponsoring agencies—the Texas Highway Department and the U. S. Bureau of Public Roads—for their continued support and guidance. Mr. Joe Wright and Mr. Paul Tutt of the Texas Highway Department, and Mr. H. M. Bremer of the U. S. Bureau of Public Roads have been most helpful in guiding this project through their efforts as Advisory Committee. Former members of this committee have made valuable contributions in the past to the study.

Appreciation is expressed also to the many people in Waxahachie whose assistance was critical to the completion of the study. Various real estate dealers, the County Clerk's Office, the County Tax Office, the City Planning Office, and the Waxahachie Title and Abstract Company were especially helpful. To all these people, as well as to the many others too numerous to mention, deepest thanks are expressed.

Other members of the Economics Department of the Texas Transportation Institute have made valuable contributions to the completion of this study. Dr. C. V. Wootan reviewed the final report and co-authored with Mr. C. R. Haning the preliminary report. Mr. H. G. Meuth gave valuable assistance in collection and interpretation of the data. Dr. W. G. Adkins made analytical suggestions and reviewed the material. Mr. Edgar C. McFadden, graduate assistant, performed many of the calculations and tasks necessary to the preparation of the report.

The opinions, findings, and conclusions expressed in this publication are those of the author and not necessarily those of the Bureau of Public Roads.

Foreword

In October, 1957, the U. S. Bureau of Public Roads and the Texas Highway Department authorized the Texas Transportation Institute to conduct studies of the economic impact of the Interstate Highway System on local areas in Texas. The authorization provided for joint financial support by the U. S. Bureau of Public Roads and the Texas Highway Department.

The purpose of the studies was to measure the effects that construction of a segment of the Interstate Highway System has on local areas and communities by analyzing the changes in land value, land use, business activity, travel patterns, and other general community developments.

The study of the Waxahachie area is one of nine studies being conducted under the project agreement. Intensive "before and after" studies have been completed in the nine areas—Austin, Temple, Rockwall, Waxahachie, Merkel, Houston, Huntsville, Conroe, and Chambers County. This volume represents the final report of findings in the Waxahachie area.

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Summary of Findings

The major effects of the Interstate Highway 35E by-pass on land values, land use, business activity, general travel habits, and general community development in the Waxahachie study area are summarized as follows:

1. To date, the new highway by-pass has produced a measurable economic effect on this area. Generally, the area has benefited economically.

2. Acreage land values in the study area increased more than the same in the control area. The highway influence, as reflected in acreage land values, amounted to an increase of about $590 per acre.

3. Abutting land values received a probable highway influence of about $100 per acre more than nonabutting land values.

4. Within the study area a total of 79 acreage tracts changed land use after 1955. Some 46 of these tracts were abutting the new highway. The 79 tracts represented three land uses in 1955 as opposed to seven land uses in 1962.

5. The assumption that land changing to a higher use should command a higher value was generally upheld.

6. Twenty-nine of the old route retail businesses, those furnishing actual gross volumes both study years, showed an actual gross dollar volume increase of 17.8 percent between 1958 and 1962.

7. Nine old route businesses closed between 1958 and 1962, but they were replaced by 10 new ones. In 1963, five additional new businesses were established.

8. Considering all old and new retail businesses on both routes, 36 traffic serving businesses experienced an estimated 13.5 percent decrease in gross sales compared to a 10.1 percent increase by 37 nontraffic serving businesses. All 73 businesses showed a 3.5 percent increase. The control towns experienced greater increases in sales. However, Waxahachie volume is only slightly lower.

9. Various economic indicators studied show that the study area and Waxahachie have experienced considerable economic growth between 1958 and 1962.

10. Although no specific study was made, it is apparent that the new facility has changed the travel habits of the people living in the Waxahachie area. Compared to use of the previous route, many more use this facility to commute north and south to work and shop, as well as for recreational purposes.

Introduction

Purpose of Study

The purpose of this study is to determine the economic effects of a limited access facility of the Interstate Highway System on a local area which is primarily agriculturally oriented, but near a major urban center. The results of such a study may be used in anticipating the economic effects that portions of the Interstate System will (or has had) upon other comparable local areas.

The principal objectives of this study are as follows:

1. To determine the changes that have occurred in land value of a selected area traversed by a part of the Interstate System.

2. To relate the land value changes to the facility from the standpoint of both proximity and cause.

3. To determine the changes in land use that have taken place in the selected area and relate these changes to proximity of the new facility.

4. To determine the relationship of land use to land values in the selected area.

5. To determine the effect of the new highway facility upon over-all business activity along the new and old highway segments in the selected area.

6. To determine the effects of the new facility on general travel habits within the selected area and Waxahachie.

7. To determine other economic changes as might be revealed by a study of the selected area and Waxahachie. Data to be collected would provide an indication of the general community development of the area.

Waxahachie

Waxahachie is one of nine local areas being studied along the Interstate Highway System in Texas. The town is situated 30 miles south of Dallas. As county seat of Ellis County, the city had a population of 12,749 in 1960, about 14 percent higher than 1950. The only other town of any size in the county is Ennis, located 15 miles to the east. (See Figure 1.)

Waxahachie is served by two major highways, three railroads, three truck lines, and three bus lines. The nearest major airport is Love Field in Dallas, 31 miles away. U. S. Highway 287 links with U. S. Highway 75 (IH 45) to the southeast and Fort Worth to the northwest. U. S. Highway 77 (now IH 35E) links Waxahachie with Dallas to the north and Waco, San Antonio, and Laredo to the south. Many farm-to-market roads provide access to Waxahachie from surrounding communities.

Waxahachie is located in the heart of the blacklands. It serves as the market center for the surrounding intensively cultivated farming area and for the expanding cattle raising area. It is also the retail center for Ellis County which had a population of 45,645 and employment of 15,928 persons in 1960. Between 1950 and 1960, the median income in the county increased from $2,180.00 to $3,900.00 or 79 percent. The farm income for Ellis County was over $14,000,000.00 in 1960.

Waxahachie has several important industries which are involved in manufacturing clothing, furniture, oil well equipment, cotton seed products, and livestock feeds. It also has a poultry processing plant. Southwestern Bible College is located in this city.

Interstate Highway 35E

Old U. S. Highway 77 was selected as the general route to be followed by IH 35E. When the design of the route was finalized, the plans called for by-passing all the cities and towns between the major metropolitan areas. Thus Waxahachie was to be by-passed on its most western fringe by a distance sufficient to miss the central business district and most of the residential areas. For the most part, the right-of-way parcels purchased for the facility were agricultural lands which cost much less than any property within the city, and considerably less than that along the old U. S. 77 route.

The by-pass route is 11.5 miles in length, extending from just south of Waxahachie to just north of the community of Sterrett. The right-of-way was purchased by the county during the period July, 1955, through July, 1956. Construction began in August, 1956, and extended through September, 1959; when the entire section was opened to traffic. The Texas Highway Department, in cooperation with the Bureau of Public Roads, paid for the construction costs which amounted to about $4.5 million.

Selection of the Study and Control Areas

The study objectives required the selection of a manageable study area which would yield data that could be used to analyze the effects of the by-pass route. In order to isolate by-pass effects, it also was necessary to select study and control areas comparable in every possible way before the new highway by-pass was constructed around Waxahachie.

Study Area

The study area in Waxahachie consists of most of the 11.5 mile by-pass around the city. Business activity was studied along this segment of the new route as well as along a parallel segment of the old route, U. S. 77, which passes through the city. Land value and land use changes were studied on a .75 to 1.5 mile strip along the by-pass route (See Figure 2). The width of the strip on each side of IH 35E depended upon existing property, land survey lines, and a railroad track serving as a natural barrier between the old and new routes. The Missouri-Kansas-Texas Railroad line runs north and south parallel to the by-pass route, almost midway between IH 35E and U. S. 77. It formed most of the eastern boundary of the study area.

Except for three residential subdivisions and several rural residential tracts, the study area land was in some form of agricultural use or lying idle just before construction of the by-pass. Most of the agricultural land was being used in cotton or feed grain production, although a substantial amount was being used for pasturage.

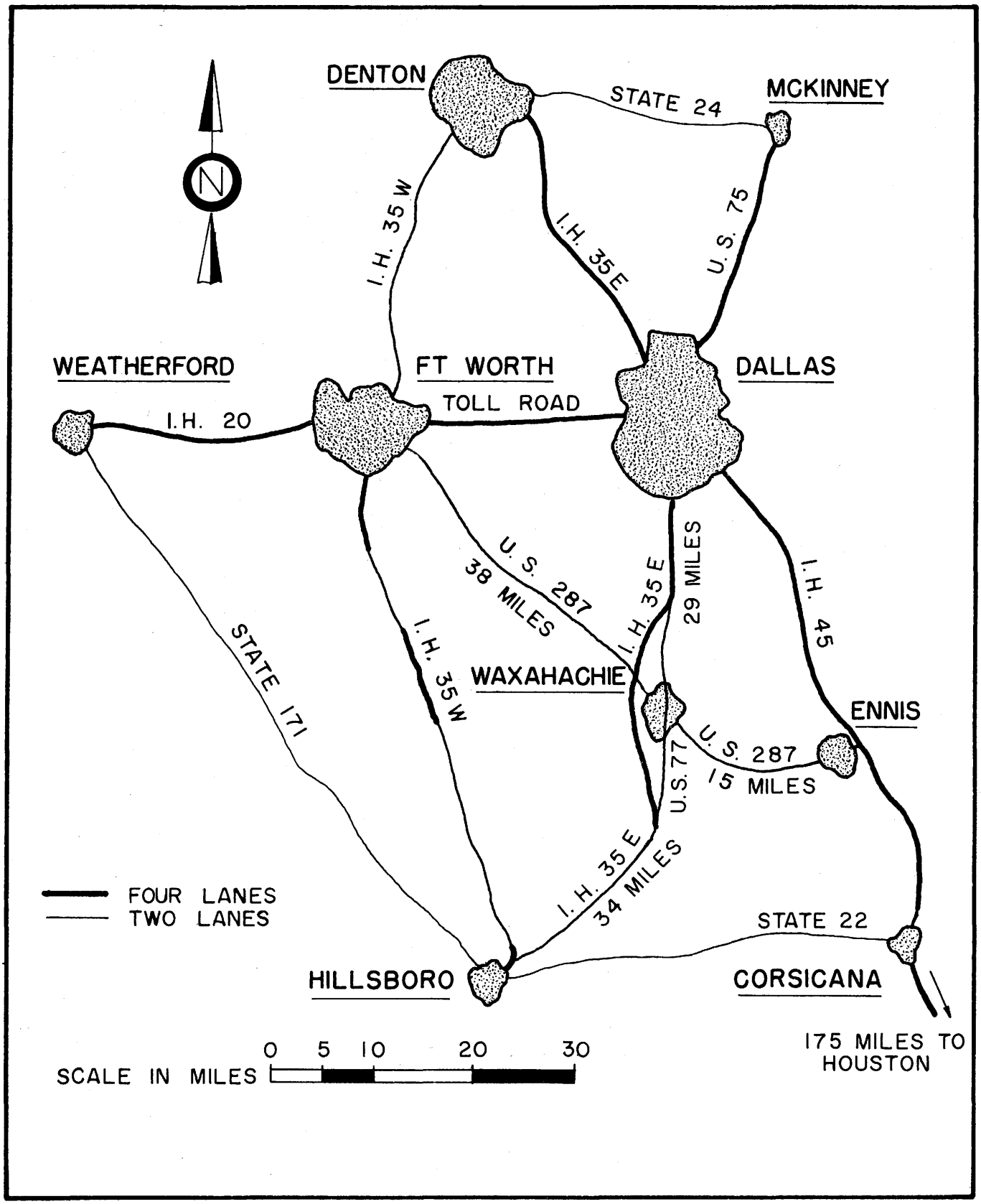


Figure 1. A map showing the location of Waxahachie with respect to other cities and the highway system serving the area.

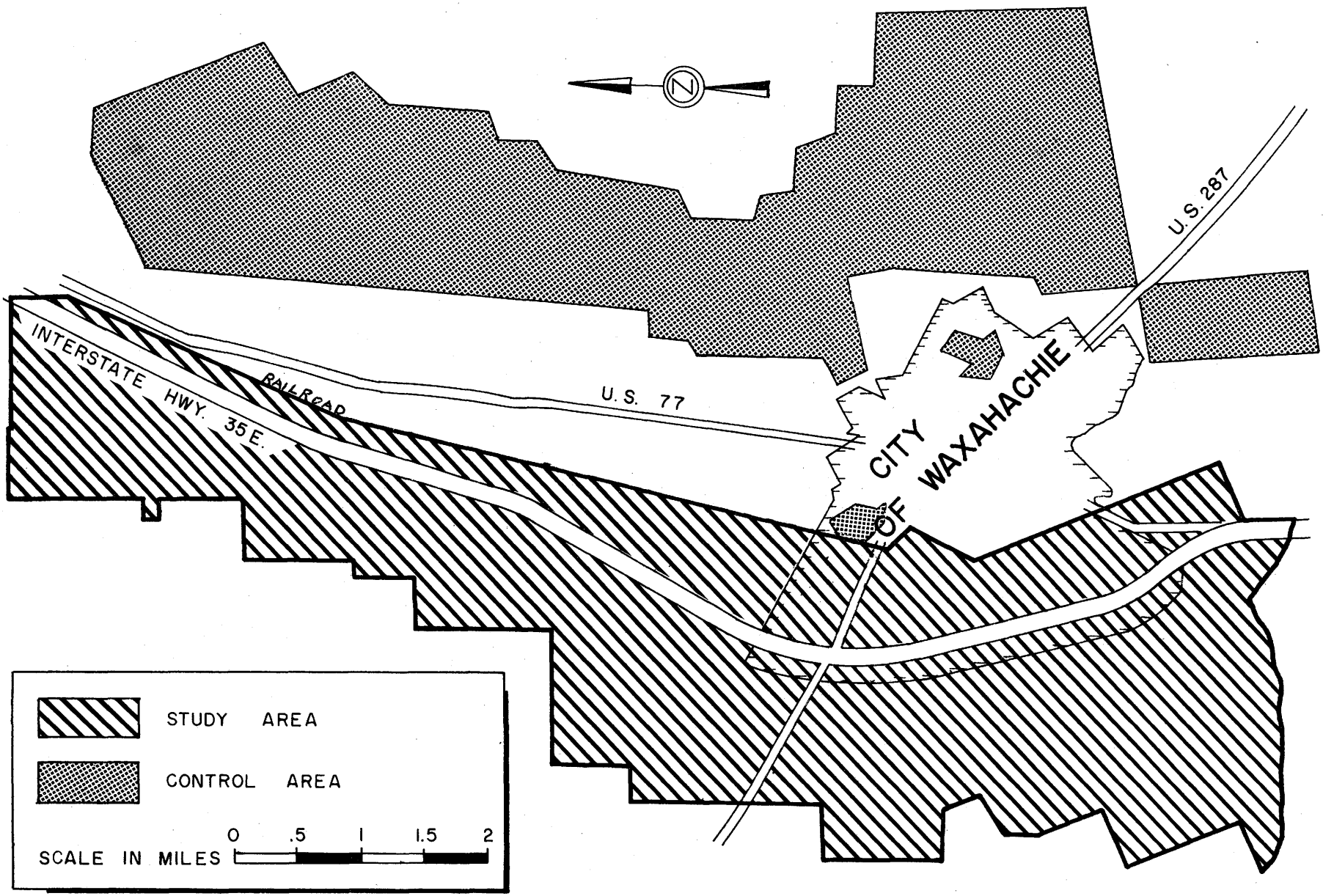


Figure 2. The Waxahachie land value study and control areas.

None of the property in the study area within the city was subject to zoning ordinances.

Control Area

A control area was selected to help measure the by-pass effects on land values in the study area. The purpose of the control area was to measure changes in land values in the general area that could not be related to the new highway facility.

Figure 2 shows the location of this area in relation to the study area. This area had most of the physical and locational characteristics similar to the study area before construction of the new facility. Both areas were primarily agricultural before the new route was introduced; both are of comparable distance from old U. S. 77 and from the central business district of Waxahachie; both are intersected by U. S. Highway 287; and both have a railroad located within or adjacent to the area.

No separate control area was selected in analyzing land use changes in the study area as was the case in the land value analysis. Observance was made of land use changes of property abutting the new facility versus that property further removed in the study area. The latter served somewhat as a control.

No individual control businesses were selected for comparison with study route businesses. However, the estimated retail sales volumes for the whole city of Waxahachie and comparable cities were compared with the sales volume of the study businesses.

Method of Study

In order to provide answers for each of the objectives of this study, the general method of analysis employed the "before" and "after" approach. By applying this approach to the study and control areas, land value differences between the areas are called the probable highway influence (effects). This assumes that both areas were affected similarly by exogenous influences other than the highway. Using the "before" and "after" approach in the land use and business activity analyses is also considered an acceptable method of indicating the extent of the new route's effects.

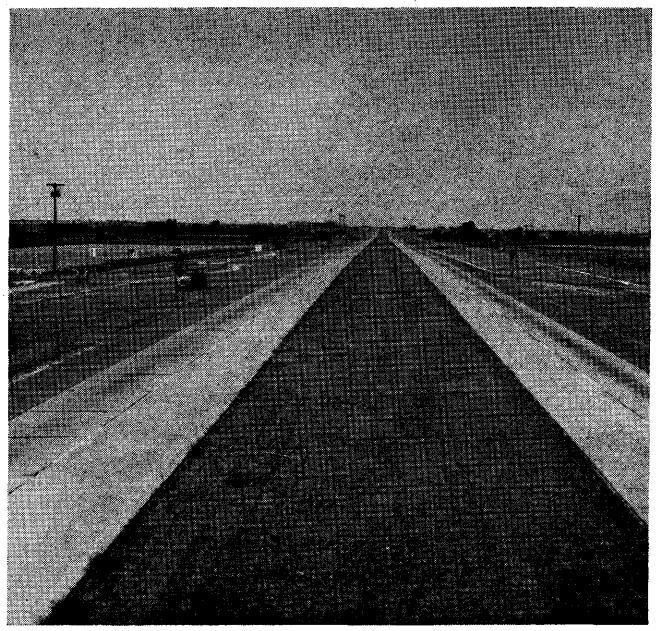
The records of private and public institutions in Waxahachie were searched for every land sales transaction which occurred during the whole study period in the study and control areas. Although information about every transaction was recorded, only the bonafide sales were considered in the land value analysis. All trades, family transactions, and transfers by quitclaim deeds were eliminated from the study during the search of the deed records. The principal information obtained from the deed was the names of the grantee and grantor, date of sale, size of tract, location and consideration (sale price). When the consideration could be determined, either by the designated amount or by the amount revealed by Federal Revenue Stamps, the sale was used in the analysis. (Each $.55 worth of stamps represents a maximum of $500 of consideration paid by the buyer for the land. The last $.55 was divided in half in computing the total consideration in order to minimize error in estimating the total consideration.)

All large tracts selling which had farm buildings were considered to be unimproved in the analysis. Acreage tract sales were analyzed separately from subdivided lot sales.

A simple correlation analysis was made separately on all the study and control area sales, to determine the relationship that existed between changes in time (years) and the actual price per acre received for the land. After reviewing a scatter diagram of the sales in each area, a straight line was considered to more accurately describe data than that of a curved line. The straight line trend equation (using the least squares computation) for each area is as follows:

$$Yc = a + bx$$

The Yc is the computed or trend value of the time series Y in the year numbered X. The constant *a* is the value



Cultivated Land

Grazing Land

The new highway passed through primarily agricultural land.

of Yc when X = O, and the constant b is the slope of the trend line or the change in Yc per unit change in X.

To determine the extent of changes attributable to the new by-pass, land use of study area properties was established for the last year (1955) before construction started and again seven years later in 1962. Land uses were determined through the help of residents and realtors in the area and through visual inspection.

All businesses selected abutting segments of the old and new highways were considered in the business activity analysis. The year 1958 was used as the before highway construction year of study and 1962 as the after construction year of study. All data presented for these two study years were gathered from the businesses by personal interviews. Only retail businesses were contacted for full interviews. The principal data collected were gross dollar sales, history of management, hours of operation, number of employees, and managerial opinions of the new route impact on Waxahachie businesses.

Time Periods

The time periods chosen for the "before" and "after" study approach were established by the dates of rights-of-way purchase, highway construction, and official opening of the facility. The last five years immediately prior to the purchase of rights-of-way (1951-55) were designated as the "before" period for the land value analysis. The 1956-58 period, designated as the "construction" period in the land value analysis, included the time required to purchase the right-of-way and construct the facility. The "after" period was designated as 1959-62.

The "before" and "after" periods were somewhat different for the land use and business activity analyses. For the land use analysis, 1955 (the last year before purchase of rights-of-way) was selected as the "before" year and 1962 was selected as the "after" year of study. Because of the difficulty of collecting accurate business activity data very far back in time, 1958 (the last year of construction) was considered the "before" year; and 1962 was considered the "after" year.

Sources of Data

Changes in the land values were measured by using the sales prices of land recorded in the deed records at the county courthouse. The land use information was derived from visual inspection of the area and from residents and realtors who were familiar with the study area. The business activity data were collected through personal interviews with operators of all the retail business establishments located on both the old and new routes.

The Texas Highway Department furnished the traffic volume counts used to indicate the changes in general traffic patterns on the major highways in Waxahachie during the "before" and "after" periods. General community development was periodically observed to ascertain if any community benefits were derived either directly or indirectly from the new Interstate facility. The local city and county officials and officers of financial institutions were personally interviewed; they furnished data which have helped evaluate the general community development of Waxahachie during the periods of study. Certain supplemental data were collected from the Bureau of Census and the Texas Bureau of Business Research.

Definition of Terms

As far as this report is concerned, the terms listed below will carry the following definitions:

1. Before and after—a comparative technique used to measure changes in land values, land uses, gross dollar sales, etc. One time period is designated as the "before" period and another the "after" period.

2. Area weighted figure—a figure derived by summing all purchase prices for a particular number of land sales and dividing by the sum of all the land area represented by those sales.

3. Figure not area weighted—a figure derived by summing a particular number of land transactions' price per unit (per acre or square feet) and dividing by the number of transactions (sales) involved.

4. Adjusted land values—values (prices of land) which are deflated to common dollars by using the Consumers' Price Index. (See explanation and schedule in the appendix.)

5. Abutting and nonabutting land—refers only to land in the study area. Abutting land is that fronting on the new IH 35E and nonabutting land is all other land in the study area.

6. Agricultural land—tracts used primarily for agricultural purposes with a minimum size of ten acres, except when devoted to truck or other intensive type farming, the minimum size there is reduced to two acres.

7. Land held for future use—tracts generally considered to be held for future use rather than for its utility at present. However, they may be farmed or grazed or used for other agricultural purposes during the interim period and may be either inside or outside of city limits.

8. Rural residents land—tracts used primarily as a dwelling place (house must be occupiable) outside city limits with a maximum size of ten acres (except truck or other intensive type farm—minimum size, two acres). A larger tract becomes either agricultural or land held for future use depending on whether farming activity is carried on.

9. Urban residential land—tracts used primarily as a dwelling place (house must be occupiable) inside of city limits or a part of a subdivision outside the city limits. Maximum size, five acres, with larger plots becoming classed as land held for future use.

10. Commercial traffic serving land—tracts used for commercial purposes and deriving more than 50 percent of income from traffic. It is primarily nonmanufacturing in nature.

11. Commercial nontraffic serving land—tracts used for commercial purposes and deriving less than 50 percent of income from traffic. It is also primarily nonmanufacturing in nature.

12. Industrial land—tracts used for manufacturing some product.

13. Institutional-municipal land—tracts used as school, park, cemetery, hospital, etc., in a nonprofit-making capacity which is publicly or group owned and operated.

Changes In Land Values

There were 462 sales in the study and control areas which showed determinable considerations. Table I shows the number of sales by area that was acreage or subdivided and improved or unimproved. Table 2 shows summary data of acreage and subdivided land sales in the study and control area which occurred during the 1951-62 period.

Acreage Land

Over a 12 year period (which includes the before, during, and after construction periods) changes in unimproved acreage land prices were measured by a simple correlation analysis using 73 and 64 study and control area sales, respectively. In the case of the study area, six high values (averaging $3,087 per acre) were removed from part of the analysis below to show statistics based on land values in the main stream. Three of these sales abut IH35E, two of which have changed to commercial use. The other three abut U. S. 287 between IH35E and Waxahachie. One of these has changed to commercial use.

Figure 3 shows the values of the solved linear equation for each area with years (X) on the horizontal scale and actual price per acre (Y) on the vertical scale. The midpoint of the time series is half-way between 1956 and 1957. This is where X = 0.

For the control area, the trend line shows only a modest $6.40 per acre per year increase in land values. For the study area, the trend line representing all 73

Table 2

SUMMARY DATA OF LAND SALES TRANSACTIONS OCCURRING IN THE WAXAHACHIE STUDY AND CONTROL ACRES, 1951-52

Item	Quantity	
	Study Area	Control Area
	(Amount)	(Amount)
Number of Sales Analyzed	227	235
Acreage Land	73	67
Subdivided Land	154	168
Total Area Sold (In Acres)	3,697	6,680
Acreage Land (In Acres)	3,651	6,623
Number of Acres Per Sale	50	99
Subdivided Land (In Sq. Ft.)	1,980,649	2,452,971
Number of Sq. Ft. Per Sale	12,899	14,601
Range In Acreage Tract Size (In Acres)	0.2-240	1.0-400
Range In Subdivision Lot Size (In Sq. Ft.)	860-46,000	1100-90,000
Total Price Paid,	(Dollars)	(Dollars)
All Transactions[1]	$1,393,742	$1,794,042
For Acreage Land	892,981	1,053,763
For Subdivided Land	500,761	738,279
Average Price Per Sale	6,139	7,634
For Acreage Land	12,232	15,757
For Subdivision Land	3,251	4,395
Range In Acreage Price Per Acre	71-5,000	45-1,667
Range In Subdivision Price Per Sq. Ft.	0.010-1.270	0.011-1.318

[1]Actual prices are recorded in this table.

Table 1

LAND SALES TRANSACTIONS USED IN ANALYZING LAND VALUES IN THE WAXAHACHIE STUDY AND CONTROL AREAS BY YEAR (1951-62)

Period of Study	Year	Number of Sales Transactions				Grand Total
		Unimproved		Improved		
		Acreage	Subdivision	Acreage	Subdivision	
			Study Area			
Before Period	1951	8	8	0	6	22
	1952	1	4	0	10	15
	1953	5	4	0	10	19
	1954	1	7	0	11	19
	1955	2	3	0	6	11
Construction Period	1956	15	4	0	8	27
	1957	6	4	0	8	18
	1958	9	6	0	11	26
After Period	1959	9	3	0	15	27
	1960	6	3	0	9	18
	1961	5	6	0	3	14
	1962	6	1	0	4	11
Subtotal		73	53	0	101	227
			Control Area			
Before Period	1951	8	5	0	15	28
	1952	2	9	1	8	20
	1953	7	5	1	17	30
	1954	12	5	0	9	26
	1955	2	2	0	16	20
Construction Period	1956	6	4	0	6	16
	1957	1	5	0	5	11
	1958	2	3	0	9	14
After Period	1959	12	0	0	16	28
	1960	2	2	0	6	10
	1961	5	1	1	4	11
	1962	5	0	0	16	21
Subtotal		64	41	3	127	235
Grand Total		137	94	3	228	462

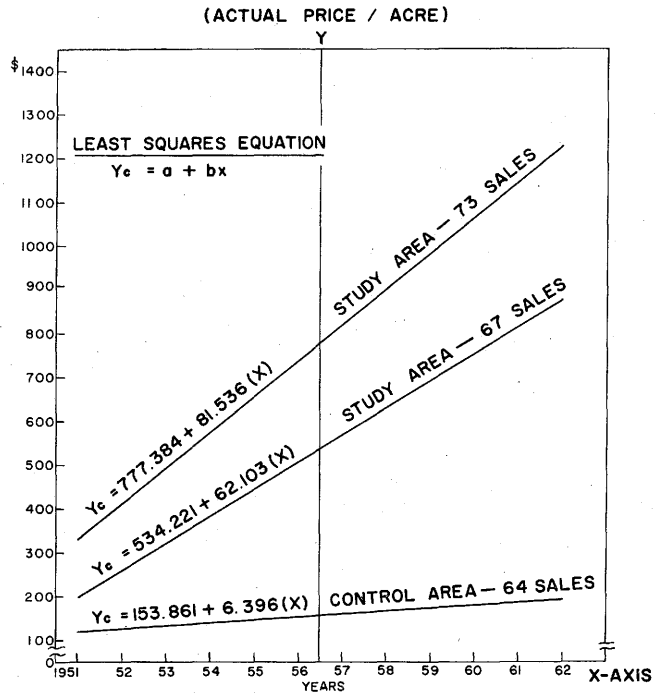


Figure 3. Price per unit changes of unimproved acreage land in study and control areas related to years.

sales (six of them extremely high values) shows a $81.54 per acre per year increase in land values. Even when the six highest values were deleted from the study area analysis, the trend line representing 67 sales shows a $62.10 per acre per year increase in land values.

Table 3 shows selected statistics developed from the correlation analysis. It reveals that the independent variable, time, explained only 8.4 percent (coefficient of determination times 100) of the variation in the price per acre of all study area land sales and explained 12.3 percent of the variation in the price of control area land. In this respect, the standard error of estimate for the study and control area data was $988.14 and $68.99 per acre, respectively, indicating a great deal more unexplained variation about the trend line in the former than the latter. As was expected, time was more highly correlated to price per acre in the control area than in the study area.

The introduction of the new highway into the study area has apparently contributed to the disruption of the normal relationship between time and price per acre. The extent attributable to the highway is open for question. The removal of only six sales prices, which occurred after construction had begun on the new highway, changes the study area coefficients considerably. As a result, time correlates more with price per acre in the study area than in the control area. It seems that this matter needs to be explored more fully when more after period sales (beyond 1962) have occurred. Only then can it be determined which path the trend line of land values is actually taking, the extreme values route or the more conservative values route as reflected by the majority of the sales.

Time Period Comparisons

Table 4 shows the average adjusted land prices (not area weighted) aggregated by time period for each area. The appendix contains tables which show changes in actual land values, both on actual and weighted basis. Price differences between areas within each period are also shown in this table. The importance of the between area comparisons within a period is that a test can be made to determine whether or not the difference between the two area average prices is significant (not all the difference due to chance). For example, the $96 difference between the before period average prices is considered significant at a high level of probability. It would have been more desirable for the test to have indicated no significant differences between these area average values. This is considered one of the tests of comparability of the study and control areas in the before period. The $699 difference between after period average values was even more significant than the difference between before period average values. It is believed that the new highway is primarily responsible for this large difference between these average values.

The same data as above are presented in Table 5 in analyzing abutting versus nonabutting land value changes.

The average price per acre increase between periods is considerably greater in the study area than in the control area. This was especially true between the before and construction periods. Between the construction and after periods, prices increased modestly in the study area and decreased slightly in the control area. Based on the price increase between before and after periods, the probable highway influence was considered to be $590 per acre or 288 percent. (See Footnotes 4, 5, 6,

Table 3
SELECTED STATISTICS DEVELOPED FROM A CORRELATION ANALYSIS BETWEEN PRICE PER ACRE AND TIME FOR ACREAGE LAND SALES IN THE STUDY AND CONTROL AREAS

Item	Control Area	Study Area	Study Area Less Extreme Values
Regression Coefficient[1]	6.396	81.536	62.103
Standard Error of Estimate[2]	68.994	988.143	399.883
Coefficient of Correlation[3]	0.351	0.291	0.507
Coefficient of Determination[4]	0.123	0.084	0.257
Number of Sales	64	73	67
Number Degrees of Freedom[5]	62	71	65[6]

[1]The regression coefficient (b) shows the change in the dependent variable Y (actual price per acre) for a unit change in the independent variable X (time in years).
[2]The Standard Error of Estimate (s y.x) value, expressed in the same units as the dependent variable, serves as an indicator of the significance and usefulness of the line of regression that describes the relationship between the independent and dependent variables.
[3]The coefficient of correlation (r) measures the degree of relationship between the independent and dependent variables.
[4]The coefficient of determination (r^2) measures the proportion of the variability of the dependent variable that is attributable to the independent variable.
[5]The number of sales (N) reduced by the number of constants in the equation of regression, which are two (a) and (b), is the number of degrees of freedom used in computing the estimated value of Y (price per acre) at some X point in time.
[6]Six extremely high values were deleted to show statistics based on land values in the main stream.

Table 4

PRICES OF UNIMPROVED ACREAGE TRACTS IN THE STUDY AND CONTROL AREAS, WAXAHACHIE, TEXAS IN CONSTANT DOLLARS (1947-49=100)

Item	Price Per Acre[1]		Difference Between Areas	Percent of Study Area Before Period Price
	Study Area	Control Area		
Before Period (1951-55)	$205(17)	$109(31)	$ 96[2]	
Construction Period (1956-58)	799(30)	142 (9)	657	
After Period (1959-62)	840(26)	141(24)	699[3]	
Increase Between Periods				
Before and Construction				
Dollars	$594	$ 33	$561	274%[4]
Percent	290%	30%	260%[5]	
Construction and After				
Dollars	$ 41	$−1	$ 42	
Percent	20%	−1%	21%[5]	
Before and After				
Dollars	$635	$ 32	$603	294%[4]
Percent	310%	29%	281%[5]	
Probable Highway Influence				
Percent[6]	288%			
Dollar[7]	$590			

[1]Number of transactions is shown in parentheses.
[2]The standard error of the difference (S.E.) is $5. This value is significant beyond the 99 percent level (t is equal to 18.22).
[3]The S.E. is $35. This value is significant beyond the 99 percent level (t is equal to 19.97).
[4]Assumes that the study and control areas would have changed in value by the same dollar value in the absence of the new road improvement. That is, both would have changed in value by $33 or $32, depending on the periods compared. But the study area prices increased more than the above amounts, in fact $561 more between the before and construction period. This dollar difference is 274 percent greater than the study area before period price.
[5]Assumes that percentage changes for each area would have been the same in the absence of a new highway. That is, both areas would have changed in value by 30 or 29 percent, depending on the periods compared. Using these control area changes as bases, the study area percentage increases were 260 percent and 281 percent greater.
[6]This measure of highway influence is the average of the above percentages, plus 294 percent (based on dollar changes) and plus 281 percent (based on percentage changes).
[7]This is the average (288) percentage increase due to the new highway times the before period study area price per acre. Using the above assumptions, this is a reasonable measure of highway influence.

Table 5

PRICES OF ABUTTING AND NONABUTTING UNIMPROVED ACREAGE TRACTS IN THE STUDY AREA AS COMPARED TO THE CONTROL AREA WAXAHACHIE, TEXAS, IN CONSTANT DOLLARS (1947-49=100)

Item	Price Per Acre[1]			Differences Between Areas			Percent of Respective Parts of Study Area's Before Period Price	
	Study Area Abutting	Study Area Nonabutting	Control Area	Abutting Versus Nonabutting	Abutting Versus Control Area	Nonabutting Versus Control Area	Abutting	Nonabutting
Before Period (1951-55)[2]	$ 172 (9)	$243 (8)	$109(31)	$ 71	$ 63	$134		
Construction Period (1956-58)	1123(16)	429(14)	142 (9)	694	981	287		
After Period (1959-62)[3]	847(13)	833(13)	141(24)	14	706	692		
Increase Between Periods								
Before & Construction								
Dollars	$ 951	$186	$ 33	$ 765	$ 918	$153	534%[4]	63%[4]
Percent	553%	77%	30%	476%	523%[5]	47%[5]		
Construction & After								
Dollars	$−276	$404	$−1	$−680	$−275	$405		
Percent	− 25%	94%	−1%	−119%	− 24%[5]	95%[5]		
Before & After								
Dollars	$ 675	$590	$ 32	$ 85	$ 643	$558	374%[4]	230%[4]
Percent	392%	243%	29%	149%	363%[5]	214%[5]		
Probable Highway Influence								
Percent[6]	369%	222%						
Dollars[7]	$ 635	$539						

[1]Number of transactions is shown in parentheses.
[2]The S.E. of the difference between the means of the study area (abutting) and the study area (nonabutting) is $19. t is equal to 3.74. The S.E. of the difference between the means of the study area (nonabutting) and the control area is $9. t is equal to 14.15. The S.E. of the difference between the means of the study area (abutting) and the control area is $5. t is equal to 12.34. All differences were significant beyond the 99 percent level.
[3]The S.E. of the difference between the means of the study area (abutting) and the study area (nonabutting) is $99, significant beyond the 11 percent level. t is equal to 0.14. The S.E. of the difference between the study area (nonabutting) and the control area is $68, significant beyond the 99 percent level. t is equal to 10.14. The S.E. of the difference between the study area (abutting) and the control area is $23, significant beyond the 99 percent level. t is equal to 30.83.
[4,5,6,7]See corresponding footnote under Table 4.

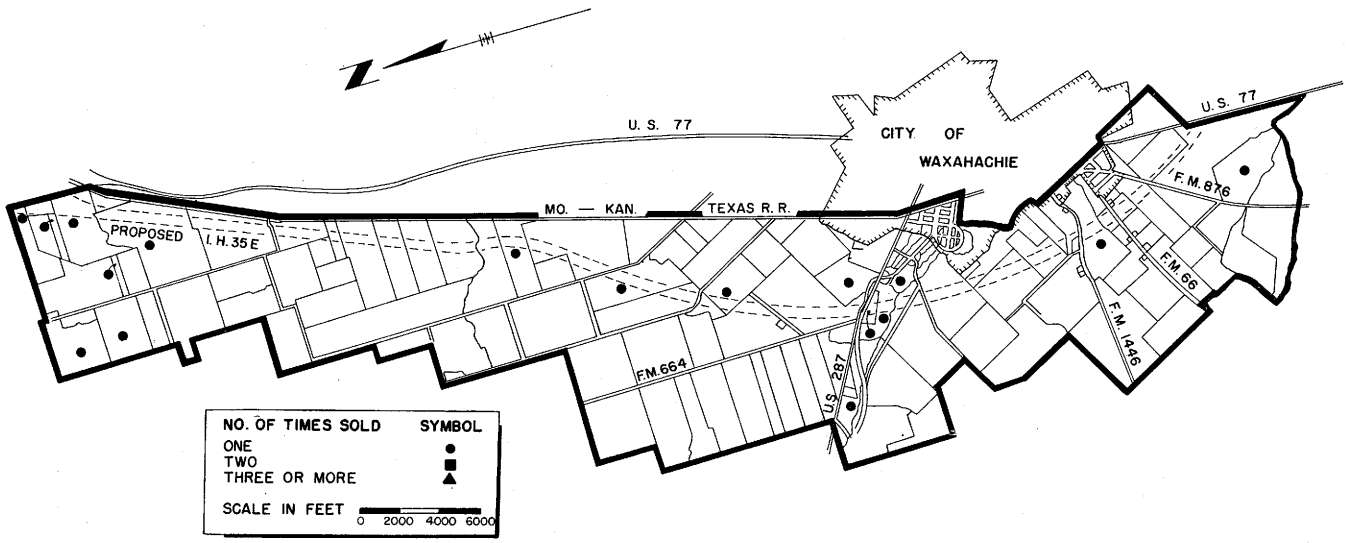


Figure 4. The location of study area acreage tracts which sold before construction of the new highway, 1951-58.

and 7 under Table 4 for an explanation of the two types of measurements used in arriving at the probable highway influence.)

Abutting Versus Nonabutting Comparisons

These changes in the abutting versus nonabutting land values were measured to determine if there was any significant difference between the two classifications as to highway influence.

The number of abutting and nonabutting land sales was almost evenly divided in each time period (See Table 5). Figure 4 shows the location of the before period abutting and nonabutting sales in relation to the proposed new facility. Figure 5 shows the location of the construction and after period abutting and nonabutting sales in relation to the new facility.

Figure 4 indicates that speculative buying occurred along the proposed route during the before period. Most of the tracts which sold during this period were later bisected by the new facility. Figure 5 shows that this speculative activity increased during the next two periods. About 50 percent of all transactions involved abutting tracts. Also, about half of the base period nonabutting sales were in close proximity to the proposed facility. The same was true for the other two periods.

The base period price of abutting land was more like the base period price of the control area land than was the price of nonabutting land. Figure 4 shows that most of the abutting sales involved tracts in the northern half of the study area, while the reverse was true for nonabutting sales.

Abutting land values increased more than nonabutting land values between the before and after period. Between the construction and after periods, abutting land prices declined while nonabutting land prices continued to rise. Again, this was due principally to the difference in location of the sales. More of the strategically located abutting tracts sold in the construction period than in the after period. Three such tracts sold for exceptionally high prices during the construction period, where as, the strategically located nonabutting tracts (three) sold for

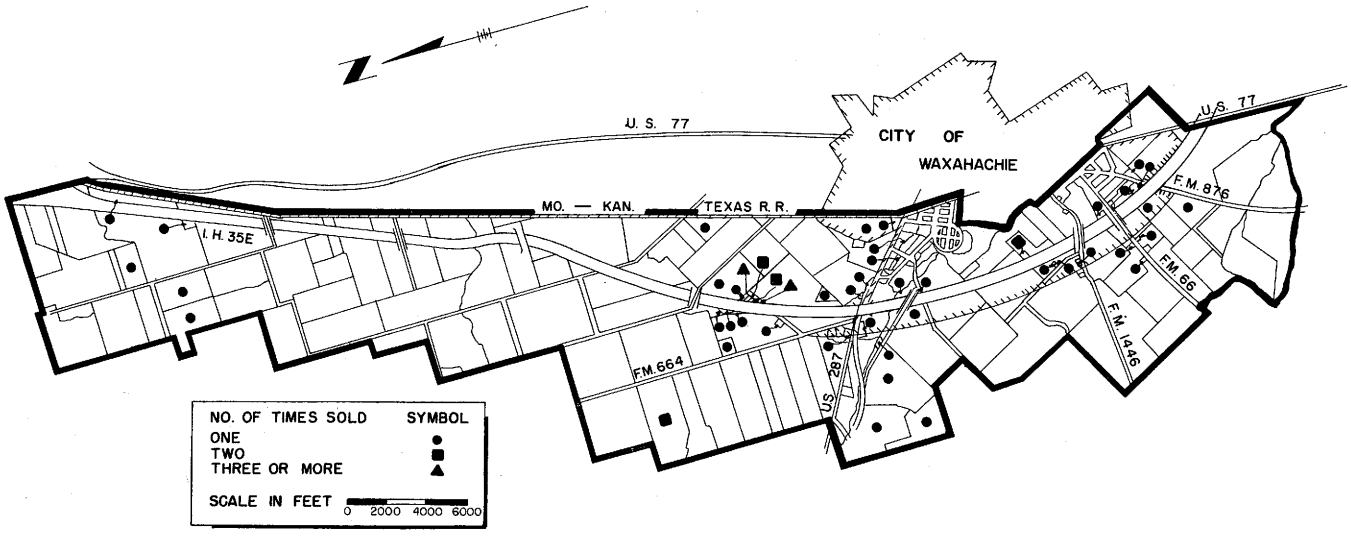


Figure 5. The location of study area acreage tracts which sold during and after construction of the new highway, 1959-62.

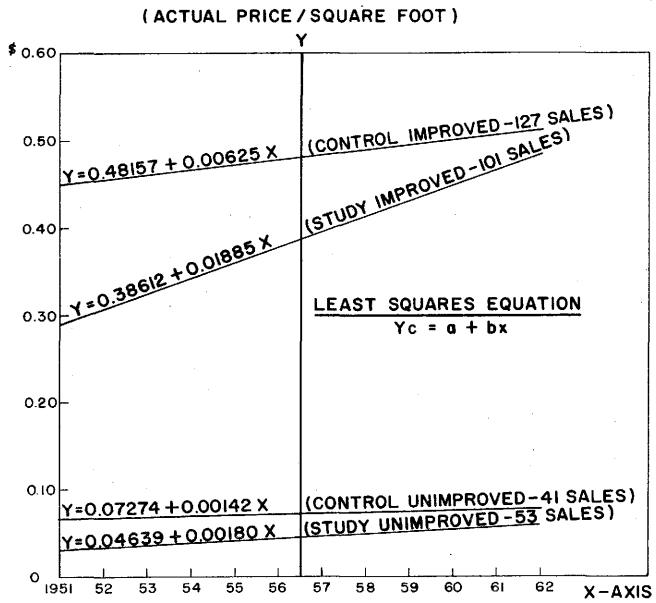


Figure 6. Price per unit changes of subdivided land in study and control areas related to years.

very high prices during the after period. All three were abutting U. S. Highway 287 on the Waxahachie side of IH 35E.

When compared with control area prices, the abutting land received a probable highway influence of $635 per acre or 369 percent as opposed to $539 or 222 percent for nonabutting land. This was assumed to be a reasonable differential between the two types of property. The abutting land should receive the most benefit because it has direct access to IH 35E by way of frontage (service) roads. As a result, such land has more immediate commercial or industrial development potential than nonabutting land. However, after a longer period has lapsed, and much of the abutting land has been developed, the differential between abutting and nonabutting land values should narrow somewhat. This is expected to be especially true at the interchange crossroads where nonabutting property is given quick and easy access to the main facility.

Subdivided Land Values

A simple correlation analysis of study and control area subdivided lot prices was performed to determine the relationship that existed between changes in time and the actual price per square foot received for lots. Figure 6 shows the values of the solved straight line equation for improved and unimproved sales in each area.

The increase in price per square foot per year was higher in the study area than in the control area. This increase was significantly greater for improved sales. Annual charges averaged $.01885 per square foot per year for the study area versus $.00625 per square foot per year for the control area.

Table 6 shows selected statistics on the subdivision correlation analysis. For both improved and unimproved sales, time explained a greater percentage of the increase in price in the study area than in the control area (as indicated by the Coefficient of Determination). Also, the table shows that greater variation of the individual sales prices about the trend line existed in the control area than in the study area (as measured by the Standard Error of Estimate). Last, correlation between time (years) and price, as reflected by the Correlation Coefficient, was greater in the study area than in the control area.

All but one of the above measures for subdivided land are the reverse of the acreage comparisons, the exception being the steepness (size of regression coefficients) of the slope of the trend line. Although study area land values in both cases showed a greater annual increase in price than occurred in the control areas, the trend analysis indicates that the study area acreage land values received a greater influence from the introduction of the new highway than subdivided land values.

Apparently, the unimproved lots which sold received very little effects from the new facility. Although minor, these effects were positive rather than negative. Improved lots showed more distinguishable highway ef-

Table 6
SELECTED STATISTICS DEVELOPED FROM A CORRELATION ANALYSIS BETWEEN PRICE PER SQUARE FOOT AND TIME FOR SUBDIVIDED LAND SALES IN THE STUDY AND CONTROL AREAS

Item	Study Area		Control Area	
	Unimproved	Improved	Unimproved	Improved
Regression Coefficient[1]	0.00180	0.01885	0.00142	0.00625
Standard Error of Estimate[2]	0.02300	0.24647	0.04014	0.25803
Coefficient of Correlation[3]	0.29348	0.26693	0.11247	0.09873
Coefficient of Determination[4]	0.08613	0.07126	0.01265	0.00975
Number of Sales	53	101	41	127
Number of Degrees of Freedom[5]	51	99	39	125

[1]The regression coefficient (b) shows the change in the dependent variable Y (actual price per acre) for a unit change in the independent variable X (time in years).

[2]The Standard Error of Estimate (s y.x) value, expressed in the same units as the dependent variable, serves as an indicator of the significance and usefulness of the line of regression that describes the relationship between the independent and dependent variables.

[3]The coefficient of correlation (r) measures the degree of relationship between the independent and dependent variables.

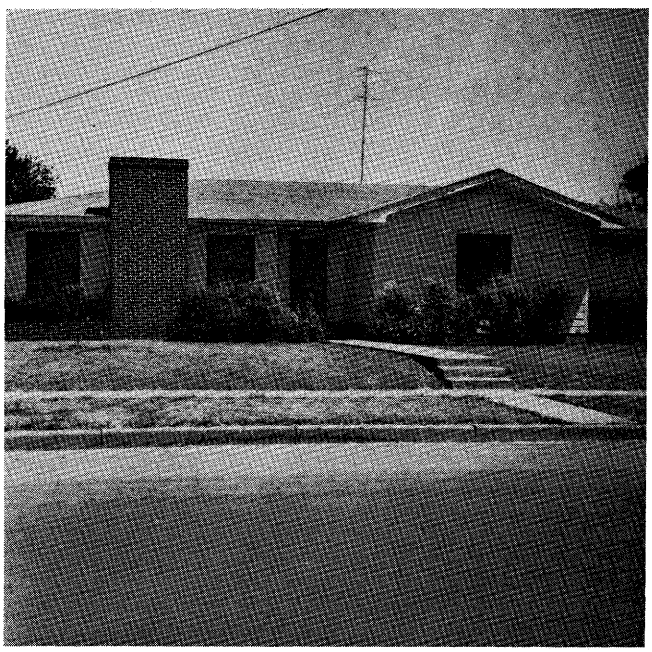
[4]The coefficient of determination (r^2) measures the proportion of the variability of the dependent variable that is attributable to the independent variable.

[5]The number of sales (N) reduced by the number of constants in the equation of regression, which are two (a) and (b), is the number of degrees of freedom used in computing the estimated value of Y (price per acre) at some X point in time.

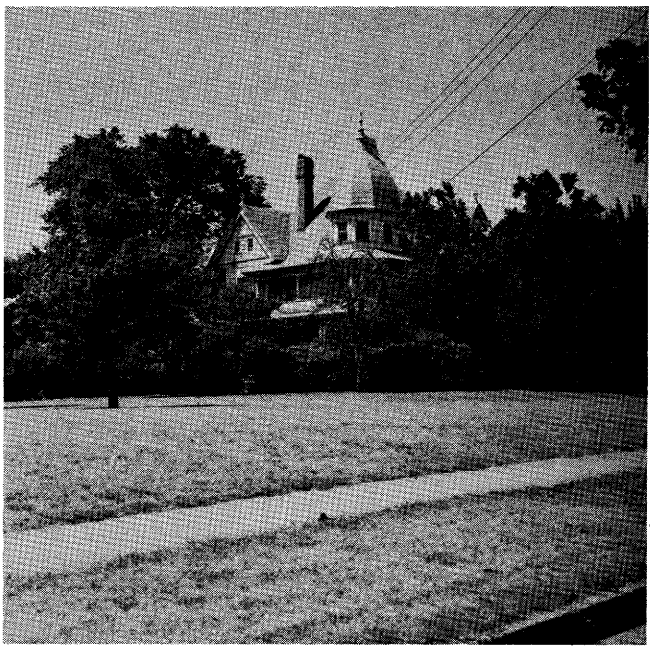
[6]Six extreme values were deleted to show statistics based on land values in the main stream.

South Park

Hill Top



West End



West End

Typical residences in the study area subdivisions.

fects. In both cases time period analysis is helpful in approximating the highway influence on subdivided land values.

Tables 7 and 8 show the changes in adjusted values of unimproved and improved lots respectively. Data presented in these tables generally confirm the above conclusions. The probable highway influence was a negative 0.9 percent for unimproved lots and a positive 35.3 percent for improved lots. There is slight disagreement in the conclusions of highway influence on unimproved lots as presented by the two methods of analysis, but not enough to cause concern. Most of the increase in improved property values came between the construction and after period when values were generally declining in the control area subdivisions. But for unimproved lots, the major price increase occurred between the before and construction periods, while a very small increase was occurring in the control area. It is logical that vacant lots may have received more immediate highway influence than improved lots.

In conclusion, it is evident that the new by-pass had a favorable effect on land values of all types between the before and after periods. Undoubtedly, a longer after period of more than four years would have shown that land values were influenced to an even greater extent.

Table 7

PRICES OF UNIMPROVED SUBDIVISION LOTS IN THE STUDY AND CONTROL AREAS, WAXAHACHIE, TEXAS IN CONSTANT DOLLARS (1947-49=100)

Item	Price Per Square Foot[1]		Difference Between Areas	Percent of Study Area's Before Period Price
	Study Area	Control Area		
Before Period (1951-55)[2]	$ .0342(26)	$.0587(26)	$ .0245	
Construction Period (1956-58)	.0396(14)	.0594(12)	.0198	
After Period (1959-62)[3]	.0423(13)	.0693 (3)	.0270	
Increase Between Periods				
Before & Construction				
Dollars	$ .0054	$.0007	$ .0047	13.7%[4]
Percent	15.8%	1.2%	14.6%[5]	
Construction & After				
Dollars	$ .0027	$.0099	$−.0072	
Percent	6.8%	16.7%	−9.9%[5]	
Before & After				
Dollars	$ .0081	$.0106	$−.0025	−7.3%[4]
Percent	23.7%	18.1%	5.6%[5]	
Probable Highway Influence				
Percent[6]	−0.9%			
Dollars[7]	$−.0003			

[1]Number of transactions is shown in parentheses.

[2]The S.E. of the difference between the means of the study and control area is $0.0017. This value is significant beyond the 99 percent level; t is equal to 14.33.

[3]The S.E. of the difference between the means of the study and control area is $0.0058. This value is significant beyond the 99 percent level; t is equal to 4.63.

[4,5,6,7]See corresponding footnote under Table 4 for an explanation of this type of measurement.

Table 8

PRICES OF IMPROVED SUBDIVISION LOTS IN THE STUDY AND CONTROL AREAS, WAXAHACHIE, TEXAS IN CONSTANT DOLLARS (1947-49=100)

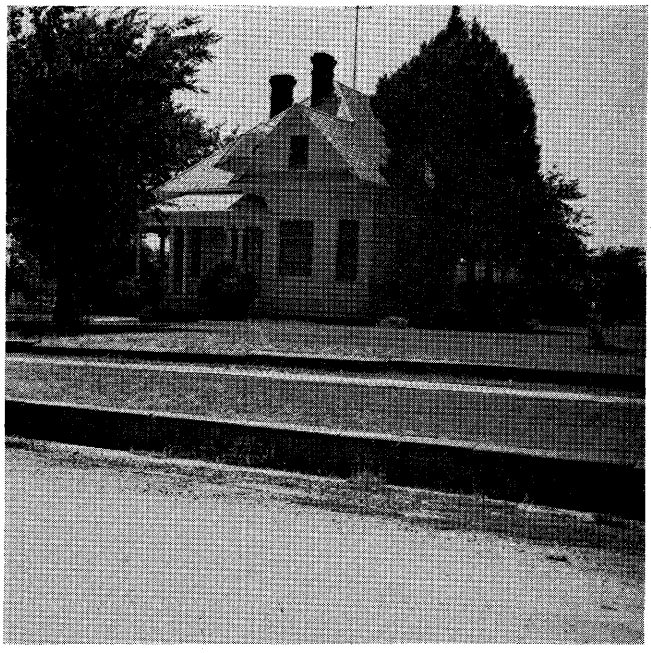
Item	Price Per Square Foot[1]		Difference Between Means	Percent of Study Area's Before Period Price
	Study Area	Control Area		
Before Period (1951-55)[2]	$.279(43)	$ .407(65)	$ .128	
Construction Period (1956-58)	.304(27)	.436(20)	.132	
After Period (1959-62)[3]	.382(31)	.378(42)	.004	
Increase Between Periods				
Before & Construction				
Dollars	$.025	$ .029	$−.004	− 1.4%[4]
Percent	9.0%	7.1%	1.9%[5]	
Construction & After				
Dollars	$.078	$−.058	$ .136	
Percent	25.7%	−13.3%	39.0%[5]	
Before & After				
Dollars	$.103	$−.029	$ .074	26.5%[4]
Percent	36.9%	−7.1%	44.0%[5]	
Probable Highway Influence				
Percent[6]	35.3%			
Dollars[7]	$.098			

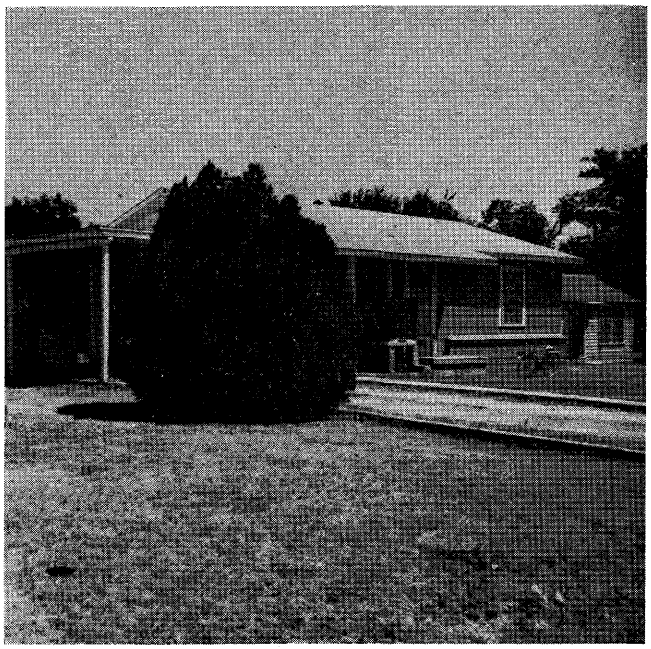
[1]Number of transactions is shown in parentheses.

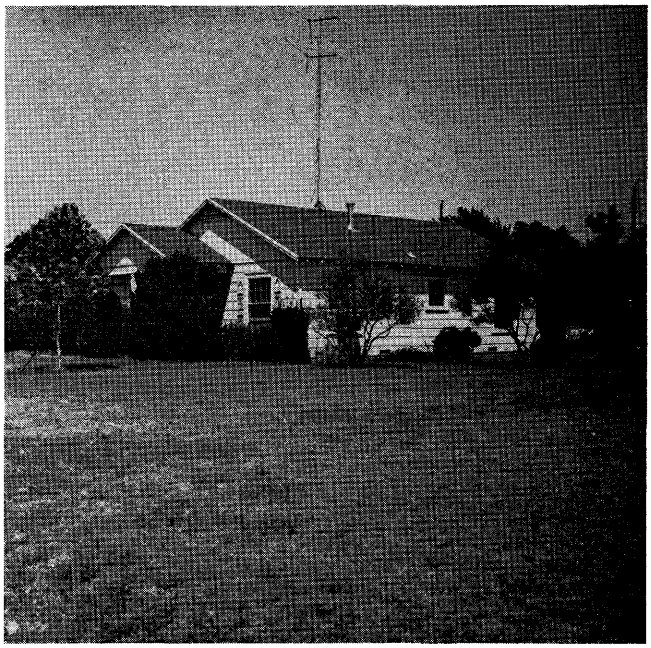
[2]The S.E. of the difference between the means of the study and control area is $0.0057. This value is significant beyond the 99 percent level; t is equal to 22.38.

[3]The S.E. of the difference between the means of the study and control area is $0.0076. This value is significant beyond the 10 percent level; t is equal to 0.05.

[4,5,6,7]See corresponding footnote under Table 4 for an explanation of this type of measurement.







Typical residences in the control area subdivisions.

Changes In Land Use

Changes in land use have been studied on a before and after construction basis. It was assumed, as was the case in other study areas, that the highway would show a noticeable influence on land use in the area. Changes in land use of abutting properties were first expected to occur shortly after the new facility was complete. Later, nonabutting properties were also expected to change land use, especially along the rural roads crossing the new facility.

A base map, Figure 7B, shows the land use existing in 1955. An overlay map, Figure 7A, shows the changes in land use which have occurred during the 1956-62 period.

In 1955 the Waxahachie city limits reached the proposed new by-pass in only one place and actually encompassed a relatively small part of the study area. After the new highway was constructed, the city limits were extended beyond the facility about 600 feet from just north of U. S. Highway 287 to Farm Road 876, south of the city.

The study area is traversed by U. S. Highway 287, three farm-to-market roads, and one railroad. Another railroad borders the east side of the study area. With the exception of the new route, IH 35E, the same network of transportation facilities existed in the area in 1962, as in 1955.

Eight land use classifications, as defined in the introduction, were used in this land use analysis. With their corresponding class numbers, they are as follows: Class 1, Agricultural tracts; Class 2, Tracts not in productive use; Class 3, Rural residental tracts; Class 4, Urban residential tracts; Class 5, Commercial traffic serving tracts; Class 6, Commercial nontraffic serving tracts; Class 7, Industrial tracts; and Class 8, Institutional or municipal tracts.

Land Use as of 1955

In 1955, nearly all of the land outside of the city limits was in some form of agricultural use. Most was in cultivation, but some was in pasturage. In most cases, the land in other uses was located in or near the city limits of Waxahachie on the major traffic arteries passing through the study area. Due to better location with respect to major roads and with respect to Waxahachie, it was in this area that higher land uses were most feasible in 1955. However, Waxahachie Creek and a railroad formed a natural boundary which hindered extensive higher land use development between the roads traversing the study area on the west side of the city. Since these barriers were not present on the south side of the city, a fairly large block of land had already developed into a higher use, even beyond the city limits.

It was established that at least eight tracts were being held for future use in the study area. Two tracts were abutting U. S. Highway 287. Another one was abutting the Missouri-Kansas-Texas Railroad. Only two tracts were as far west as the proposed by-pass route.

As was expected, rural residential tracts (small tracts improved with homes on the outside of the city limits) were located abutting the major roads leading out of Waxahachie. There were 14 such tracts in rural residential use in 1955. Since people living on these properties usually worked in town, which requires daily travel, they were not attracted to gravel and dirt roads. Only farm houses were located on the unpaved roads.

Most of the study area land within the city limits was classed as urban residential. With the exception of one acreage tract, all of this area is located within three subdivisions. Two of these subdivisions are over 50 years old. The other was dedicated in 1946. Therefore, the new highway by-pass had no influence on either the existence or location of these subdivisions. In 1955, two of these subdivisions had numerous vacant lots, even though all three of the subdivisions have good access to the central business district.

As shown on the base map (Figure 7B), all the land within the subdivisions was coded as urban residential, although there were a few lots in other uses. The other uses were: one commercial traffic serving tract; two commercial nontraffic serving tracts; and two institutional-municipal tracts.

In 1955, there were four acreage tracts in commercial traffic serving use in the area. All of them were abutting U. S. Highway 287 near a subdivision on the east side of the study area.

All but one of the five existing nontraffic serving commercial tracts located in the study area were abutting U. S. Highway 287. The other was just off this highway on a gravel road. Two of the five were outside the city limits of Waxahachie and west of the proposed new by-pass. They were located so to serve primarily farmers.

There was only one industrial tract in the study area before 1955. This tract is occupied by a small firm with little economic significance to the community.

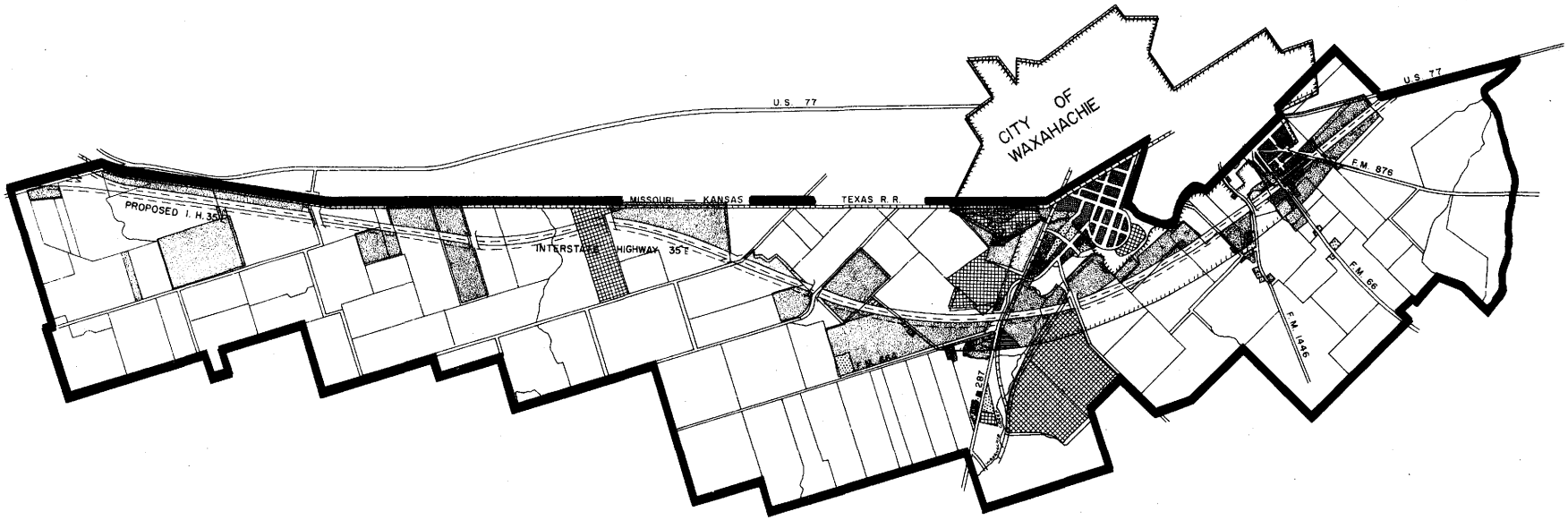
Of the four acreage tracts in institutional-municipal use in 1955, one is used for a country club, one a children's home (the farm), one a city park, and one a cemetery. The tract operated by the children's home is about 3.5 miles north of the city. The cemetery and the country club are abutting U. S. Highway 287 outside the city limits, the former being the farthest west. The city park is adjacent to one of the subdivisions abutting U. S. Highway 287. The city hospital is in this subdivision.

Figure 8A shows a 1956 aerial photograph of the Waxahachie study area, indicating land use at that time. Figure 8B is a 1964 photograph of the same area.

Land Use Changes During the 1956-62 Period

During the construction period, several tracts of land abutting or near the new by-pass changed to higher use. There were those changing from lower uses to Class 2 (land held for future use), Class 3 (rural residential), Class 6 (commercial nontraffic serving), Class 7 (industrial), and Class 8 (institutional) uses.

Four years lapsed between the formal opening of the highway and the end of 1962. During this after

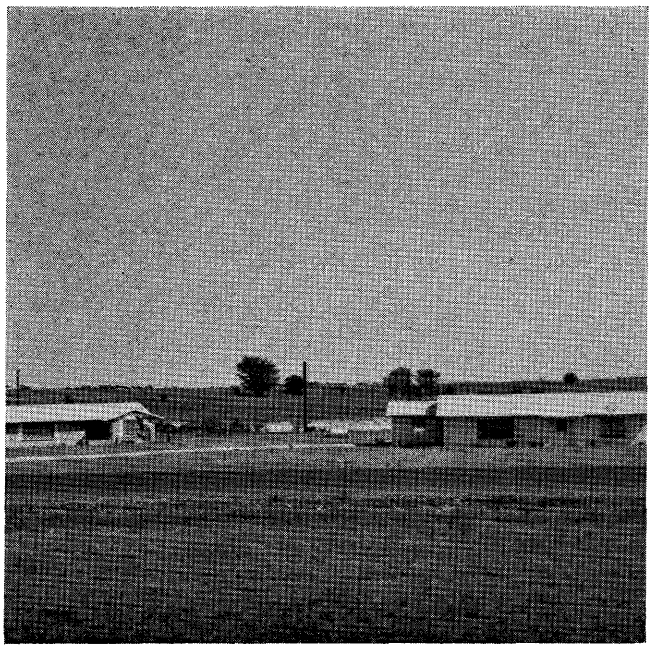


AN OVERLAY MAP OF THE WAXAHACHIE STUDY AREA SHOWING CHANGES IN LAND USE BETWEEN 1955 AND 1962 DURING AND AFTER CONSTRUCTION OF INTERSTATE HIGHWAY 35E.

FIGURE 7B

Land Held for Future Use

Institutional Land



Rural Residential Land

Urban Residential Land

Much agricultural land has changed to the above uses since construction of the new facility.

period, tracts changed to three of the five above uses. In addition, other tracts changed to Class 4 (urban residential). Some of these were rural residential (Class 3) tracts automatically changing to urban residential (Class 4) due to the moving of the city limits westward beyond the new highway (See Figure 7A).

As can be seen from Figure 7A, an overwhelming majority of the tracts changing use during the 1956-62 period were located very close to the new route. This indicates that the higher use potential of land abutting or near the new facility was recognized by the new purchasers. Most of these tracts were abutting the facility; in fact, some were bisected into smaller tracts by the new highway.

The new route paralleled one of the railroads so closely that it helped create many ideal industrial sites between the two transportation facilities. One such firm was located on one of these sites as early as 1959. In 1963 a much larger industrial plant was constructed on another of these tracts. Changes since 1962 are not shown in the figures and table. Another firm is located on a tract abutting only IH 35E, closer to Waxahachie. Evidence is mounting to support the conclusion that

Figure 8A. A 1958 aerial photograph of the Waxahachie study area.

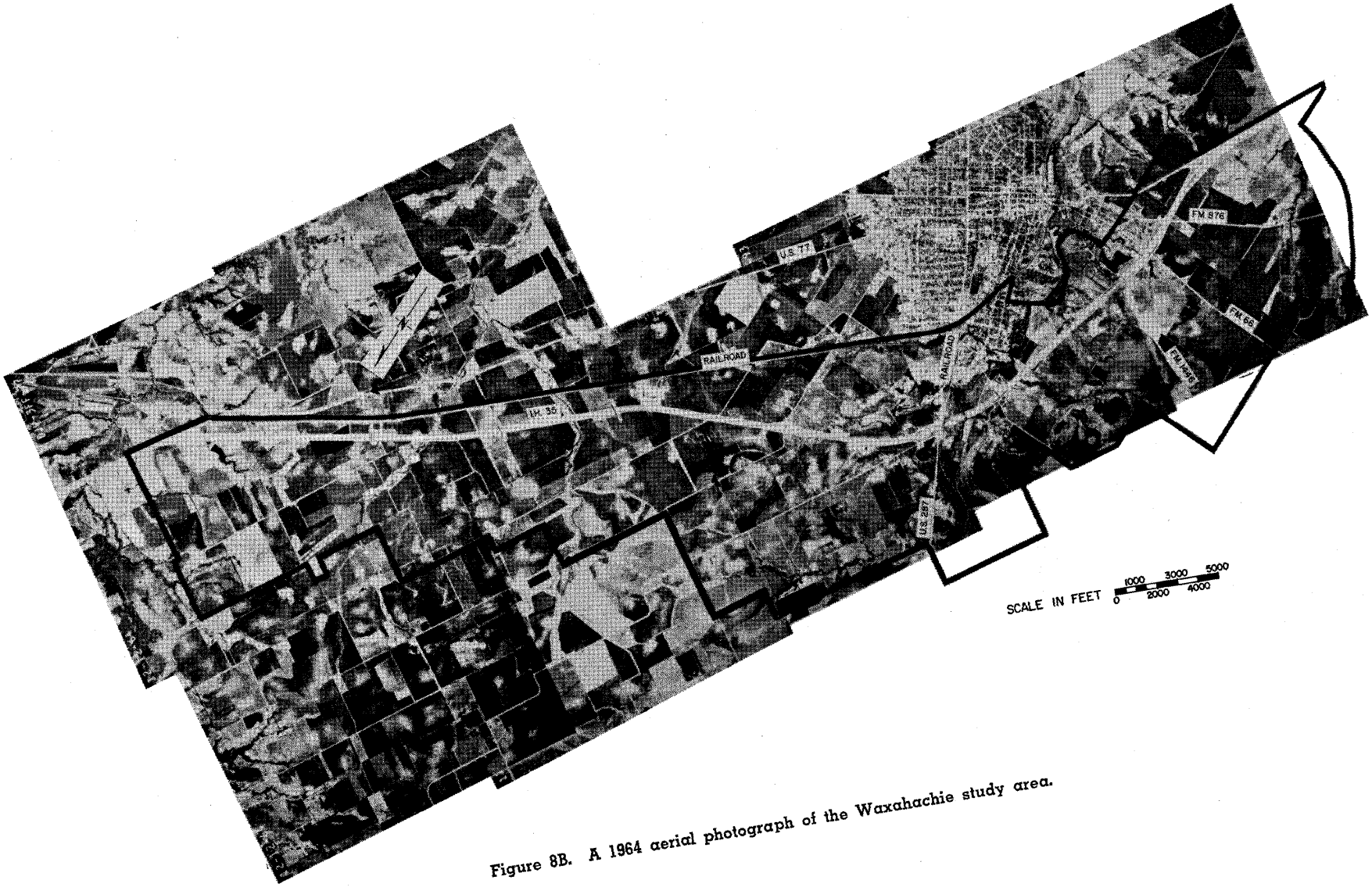


Figure 8B. A 1964 aerial photograph of the Waxahachie study area.

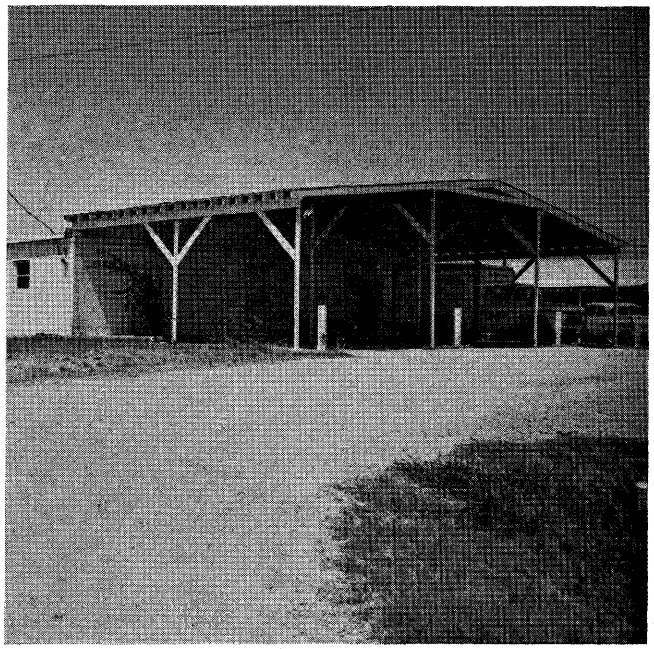
industrial firms covet locating on sites abutting the Interstate Highway System.

By the end of 1962, only one commercial traffic serving tract (Class 5) had been located abutting the new route. Another was established just west of the facility and abutting U. S. Highway 287. Since 1962, four other such tracts have been developed abutting the facility near interchanges, one having major improvements.

Five nontraffic serving tracts were established abutting or near the Interstate Highway System. Four of the five have easy access to IH 35E by way of U. S. Highway 287.

There were 16 new rural and urban residential tracts established abutting or near the new highway. In fact, seven were abutting IH 35E which provides them easy access to job and shopping facilities.

Of the six institutional tracts (Class 8) located in the area during the 1956-62 period, two were purchased by a children's home, two by nonprofit clubs, one by a church group, and one by the Texas Highway Department.



Bakery Warehouse

Grain Elevator

Clothing Manufacturing Firm

Fiber Glass Manufacturing Firm

Abutting land originally in agricultural use changed to the above specific uses after completion of the new highway.

Table 9
THE NUMBER OF ACREAGE TRACTS CHANGING LAND USE IN THE STUDY AREA AFTER 1955

Changes in Land Use[1]		Number of Tracts		
From 1955 Use	To 1962 Use	Abutting IH 35E	Nonabutting IH 35E	Total
(Use Class)	(Use Class)	(Number)	(Number)	(Number)
1	2	28	5	33
1	3	6	6	12
1	4	7	7	14
1	5	1	1	2
1	6	1	3	4
1	7	1	1	2
1	8	1	5	6
2	6	0	1	1
2	8	0	1	1
3	4	1	3	4
	TOTALS	46	33	79

[1]The numbers represent the following land uses: Class 1, agricultural tracts; Class 2, tracts held for future use; Class 3, rural residential tracts; Class 4, urban residential tracts; Class 5, commercial traffic serving tracts; Class 6, commercial nontraffic serving tracts; Class 7, industrial tracts; and Class 8, institutional or municipal tracts. These classes are defined in the introductory section.

Table 9 summarizes the number of acreage tracts changing land use in the study area after 1955. However, since it shows only uses in 1955 and 1962, it does not reveal the intermediate changes in use which a tract may have experienced between 1955 and 1962. It also shows the number of these tracts which were abutting Interstate Highway 35E.

The table reveals that most of the tracts changed from Class 1 (agricultural) to Class 2 (land held for future use). Nevertheless, the study area land remained predominantly agricultural. Of course, this was to be expected since the study area is large and extends well away from the city. Also, only a short period has lapsed since the opening of the facility. During the next few years, it is likely that much more of the land will be taken out of agricultural production, and land being held for future use will move into a higher use. As of 1962, however, the abutting land was by far the quickest to shift into a speculative status.

Relationship Between Changes In Land Use and Land Values

There are many factors which may induce a land use change. Among these, location of a tract of land in relation to a transportation facility is considered one of the principal motivators. Although the study area was traversed with minor roads, the new by-pass route is considered a major change in the transportation serving the area. Thus, it is assumed that the location of such a facility in a previously agricultural area has encouraged changes in land use with corresponding changes in land values.

The question is, what is the relationship between the changes in land use and land values? A direct, instead of an inverse relationship between succession in land use and value should exist in order to follow the dictates of the theory of land use-land value succession. If a tract succeeds to a higher (more intensive) use, it should yield a greater return than if it remained in a lower (less intensive) use. Therefore, the sale price of the tract should be in proportion to the use level to which it succeeds.

As Table 10 reveals, this analysis is somewhat limited by the number of tracts selling to the several uses—especially in the case of the higher uses. Therefore, the results cannot be considered as completely conclusive. However, there are enough sales to indicate the general relationship which exists between changes in land use and corresponding changes in land value.

In order to minimize problems associated with the length of time between sales of properties in various uses, three time periods were used which correspond with the construction schedule of the new highway. They are the before period (1951-55), construction period (1956-58), and after construction period (1959-62). All sales were divided according to their specific after sale use for each of the three periods. The 73 land sales transactions represent the following six land use designations: Class 1, agricultural tracts; Class 2, tracts held for future use; Class 3, rural residential tracts; Class 6, commercial non-traffic serving tracts; Class 7, industrial-manufacturing tracts, and Class 8, institutional-municipal tracts.

Table 10
CHANGES IN LAND USE OF ACREAGE PROPERTIES SELLING IN THE STUDY AREA, 1951-62

Land Use Class Changes	Properties Selling	
	Number	Percent
1 to 1	24	32.7
1 to 2	7	9.6
1 to 3	7	9.6
1 to 6	3	4.1
1 to 7	1	1.4
1 to 8	6	8.1
2 to 2	13	18.0
2 to 3	7	9.6
2 to 6	2	2.7
2 to 7	1	1.4
2 to 8	1	1.4
8 to 1	1	1.4
TOTAL	73	100.0

[1]The numbers represent the following land use classes: (1) agricultural, (2) land held for future use, (3) rural residential, (6) commercial non-traffic serving, (7) industrial (manufacturing), and (8) institutional-municipal.

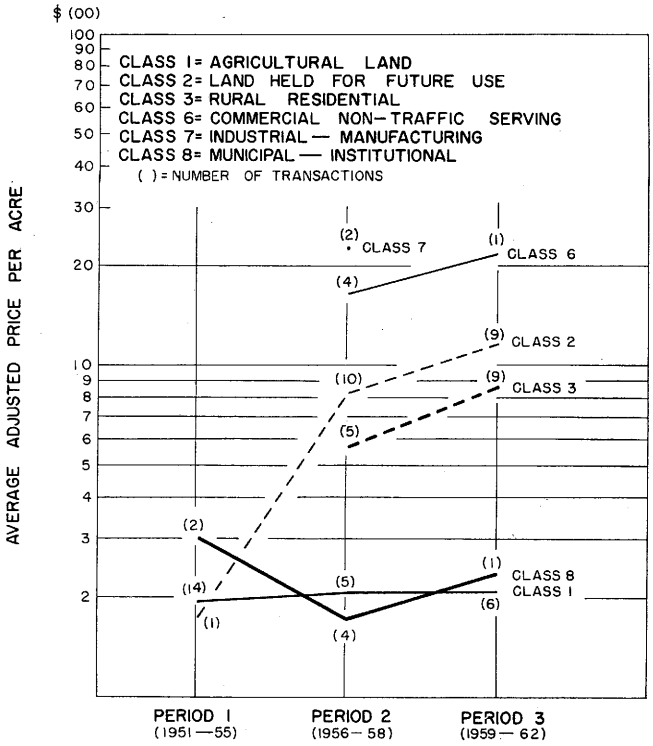


Figure 9. Sales of properties from uses to specific uses by time periods.

Underdeveloped tracts, or those in lower uses (such as agricultural), tended to change ownership before they actually changed to a higher use (such as residential). The buyers were either those who had the capital to develop these tracts into higher uses or speculators who were aware of the higher use potential of the tracts.

Figure 9 shows that a direct relationship existed between price and land use of each acreage tract which sold in periods 2 and 3. Of the six land uses, Classes 1 and 8 (agricultural and institutional) were considered the lowest, least intensive, uses. Classes 6 and 7 (commercial nontraffic serving and industrial) were considered the highest, most intensive, uses.

It is interesting to note that the tracts in Class 2 (land held for future use) sold for higher prices than tracts in Class 3 (rural residential). In general the Class 2 lands had a greater potential for development into even higher uses than Class 3 lands. Thus, land changing from lower uses to Class 2 maintained the direct and positive relationship with land values between the three periods.

Therefore, it seems that the new highway significantly affected the changes in use which occurred between the three periods. Most of the change in the price level of tracts selling to the various uses is also attributed to the facility. Thus, it has contributed to the direct relationship which exists between changes in land value and land use in the Waxahachie area.

Changes In Business Activities

This section of the report is concerned with an analysis of the effects of the IH 35E by-pass on retail businesses located along old U. S. 77 in Waxahachie, and the extent to which losses, if any, were offset by increases in business activity along the new route. Figure 10 shows the business study area segments.

The new route had a considerable effect on traffic volumes along the old route. The data shown in Table 11 indicate that between 1958 and 1962 the old route traffic volume declined by over 30 percent north and over 60 percent south of the city of Waxahachie. However, by 1962, the combined volume of the old and new routes was greater than the 1958 old route volume. While it could be assumed that some old route businesses (especially traffic serving) would experience a decline in gross sales caused by a reduction of through traffic volume, it could also be assumed that the establishment of new route businesses would tend to offset these losses. Net changes in the area as a whole, then, would depend upon both the adjustments made along the old route and the inducement to locate new firms along the new route.

Between 1958 and 1962, there was virtually no change in the average daily traffic volume on U. S. Highway 287 on either side of Waxahachie. Therefore, the gross sale figures of the study businesses along the old route of U. S. 77 were not biased by a change in traffic volume on U. S. 287.

Both short and long-term effects may have resulted from construction of the IH 35 facility. The short-term effects are considered as occurring during the construction period and immedately after opening the by-pass before necessary adjustment could be made. The long-term effects would be those occurring after a reasonable period of time had passed to allow for any needed adjustments in business operations.

Short-term benefits were sizable, since they included all expenditures made for materials and supplies necessary for construction of the facility. On the other hand, there should have been no short-term disbenefit due to construction, since no portion of U. S. 77 was disrupted. However, immediately after the opening of the facility, there were disbenefits to some businesses, especially those receiving a majority of their gross sales from highway customers. These disbenefits were obviously most severe during this initial period before any adjustments could be made.

While short-term effects are certainly important to the economy of an area, these effects are quite difficult to analyze and do not give as true a picture of the overall effect as the long-term analysis. Therefore, the longer run effects will be dealt with primarily in this report.

There are eight nonretail businesses which are not discussed in this section of the report. Of the eight businesses, six are located on the old route. These include an aluminum casing manufacturer, a life insurance company, a gas company and a motor bank. The two new route businesses are a clothing manufacturer and a baking warehouse.

Table 12 shows all old and new route businesses (73 retail, six nonretail, and two manufacturing) that were open during either one or both of the study years. Also, it shows those of each type that were planned or under construction in 1963.

For purposes of showing a clearer picture of the by-pass effects, the study routes' retail businesses are divided into two major groups, traffic serving and nontraffic serving. Of the 73 retail businesses in operation during 1958 and/or 1962, 36 were traffic serving and 37 nontraffic serving. These broad groups are further broken down into types of businesses.

Only retail businesses reporting actual information for both 1958 and 1962 are used in the data presentation for the primary analysis of each type of business. There are 29 such businesses, 17 traffic serving and 12 nontraffic serving. Data on the other 44 retail businesses (noncooperative, closed or new) are used to complete the analysis.

The experience of businesses remaining in operation through the whole period and giving actual gross sale data should give the most reliable measure of the new highway's influence on individual business volumes. However, this group in itself does not tell the whole story. Therefore, consideration is given also to the old businesses closing, new businesses opening, and noncooperative old and new businesses in order to complete the story.

Table 11
AVERAGE DAILY TRAFFIC ALONG THE OLD AND NEW ROUTES IN WAXAHACHIE, TEXAS[1]

	Average Daily Traffic Volume[2]			Changes in ADT From 1958 to 1962	
	1955	1958	1962		
	(Number)	(Number)	(Number)	(Number)	(Percent)
At North Exchange					
Old Route	6320	6560	4410	−2150	−32.8%
New Route	NA	NA	5150	+5150	NA
Total, Old and New Route	6320	6560	9560	+3000	−45.7%
At South Exchange					
Old Route	4980	5120	1800	−3320	−64.8%
New Route	NA	NA	3670	+3670	NA
Total, Old and New Route	4980	5120	5470	+ 350	+ 6.8%

[1]The data presented in this table are supplied by the Highway Planning Survey Division of the Texas Highway Department.
[2]The average daily traffic volumes are based on twenty-four hour periods.

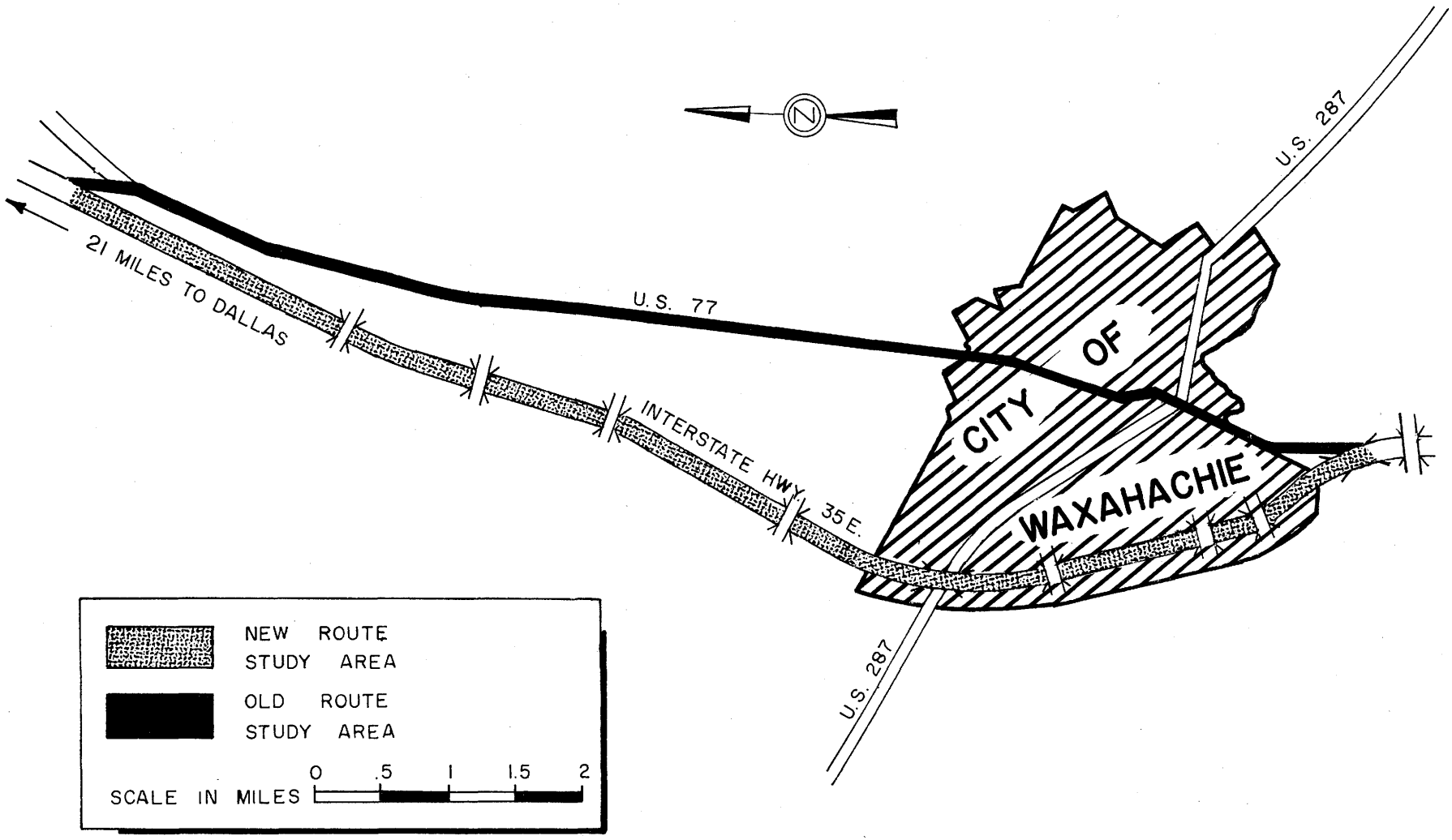
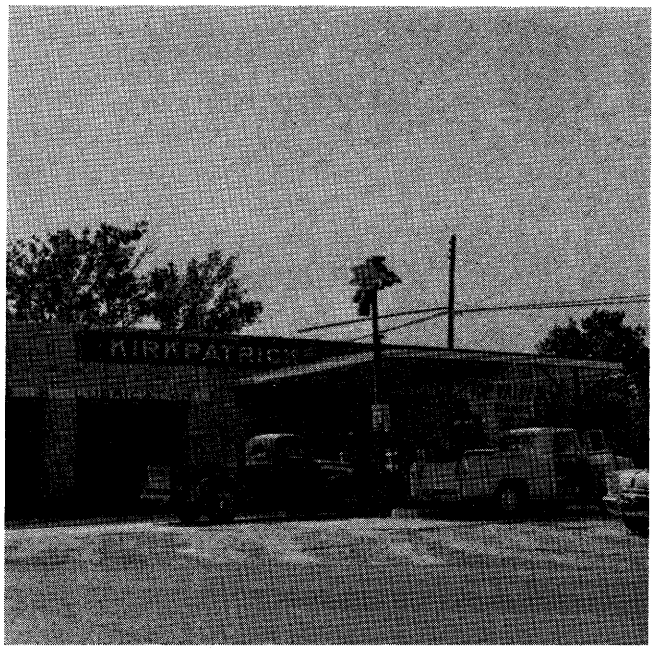


Figure 10. The Waxahachie business study areas.



Two of 11 older old route stations remaining in operation through the study years.

Two of 10 newer old route stations remaining in operation through the study years.

Traffic Serving Businesses

There were a total of 36 traffic serving businesses operating in the Waxahachie study area during 1958 and/or 1962. Of these businesses, 35 were old route firms, while one was the new route service station mentioned before. The three traffic serving sub-groups are composed of 27 service stations, six food service establishments, and three motels.

Service Stations

Of the 27 service stations, 25 were in operation during 1958, but four closed before 1962. The other two stations, one old route and one new route station, were opened between 1958 and 1962.

Only 10 of 21 stations that were open in both 1958 and 1962 reported actual gross sales for both study years. The individual percentage increase or decrease in gross dollar volume for each of these 10 reporting stations is shown in Figure 11.

Although there was a combined 17.3 percent decrease in gross dollar volume for these stations, there are factors other than the by-pass that should definitely be considered. There is reason to believe that the stations showing a decrease had lower quality management and less desirable physical facilities than those which experienced increases. Of these six stations, three gave exterior impressions that were definitely not conducive to drawing either transient or local customers. While

Table 12

TOTAL NUMBER OF OLD AND NEW ROUTE BUSINESSES THAT WERE IN OPERATION DURING 1958 AND/OR 1962 AS WELL AS THOSE BUSINESSES OPENING, UNDER CONTRUCTION OR PLANNING CONSTRUCTION IN 1963

Type of Business	Number of Businesses In Operation Along Old Route: 1958 and 1962 (Number)	Old Route: Closed before 1962 (Number)	Old Route: Opened By 1962 (Number)	Old Route: Opened after 1962 (Number)	New Route: Opened By 1962 (Number)	New Route: Opened after 1962 (Number)
			TRAFFIC SERVING			
Service Stations	21	4	1	0	1	2
Food Service	6	0	0	0	0	1
Motels	3	0	0	0	0	2
Total Traffic Serving	30	4	1	0	1	5
			NONTRAFFIC SERVING			
Grocery Stores & Drive-Ins	2	1	1	1	0	0
Automotive Sales & Repair	9	1	3	1	0	0
Service	2	1	3	1	0	0
Other Retail	6	2	6	6	0	1
Nonretail	4	0	1	0	1	0
Manufacturing	0	0	1	0	1	1
Total Number Nontraffic Serving	23	5	15	9	2	2
Total All Businesses	53	9	16	9	3	7

the other three declining stations presented a much better front, unsatisfactory management seems to be at least partially the cause for their sales decrease. One of these stations had four, and another had three ownership changes between 1958 and 1962.

It is significant that four of the old route stations experienced a gross dollar volume increase averaging about 18 percent. All were in relatively new buildings, with only one being over 10 years old. They had a pleasing exterior appearance and modern equipment. Their operators gave very good service. Taking these facts into consideration, it would quite possibly be misleading to assume that the IH 35E by-pass was the sole factor in bringing about all the 17.3 percent sales decrease for the 10 stations combined.

Eleven of the 21 old service stations reported gallonage for both study years. Their percentage increase or decrease in gallonage is shown in Figure 12. Four of the 11 stations experienced increased gallonages. Of these 11 stations, six also reported gross sales for both study years. As would be expected, stations having increases in dollar volume also had increases in gallonage. This comparison is shown in Figure 13.

Also, in every case of dollar and gallonage increase, there was no increase in annual hours of operation. In fact, two of the four reported that they made these gains

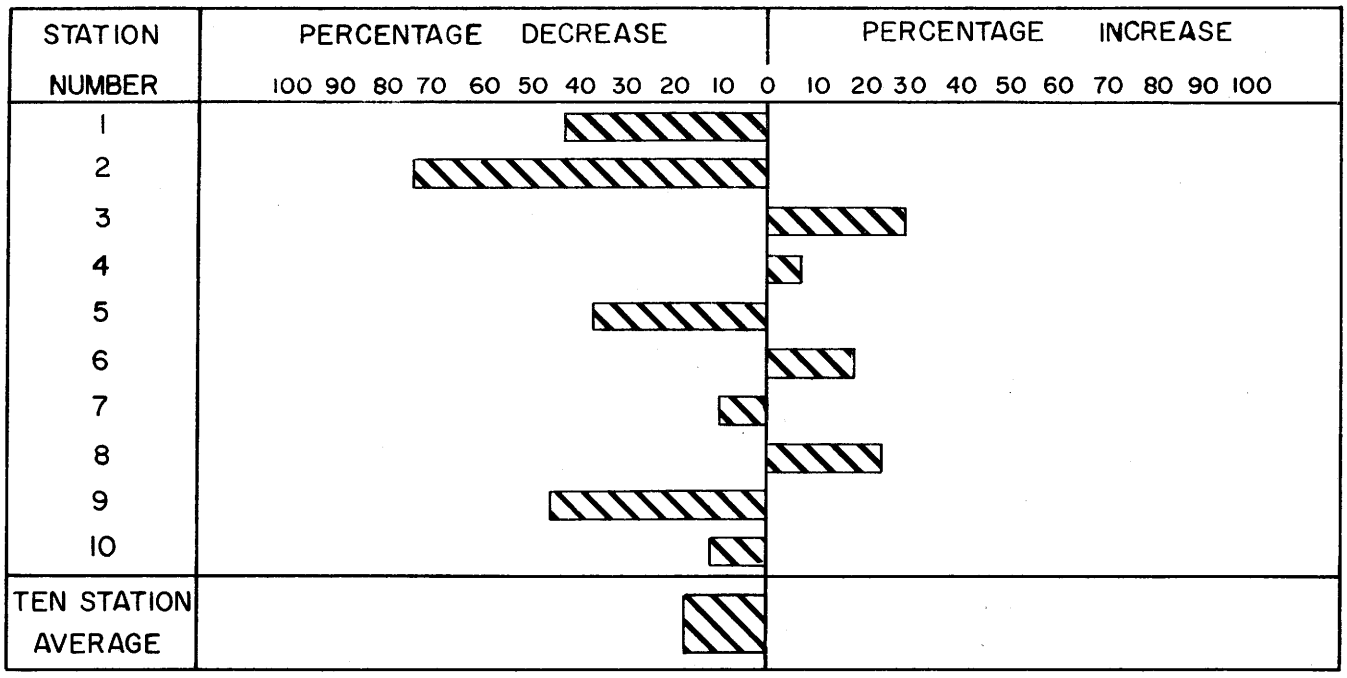


Figure 11. Percentage changes in gross dollar volume of ten old route service stations reporting actual sales data for both 1958 and 1962.

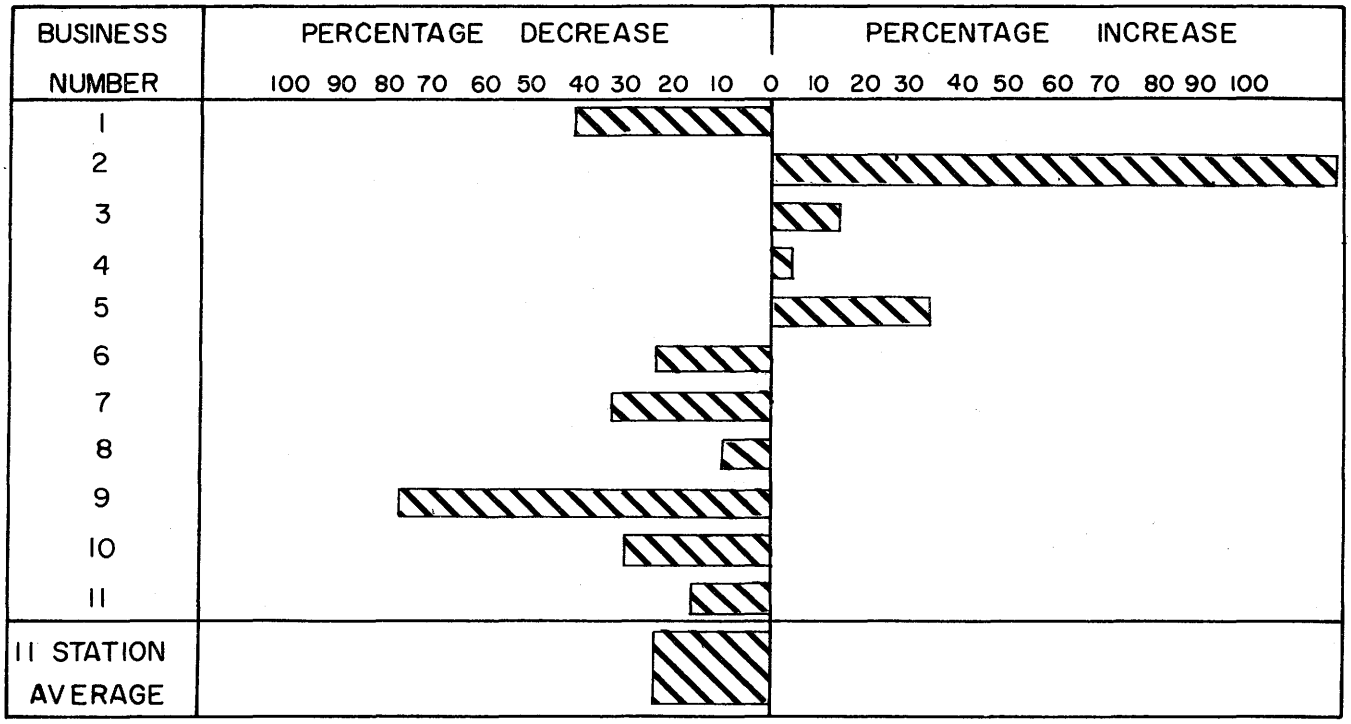


Figure 12. Percentage changes in gasoline gallonage volume of eleven old route service stations in operation during 1958 and 1962.

even though they decreased their annual hours of operation. Only one of the stations that declined in dollar and gallonage volume increased its operation time. These facts seem to substantiate the hypothesis that type of management, service, and atmosphere govern to a great extent whether or not an individual station will show a gain or a loss in gross sales. However, the data also support the conclusion that the total gross sales of all service stations as a group were adversely affected by the by-pass route.

Food Service Establishments

All six of Waxahachie's old route food service establishments were open in 1958 and 1962, with five establishments reporting gross sales for both study years. One of the restaurants burned during 1962. The percentage changes in dollar volume for these five reporting businesses are shown in Figure 14. On an aggregative basis they show a slight increase in gross sales in 1962 and 1958.

It is natural to assume that these businesses lost transient customers when the by-pass opened. Also, it is possible that the aggregate percentage increase in gross sales would have been somewhat larger had all of the through traffic remained on the old route. However, the three businesses showing sales increases must have gained enough local patronage to more than compensate for customer losses attributed to the by-pass. In fact, two of these businesses took definite steps to gain local business. They are prime examples of how good management can increase sales. One owner took over in 1957 when business was declining. He remodeled and improved his service, and his reported increase in gross sales speaks for itself. The other owner took over his business after the new facility was opened. The previous management had been unable to cope with the changes

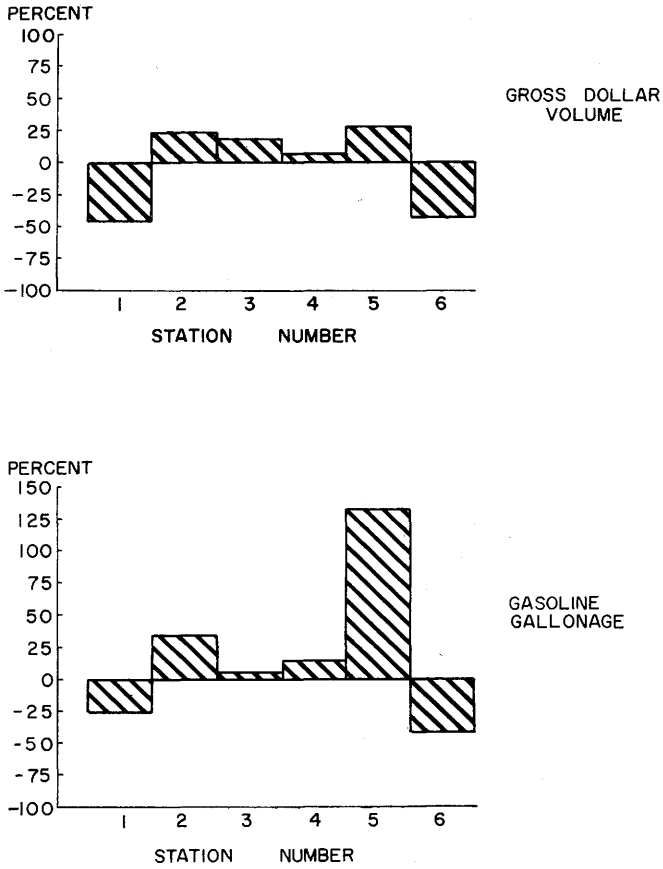


Figure 13. A comparison of the percentage changes in gross dollar and gallonage volumes of six old route service stations reporting actual data for both 1958 and 1962.

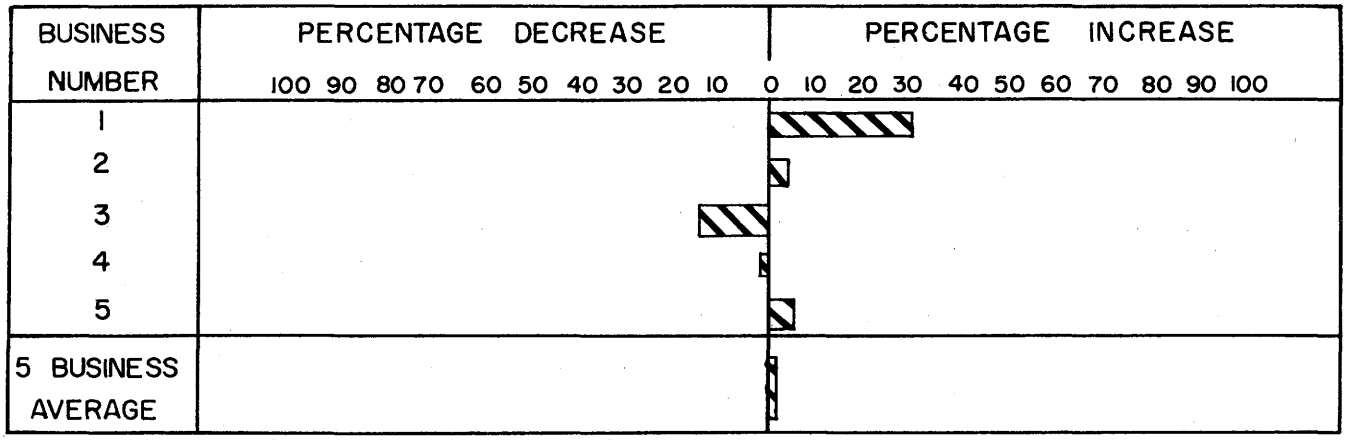


Figure 14. Percentage changes in gross dollar volume of five old route food service establishments in operation between 1958 and 1962.

brought about by the by-pass, but the increased stock and advertising brought about by the new management increased his business shortly by over 10 percent.

In general, the management of all five establishments felt that the gross sales of their businesses had initially declined due to the by-pass. However, most also felt that with less through traffic congestion they had gained some local patronage. Since three of the five businesses have more than offset their by-pass losses, at least in part by modernizing, advertising, and an over-all good managerial policy, there is reason to assume that the others could overcome their losses in the same manner.

Motels

All three of Waxahachie's motels on the old route were operating in both study years. But only two were able to furnish complete gross sales information for both years. Therefore, no percentage change graph is shown for the motel category in order to conceal the identity of the figures of the two reporting motels. However, the motel gross sale data are included in all totals tables.

Each of these two reporting motels showed sizable gross sale increase in 1962 over 1958, with a combined increase of 43.3 percent. This seems to be an unusually large increase for motels in a by-passed community, and it must mean that these motels were receiving as much or more transit trade in 1962 than in 1958. One explanation for such an increase in transient trade could be that most traveling business men are looking for more modest and reasonable housing, of which all the above qualify, than found in the luxury class motels located directly on the super highway. Also, these motels get traveling salesmen and others who have business in town. The general increase in the level of Waxahachie's business has brought in more salesmen and temporary workmen. One motel added three kitchenette apartments after the by-pass was opened, specifically for this purpose.

Two of the three motel owners felt the by-pass would definitely be a benefit to Waxahachie in the long run, even though they thought the new by-pass had depreciated the value of their respective motel properties.

Two of six old route food service establishments operating in 1958 and 1962.

Two of three old route motels operating in 1958 and 1962.

All Traffic Serving Businesses

As indicated earlier, there were 17 old route traffic serving businesses which reported gross sales for both 1958 and 1962. Nineteen other such businesses on both routes were either open in 1958 but closed before 1962, newly opened after 1958 (including the new route service station), or noncooperative during one or both years. Table 13 shows the estimated change in combined gross sales for all the 36 traffic serving businesses by type of business and aggregatively. On the aggregated basis, the gross sales of traffic serving businesses declined 13.5 percent between 1958 and 1962. This decrease is solely attributable to the service station group, as both the food service establishments and motels showed increases in gross sales between the two study years. In other study areas, the motel group has been the most adversely affected by removal of transient customers.

There are several important characteristics to be considered in determining whether a particular business can adjust to an external change of the magnitude of a by-pass. Table 14 lists these characteristics for the 17 traffic serving businesses that reported gross sales for 1958 and 1962. For each major group of businesses having a certain characteristic, the percentage change in gross sales is shown for that group.

The two most striking categories are building age and building condition. Whereas the traffic serving group as a whole showed a 13.5 percent decrease in gross dollar volume, the businesses housed in newer buildings and buildings in excellent condition showed a definite increase in sales. Those in older buildings in poorer condition experienced a decline in sales. Also, businesses in rented buildings suffered a greater decline in sales than those that were owner-operated. Time under present management showed mixed results.

The characteristics of the other 19 traffic serving businesses are shown in Table 15. Since gross sales of these firms were available for only one year, the characteristics of these businesses could not be directly related to changes in gross sales. However, some infer-

Table 13

ACTUAL AND CALCULATED GROSS DOLLAR VOLUME OF THIRTY-SIX TRAFFIC SERVING BUSINESSES IN OPERATION ALONG THE OLD AND NEW ROUTES DURING 1958 AND/OR 1962

Business	Gross Dollar Volume[1]		Change from	
	1958	1962	1958	1962
	(Dollars)	(Dollars)	(Dollars)	(Percent)
27 Service Stations	$1,464,303	$1,190,070	$−274,233	−18.7%
6 Food Service Establishments	372,973	375,989	+ 3,016	+ 0.8%
3 Motels	40,141	57,526	+ 17,385	+43.3
Total, 36 businesses	$1,877,417	$1,623,585	$−253,832	−13.5%

[1]The totals in each category include gross sales for all businesses in that particular group, whether the business closed before 1962, opened after 1958, or was open both study years. In every case where there should have been actual gross sales, but none were reported, these values were estimated. The estimates of gross sales in each category for uncooperative businesses open in 1958 and 1962 were based on the percentage increase of the businesses reporting actual gross sales for both study years. For nonreporting businesses open only one of the two study years, the gross sales estimates in each category were based on the average of the businesses reporting actual gross sales for the particular study year open.

[2]The gross sales for the one new route station are included in this total.

Table 14
SOME CHARACTERISTICS OF TWENTY-NINE OLD ROUTE RETAIL BUSINESSES RELATED TO PERCENTAGE CHANGES IN GROSS SALES BETWEEN 1958 AND 1962

Characteristic[1]	17 Traffic Serving Businesses		12 Nontraffic Serving Businesses	
	Number of Businesses	Percentage Change In Gross Dollar Volume Between 1958 and 1962	Number of Businesses	Percentage Change in Gross Dollar Volume Between 1958 and 1962
	(Number)	(Number)	(Number)	(Number)
Location of Business				
Corner Lot	11	−13.2	4	+40.8
Inside Lot	6	− 3.3	8	+12.7
Age of Building,				
5-8 Years	3	+18.9	2	+14.4
9-12 Years	2	+ 6.6	0	
13-16 Years	4	−15.2	2	+26.4
17 Years and Over	8	−23.5	8	+38.0
Condition of Building,				
Excellent	2	+10.7	1	+ 4.2
Good	10	− 1.2	9	+39.8
Fair	3	−44.9	0	
Poor	2	−18.2	2	−39.5
Type of Building,				
All Brick and Masonry	12	− 2.5	5	+32.5
Part Brick & Masonry	2	−43.9	3	+33.5
Frame	3	−15.6	2	+20.0
Other Materials	0		2	−37.0
Building Ownership,				
Owned	7	− 6.3	6	+ 8.6
Rented	10	−11.6	6	+39.8
Time Business Under Present Management,				
Under 1 Year	2	+35.6	1	+61.4
1-3 Years	2	−46.5	1	+52.9
4-6 Years	5	+ 9.7	1	+ 4.2
7 Years and Over	8	−11.2	9	+22.8
Distance from Main Business Area				
0-0.5 Miles	7	− 7.5	7	+39.1
0.6-1.0 Miles	6	−20.7	1	+ 4.2
1.1-1.5 Miles	4	− 0.6	3	−13.9
1.6 Miles and Over	0		1	+38.5

[1]As of 1962.

ences can be drawn. All four businesses that closed were service stations housed in rented buildings at least 11 years old. Three of these were under the same management less than four years. Eight of these 19 traffic serving businesses were in buildings rated in fair or poor condition. Thirteen of the buildings were at least 11 years old.

Another factor that should be considered in trying to determine the effect of the IH 35E by-pass on study area businesses is the relationship between the number of employees and weekly hours of operation. Table 16 shows the percentage change in number of employees and weekly hours of operation for 18 reporting traffic serving businesses. These businesses, as a group, indicate that neither the number of employees nor the number of hours they worked declined between 1958 and 1962. Thus construction of the new highway did not appreciably depress man hour employment in the case of traffic serving businesses.

Included in the interviews were questions that enabled the owners of the businesses to state any favorable or unfavorable effects that they felt the by-pass had made on Waxahachie in general. Table 17 lists these advantages and disadvantages referred to by traffic serving and nontraffic serving businesses.

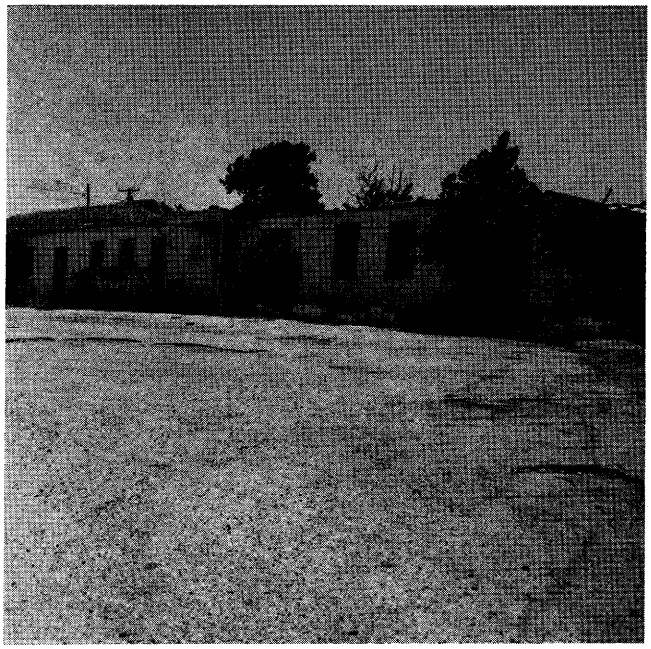
The greatest advantage noted by the owners of the 36 traffic serving businesses was the alleviation of the traffic congestion problem, while the most noted disadvantage was gross sale losses to the old route traffic serving businesses.

Nontraffic Serving Businesses

There was a total of 37 old route nontraffic serving retail businesses in operation in the Waxahachie study area during 1958 and/or 1962. These businesses are divided into four categories—grocery stores and drive-ins, automotive sales and repairs, service businesses, and other retail businesses. Due to the small number of businesses reporting actual gross sales for both 1958 and 1962 in two of the four above categories, percentage change graphs are not used in the discussion of each subgroup. Instead, the 12 reporting nontraffic serving businesses are shown separately in Figure 15. As a group these businesses experienced a gross sales increase of over 30 percent between 1958 and 1962.

Grocery Stores and Drive-Ins

There were two drive-in groceries, one chain supermarket, and one independent grocery store in operation along old U. S. 77 in 1958 and/or 1962. Two of these four businesses were open both study years while one closed before 1962 and one opened after 1958. Of the two old businesses remaining open, only one reported gross sales for both 1958 and 1962. This store had a 19.1 percent increase in gross dollar volume from 1958



Restaurant

Service Station

Grocery Market

Electric Services

Four of nine old route businesses which were closed after 1958.

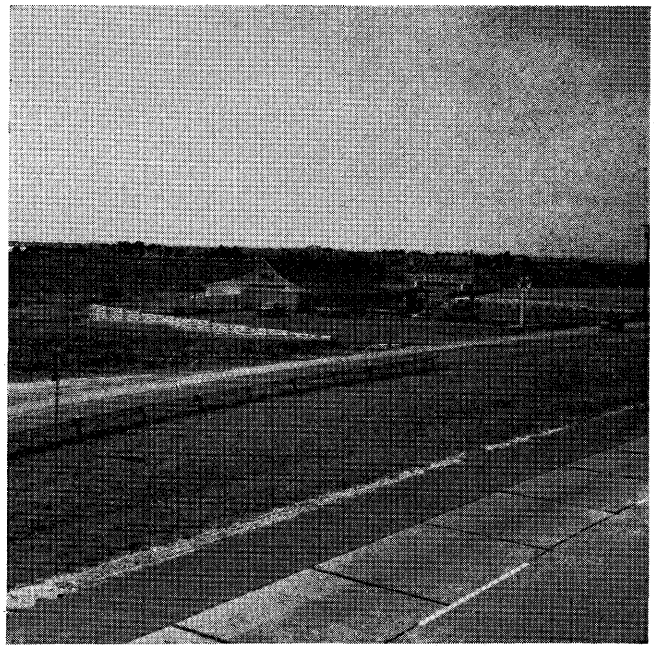
to 1962. It was the opinion of the operator that the by-pass, by alleviating the traffic congestion in the old route, at least in part accounted for the store's increase in local trade.

Also, the owner of the store that closed stated that his business was entirely local, and therefore independent of transient patronage. Aggregatively, the general opinion of store owners was that the by-pass may have caused an increase in their business along the old route. One good example of the new attractiveness of the old route was the construction of another nationally known chain supermarket in 1963.

Automotive Sales and Repairs

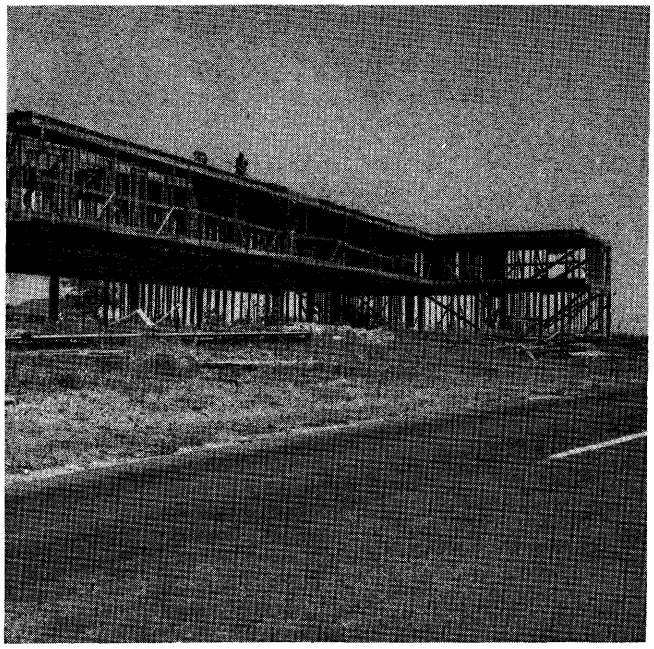
There was a total of 13 automotive sales and repair businesses operating along the old route during 1958 and/or 1962. These businesses included farm equipment sales and service, new car sales and service, used car sales, and car service garages. Of the 13 businesses, nine were open both study years, one closed before 1962, and three were opened after 1958.

Six automotive businesses open in 1958 and 1962 reported actual gross sales for both years. Of these six, included in Figure 15, four showed increases and two showed decreases in gross dollar volume from 1958 to



Combination Station and Food Service

Service Station



Motel

Service Station

Four of six traffic serving businesses which were located on the new route after 1958.

1962. The owners of these businesses felt that on the whole, any loss of transient trade was made up by gains in local trade. This is shown by the 30.6 percent increase in sales for the six businesses. Of the two businesses showing losses from 1958 to 1962, one was an automobile repair shop housed in an old building without modern equipment. The other one was a small used car lot.

Service Businesses

There were six service businesses in operation along the old route in 1958 and/or 1962. These businesses included washaterias, air conditioning and electric service, radio and television service and beauty and barber shops. Of these six businesses, only two were open both in 1958 and 1962, and each reported actual sales information for both study years. One business closed before 1962, and three opened after 1958.

Of the two reporting businesses, one had an increase in sales from 1958 to 1962, while the other had a decrease. Both owners felt the by-pass had helped rather than hindered their business. Their trade was entirely local and the by-pass made it easier and safer for more local customers to travel on the old route.

Other Retail Businesses

This section is concerned with all old route retail businesses not in the above groups. There were 14 of these businesses operating in 1958 and/or 1962. Six of them were open both in 1958 and 1962, and six came to existence after 1958.

Of the first six businesses, three furnished gross sales data for both years, all three showing a large percentage gain in gross dollar volume. Two of these three owners felt that the by-pass did not cause any significant loss of business. In fact, they felt that an increase in local trade overcame any possible loss in transitory trade.

All three reporting businesses were housed in buildings in good condition, and the ownership had not changed since the businesses were originally opened.

In 1963, construction began on two new chain stores (a drug store and a dry good store) abutting the old route. Sites for other shoppers' goods businesses were

Table 15

SOME CHARACTERISTICS OF FORTY-FOUR OLD ROUTE RETAIL BUSINESSES THAT WERE NONREPORTING, CLOSED BEFORE 1962, OR NEW AFTER 1958

Characteristic[1]	19 Traffic Serving Businesses			25 Nontraffic Serving Businesses		
	Nonreporting Open in 1958 and 1962	Closed Before 1962	Opened After 1958	Nonreporting Open in 1958 and 1962	Closed Before 1962	Opened After 1958
	(Number)	(Number)	(Number)	(Number)	(Number)	(Number)
Location of Business						
Corner Lot	9	2	2	4	4	5
Inside Lot	4	2		3	1	8
Age of Building						
Under 5 Years			2			4
5-10 Years	4			3		1
11-15 Years	2	1		1		2
16 Years and Over	7	3		3	5	6
Condition of Building						
Excellent	2		2	1	1	4
Good	5	2		1	1	5
Fair	4	2		4	2	2
Poor	2			1	1	2
Type of Building						
All Brick & Masonry	9	3	2	2	3	8
Part Brick & Masonry Frame	3	1		5	2	3
Building Ownership						2
Other Materials	1					
Owned	5			5	1	6
Rented	8	4	2	2	4	7
Time business Under Present Management						
Under 1 Year	4	1	1	1		3
1-3 Years	6	2	1	2	2	10
4-6 Years	1			1	1	
7 Years and Over	2	1		3	2	
Distance from Main Business Area						
0.0-0.5 Miles	5	2		4	4	3
0.6-1.0 Miles	2	1		3	1	4
1.1-1.5 Miles	3		1	1		5
1.6 Miles and Over	3	1	1			1

[1]As of 1962.

Table 16

A COMPARISON OF NUMBER OF EMPLOYEES AND WEEKLY HOURS WORKED FOR THIRTY STUDY AREA BUSINESSES REPORTING ACTUAL DATA FOR BOTH 1958 AND 1962

Business Category	Total Number of Employees		Percentage Change from 1958 to 1962	Total Weekly Hours Worked		Percentage Change from 1958 to 1962
	1958	1962		1958	1962	
	(Number)	(Number)	(Percent)	(Number)	(Number)	(Percent)
		Traffic Serving[1]				
14 Service Stations	57	46	−19.3%	2985	2651	−11.2%
4 Food Service Establishments	20	32	+60.0	872	1212	+39.0
Total, 18 Businesses	77	78	+ 1.3	3857	3863	+ 0.2
		Nontraffic Serving				
7 Automotive Sales & Repairs	49	49	0.0	1973	2056	+ 4.2
5 Other Nontraffic Serving Retail Businesses[2]	36	37	+ 2.8	974	932	− 4.3
Total, 12 Businesses	85	86	+ 1.2%	2947	2988	+ 1.3%
Total, 30 Traffic & Nontraffic Serving Businesses	162	164	+ 1.2%	6804	6851	+ 0.7%

[1]Since the motels theoretically remained open on a 24 hour basis, they were excluded from this table.

[2]Since the other three nontraffic categories are so sparsely represented by reporting businesses, they are combined in this table.

Table 17
ADVANTAGES AND DISADVANTAGES OF THE IH 35E BY-PASS AS REPORTED BY THE 73 OWNERS OF THE STUDY AREA BUSINESSES

Item	Traffic Serving Businesses (Number)	Nontraffic Serving Businesses (Number)	Total All Businesses (Number)
Advantages of By-Pass			
Less Traffic Congestion	15	15	30
Increase in Local Business	5	7	12
New Business Opportunities	3	1	4
Less Traffic Connected Danger	2	2	4
Less Noise	2		2
Disadvantages of By-Pass			
Gross Sale Losses to Old Route Traffic Serving Businesses	19	18	37
Gross Sale Losses to all Town Businesses	7	6	13
Only Temporary Gross Sale Losses of Business	5	2	7
Decrease in Old Route Property Values	1		1

being cleared of old residences. This is further evidence of the desirability of the old route for nontraffic serving businesses.

All Nontraffic Serving Businesses

As mentioned before, 12 of the 37 nontraffic serving businesses operating on the old route reported gross volumes for both 1958 and 1962. The other 25 businesses were one of the following: closed before 1962, new businesses opening after 1958, businesses whose management was uncooperative in one or both years. Table 18 shows the percentage changes in the combined (actual and calculated) gross sales for these 37 nontraffic serving businesses.

Whereas the 36 traffic serving businesses showed a combined decline of 13.5 percent in gross sales, the 37 nontraffic serving businesses show a combined 10.1 percent increase in gross sales. These comparisons substantiate the assumption that nontraffic serving businesses in Waxahachie were more adaptable to the changed conditions brought about by the new highway. Nontraffic serving businesses in all categories other than grocery stores and drive-in groceries were able to increase their local business, even though they faced increased competition from Dallas firms brought about by the new facility.

The characteristics and gross sales changes of the 12 nontraffic serving businesses reporting actual sales data for 1958 and 1962 are shown in Table 14. The age of the buildings does not seem to have adversely affected business volume unless the building was in poor condition. It seems that in smaller towns, people tend to trade with the older established businesses as long as these businesses present a pleasing appearance and handle a quality product. It also appears that the type of structure and location were relatively unimportant in the nontraffic group. However, businesses on corner lots and in all-brick or masonry buildings showed somewhat larger dollar volume increases between 1958 and 1962 than businesses on inside lots housed in buildings of other materials.

The characteristics of the 25 nonreporting, closed, and new nontraffic serving businesses are shown in Table

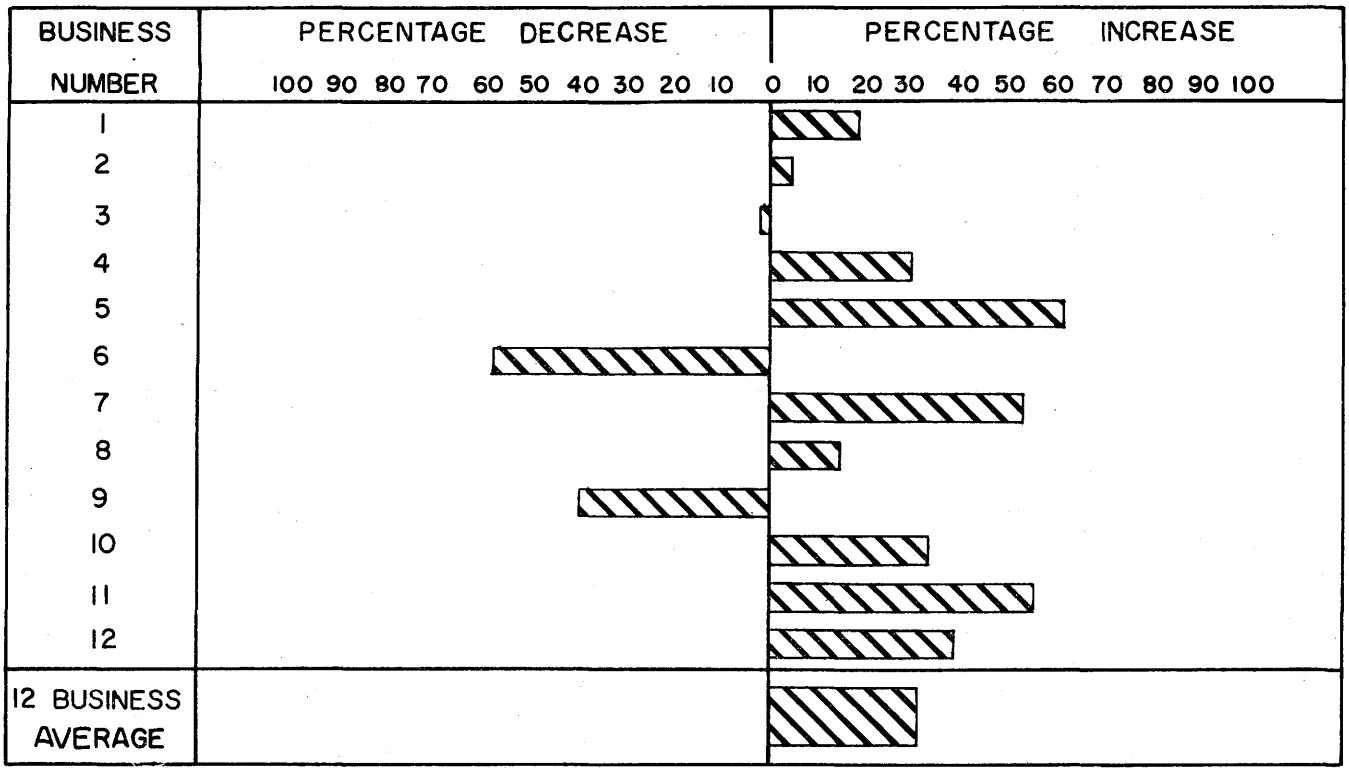


Figure 15. Percentage changes in gross dollar volume of twelve nontraffic serving businesses reporting actual sales figures for both 1958 and 1962.

Table 18

ACTUAL AND CALCULATED GROSS DOLLAR VOLUME OF NONTRAFFIC SERVING BUSINESSES IN OPERATION ALONG OLD U. S. 77 DURING 1958 AND/OR 1962

Type of Business	Gross Dollar Volume[1]		Change From 1958 to 1962	
	1958	1962		
	(Dollars)	(Dollars)	(Dollars)	(Percent)
4 Grocery Stores or Drive-Ins	$1,631,041	$1,315,183	$−315,858	−19.4%
13 Automotive Sales and Repair Businesses	2,653,585	3,308,291	+654,706	+24.7
6 Service Businesses	28,000	37,469	+ 9,469	+33.8
14 Other Retail Businesses	546,712	690,060	+143,338	+26.2
Total: 37 Businesses	$4,859,338	$5,351,003	$+491,665	+10.1%

[1]Totals include gross sales for all businesses in each particular group, whether the business closed before 1962, opened after 1958, or was open both study years. In every case where there should have been actual gross sales, but none were reported, these values were estimated. The estimates of gross sales in each category for uncooperative businesses open in 1958 and 1962 were based on the percentage increase of the businesses reporting actual gross sales for both study years. For nonreporting businesses open only one of the two study years, the gross sales estimates in each category were based on the average of the businesses reporting actual gross sales for the particular study year open.

Four of the major old route nontraffic serving businesses remaining in operation through the study period.

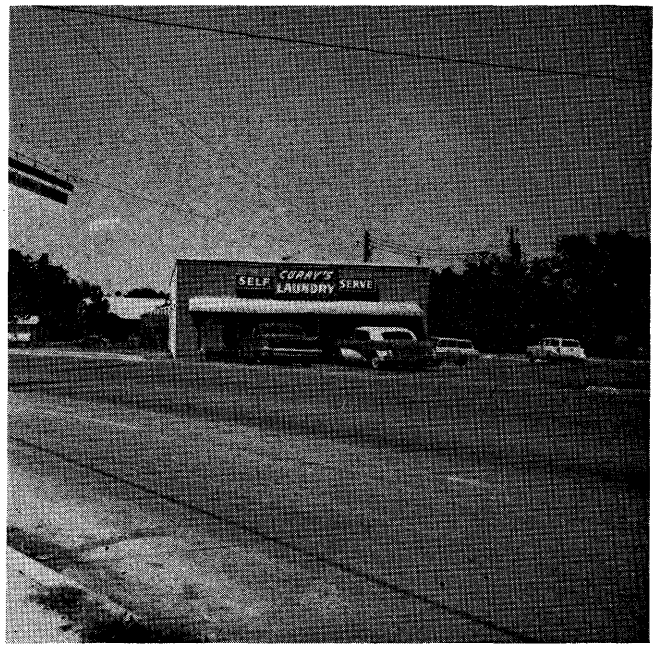
15. All of the five businesses that closed were housed in buildings 16 years old or older. Building age alone would not necessarily have adversely affected the sales of these businesses. However, since four of these five businesses were housed in rented buildings, and three of the five were in less than good condition, the combination of factors probably caused the closings.

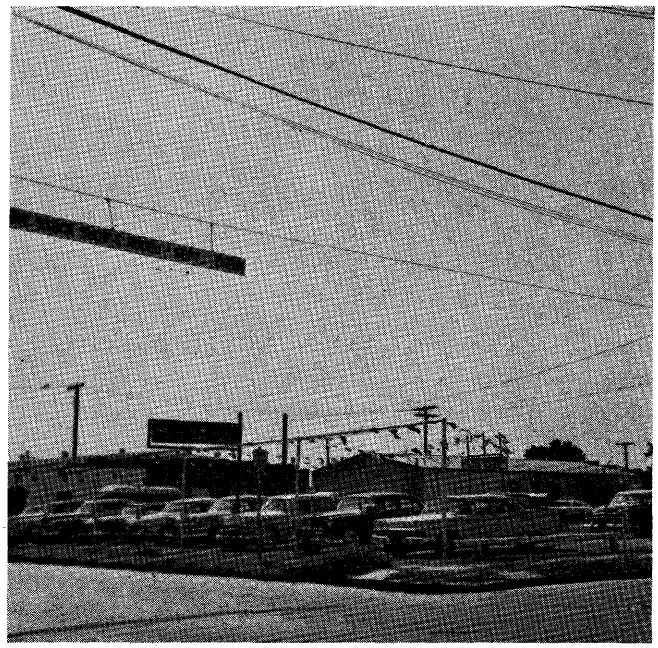
The employee hours of operation relationship for the nontraffic serving group is included in Table 16. The 12 reporting nontraffic serving businesses, like traffic serving businesses, show slight combined increases in both numbers of employees and weekly hours of operation.

Included in Table 17 is a list of the opinions of the 37 nontraffic serving businesses concerning the advantages and disadvantages of the new facility. Their opinions were similar to those reported by the traffic serving group. They felt that the lessening of the traffic congestion problem and the losses to old route traffic serving businesses were the greatest respective advantages and disadvantages created by the new highway.

All Traffic and Nontraffic Serving Businesses

By combining all study area retail businesses (those on both routes), an over all estimate of Waxahachie's business changes between 1958 and 1962 can be made. These study area businesses consist of the previously discussed 36 traffic serving businesses (including the one new route service station) and 37 nontraffic serving businesses.





Some of the old route businesses which have opened since the new route was completed.

Table 19

ACTUAL AND CALCULATED GROSS DOLLAR VOLUME OF ALL SEVENTY-THREE RETAIL BUSINESSES OPERATING IN THE WAXAHACHIE STUDY AREA IN 1958 AND/OR 1962

Type of Business	Gross Dollar Volume		Change From 1958 to 1962	
	1958	1962		
	(Dollars)	(Dollars)	(Dollars)	(Percent)
29 Businesses with Actual 1958 and 1962 Data	$3,123,707	$3,680,416	$+ 556,709	+17.8%
20 Businesses with Some Estimated 1958 and/or 1962 Data[1]	2,367,958	2,168,129	− 199,829	− 8.4
Total, 49 Businesses Open Both 1958 and 1962	5,491,665	5,848,545	+ 356,880	+ 6.5
7 Businesses with Actual 1958 Data That Closed Before 1962	641,398	NA	− 641,398	NA
2 Businesses with Estimated 1958 Data That Closed Before 1962	603,692	NA	− 603,692	NA
Total, 9 Businesses Open 1958 but Closed 1962	1,245,090	NA	−1,245,090	NA
12 New Businesses with Actual 1962 Data[2]	NA	666,089	+ 666,089	NA
3 New Businesses with Estimated 1962 Data	NA	459,954	+ 459,954	NA
Total, 15 New Businesses	NA	1,126,043	+1,126,043	NA
Grand Total for 73 Businesses	$6,736,755	$6,974,588	$+ 237,833	+ 3.5%

[1]See the footnote under Table 18 for estimating procedures.
[2]This total includes the new route service station.

Table 19 shows that, on a combined basis, these 73 businesses increased 3.5 percent in gross dollar volume from 1958 to 1962. The percentage change in total gross sales in the study area between 1958 and 1962 was not greatly affected by closing businesses, as new businesses made up all but about 10 percent of the 1958 sales volume of those closed.

For a further insight into the over all retail sales picture in Waxahachie, the result of the 1963 "Census of Business," conducted by the United States Department of Commerce, are contrasted to the gross sales of the study area businesses in Table 20. Data from the "Census of Business" are presented on Waxahachie and three control towns of reasonably comparable size that were not by-passed during the study period, but are on Interstate (or divided) highways. These data show that Waxahachie had a 13.1 percent increase in gross dollar volume between 1958 and 1963 compared to the 3.5 percent increase between 1958 and 1962 for the 73 study area businesses. This is compared to a 17.8 percent increase in gross sales from 1958 to 1963 for the State of Texas, and a 19.7 to 28.1 percent increase for the control towns.

The above figures show that Waxahachie lagged slightly behind both the State of Texas and the control towns. Although the gross sales of all 73 study area businesses showed even a greater lag than the whole town, 29 of these reporting 1958 and 1962 data increased 17.8 percent which is the same for the State of Texas. Seventeen of the above 29 businesses were traffic serving in nature.

In conclusion, the business study area (old and new route businesses) as a whole was not adversely affected by the new by-pass in an absolute sense. Of the traffic serving businesses, the service stations did suffer a sizable loss of transient business. Motels did not. Of the nontraffic serving businesses, the grocery stores and drive-ins experienced a decline in sales that was not considered to be attributable to the new highway. The remaining businesses experienced a 22.7 percent increase, or an annual increase of 5.7 percent. The nine businesses (traffic and nontraffic) which closed were replaced by 15 new businesses.

Although no data were collected on businesses opening after 1962, it should be noted that 15 new retail businesses were either opened or under construction on both routes in the succeeding period. There were five new route traffic serving businesses—another service station, a luxury restaurant, two luxury type motels, and a combination service station-food service-specialty center. Also, one small nontraffic serving business located on the new route. On the old route, 9 new businesses were opened or under construction after 1962. These included a chain drugstore, a chain supermarket, and a chain department store. One new route manufacturer, a fiber glass producer, opened after 1962.

Table 20

RETAIL SALES AS REFLECTED BY SEVENTY-THREE BUSINESSES INTERVIEWED VERSUS THAT REPORTED BY THE BUREAU OF CENSUS' "CENSUS OF BUSINESS" FOR WAXAHACHIE, McKINNEY, CORSICANA, WEATHERFORD, AND THE STATE OF TEXAS, 1958 AND 1963

Source of Information	Population		Change from 1950 to 1960	Total Retail Sales		Change from 1958 to 1963	
	1950	1960		1958	1963		
	(Number)	(Number)	(Percent)	(Dollars)	(Dollars)	(Dollars)	(Percent)
73 Study Area Businesses Interviewed[1]	NA	NA	NA	$ 6,736,755	$ 6,974,588	$+ 237,833	+ 3.5%
"Census of Business"[2]							
Waxahachie	11,204	12,749	+13.8%	16,894,000	19,113,000	2,219,000	13.1%
McKinney	10,560	13,763	+30.3%	19,575,000	24,638,000	5,063,000	25.9%
Corsicana	19,211	20,344	+ 5.9%	26,646,000	31,883,000	5,237,000	19.7%
Weatherford	8,093	9,759	+20.6%	17,716,000	22,688,000	4,972,000	28.1%
State of Texas	7,711,194	9,579,677	+24.2%	$10,792,559,000	$12,715,376,000	$1,922,817,000	17.8%

[1]The after year for study area businesses in 1962 instead of 1963.
[2]This is a publication prepared by the Bureau of Census concerning retail sales on a state, county, and city basis. The Bureau of Census bases their statistics on income tax information for 1958 and 1963.

Other Economic Changes In Waxahachie

This section of the report is concerned with some general changes that have taken place within Waxahachie between 1958 and 1962. It may be logical to assume that at least some of these changes could be related directly to the construction of the new facility. However, it would be extremely difficult to measure how much effect, if any, the new highway has had on the individual economic indicators shown in Table 21. Therefore, these indicators will be presented merely to show the status of Waxahachie's economy during the 1958-62 period and not primarily to show any definite links between the new facility and the various aspects of community growth.

Employment by Local Manufacturing Firms

There was a total of 36 firms falling into the broad category of "manufacturing" operating in Waxahachie during 1958 and/or 1962 according to the "Directory of Texas Manufacturers." The diversity of industrial development in the Waxahachie area is shown by the wide range of products produced by these 36 firms. Some of the major products are house furniture, yard furniture, oil field equipment, ladies' dresses, men's slacks, industrial laundry service, and commercial refrigeration.

An estimate of the number of persons employed by manufacturing firms was made for firms operating in 1958 and 1962.[1] The estimated number of persons employed was 1,358 in 1958 and 1,753 in 1962. This is an increase in employment of 29.1 percent between the two study years. Although there was one more manufacturing firm operating in 1958 than in 1962, the eight new businesses employed more personnel than the nine firms that closed. Also, the firms that were open both study years employed more people in 1962 than in 1958.

[1]Used the midpoints of each employee size group as follows: Group 1, under 8; Group 2, 8 to 24; Group 3, 25 to 49; Group 4, 50 to 99; Group 5, 100 to 249; and Group 6, 250 to 499.

Enrollment in Public Schools

School enrollment increased by 10.6 percent in Waxahachie between 1958 and 1962. Additions to existing schools were made in 1961 and a new school was constructed in 1962. The local school administrators are anticipating continued growth in this area. In fact, a site for a new high school was purchased in 1962.

Motor Vehicle Registration

Between 1958 and 1962, motor vehicle registrations in Ellis County increased by 3.2 percent. Since motor vehicle registration is one measure of economic activity, this increase tends to substantiate the contention of continued economic growth and development in Ellis County and Waxahachie.

Water and Sewer Connections

Both water and sewer connections have increased in number between 1958 and 1962. Water connections increased 3.9 percent and sewer connections increased 5.0 percent between the two study years. An increase has occurred every year following construction of the new facility. These increases tend to confirm the as-

Table 21
CHANGES IN VARIOUS ECONOMIC INDICATORS IN WAXAHACHIE BETWEEN 1958 AND 1962[1]

Item[2]	Quantity 1958	Quantity 1962	Change in Quantity between 1958 and 1962	
	(Number)	(Number)	(Number)	(Percent)
Employment by Manufacturing Firms[3]	1,358	1,753	395	+ 29.1
Enrollment in Public Schools	2,875	3,180	305	+ 10.6
Motor Vehicles Registered in Ellis County	19,827	20,470	643	+ 3.2
Water Connections	4,294	4,460	166	+ 3.9
Sewer Connections	4,006	4,208	202	+ 5.0
	(Dollars)	(Dollars)	(Dollars)	(Percent)
Assessed Tax Evaluations				
Real Estate	8,559,589	11,445,495	2,885,906	+ 33.7
Personal Property	4,049,477	4,140,280	90,803	+ 2.2
Total	12,609,066	15,585,775	2,976,709	+ 23.6
Building Permit Values				
New Commercial	122,300	53,075	− 69,225	− 56.6
New Residential	853,762	472,141	−381,621	− 44.7
All Others[4]	104,302	362,908	258,606	+247.9
Total	1,080,364	888,124	−192,240	− 17.8
Value of Bank Deposits	13,751,121	16,646,815	2,895,694	+ 21.1
Value of Bank Loans	5,566,426	7,178,206	1,611,780	+ 29.0

[1]It was impossible to use identical year spans for all items presented in this table. Some of the above data was gathered by fiscal year and some by school year.
[2]The sources of the information presented in this table are as follows: The City of Waxahachie, Waxahachie Bank and Trust, The Citizens National Bank, The Texas Department of Education's "Annual Statistical Report," The Texas Highway Department (concerning motor vehicle registration), and "The Directory of Texas Manufacturers" of the Bureau of Business Research, University of Texas.
[3]An estimate based on the midpoint of the employee size-group coded for each firm in "The Directory of Texas Manufacturers."
[4]This category consists of the values given to all authorized building projects other than new commercial and residential development. This "other" category was only represented by repairs to residential houses in 1958, whereas in 1962 building permits were issued for several new civic buildings as well as normal repairs and additions to previously constructed structures.

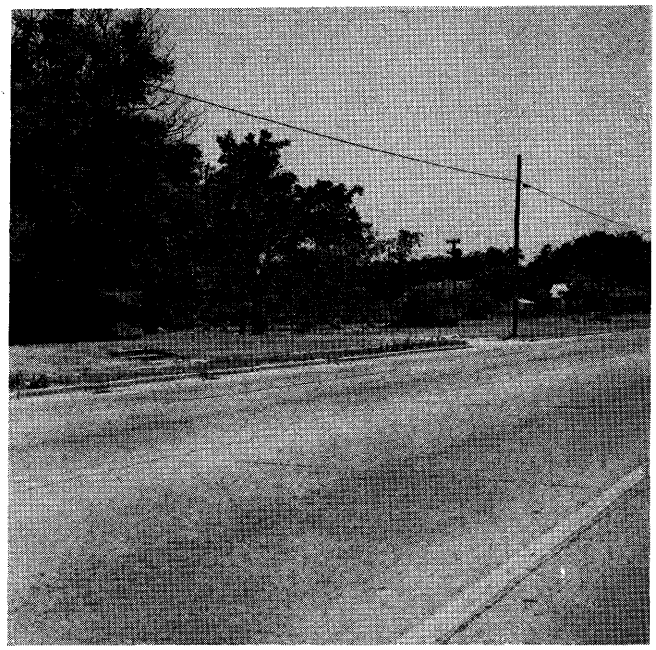
sumptions that more residences and other types of buildings were being occupied than vacated between 1958 and 1962. Such net increases add to the tax revenues of the city as well as contributing to retail sales, and increasing the available labor force.

In 1963 considerable improvements were made in the city's sewage disposal system. Also, while the new highway was being constructed, the city of Waxahachie built a municipal and industrial water reservoir with a 13,500 acre feet capacity. This has no doubt been an economic asset to the city and area.

Assessed Tax Valuation

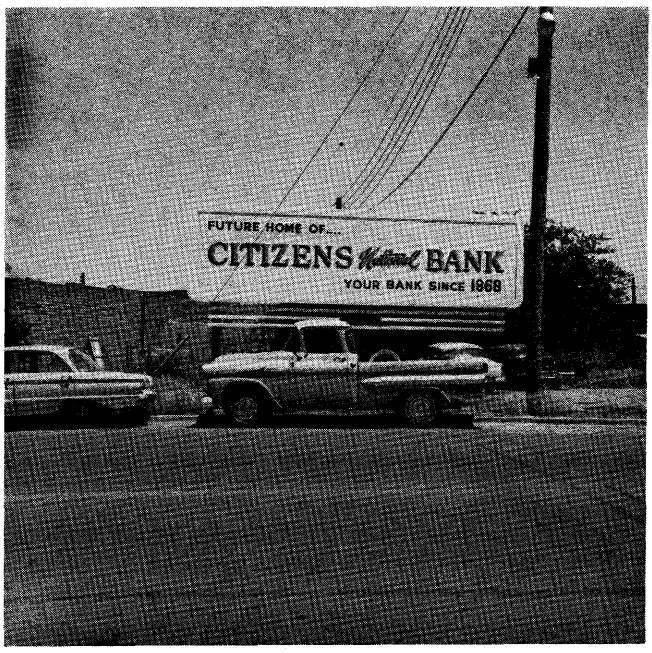
Tax valuations also offer some indication of economic growth within a community. Between 1958 and 1962, real estate assessed tax valuations showed a large increase of 33.7 percent, while personal property assessed tax valuations showed a modest gain of 2.2 percent. Total assessed valuations between the two study years increased 23.6 percent. In every year following construction of the new facility, the total assessed tax valuations in Waxahachie increased.

One possible explanation for the large increases is that commercial, residential, and other types of construc-



Old Residences Being Wrecked

New Residential Development



Site for Bank

Site for Shopping Center

Commercial development along the old route and residential development nearby were occurring in 1963.

tion and expansion have continued in Waxahachie since the by-pass was opened. Of major significance, however, is the fact that property values in the western part of the city have increased greatly with the construction of the new facility. The "city limits" were extended to include this area.

Building Permit Values

Although building permit values decreased in Waxahachie for new residential and commercial construction from 1958 to 1962, permits for other construction show a very large gain of 247.9 percent. A new school, church, orphan's home, and public works building account for a substantial part of the increase.

Planned construction on the old business route (U. S. 77) and the new by-pass route (IH 35E) indicates a definite expansion of the economic base for Waxahachie. Also, not to be overlooked is the fact that considerable construction occurred during each year between 1958 and 1962. In fact, during 1959, the year after completion of the by-pass, the total building permit value exceeded the same for 1958. The 1960 total was only slightly lower than that of 1958.

Bank Deposits and Loans

Two more indications of a community's economic growth or decline are bank deposits and bank loans. Both show stable increases in 1962 over 1958.

Bank deposits for the two banks increased 21.1 percent, showing an increased flow of money into the hands of Waxahachie depositors. The 29.0 percent increase in bank loans could be viewed as a feeling of confidence on the part of lenders that Waxahachie is experiencing a definite trend toward greater economic growth. In 1963, the two banks had combined resources in excess of 18 million dollars.

In addition to these specific indicators, city officials estimate that now approximately 3,000 persons commute to the Dallas-Fort Worth area for employment. They believe that the completion of IH 35E between Waxahachie and Dallas has made commuting to that area more attractive, not only for employment, but for shopping and entertainment. Many people prefer to live in a small town and commute to work, rather than live in a large city. Many former Dallas residents now reside in Waxahachie while still working in Dallas. Waxahachie is an attractive place to live, having among other things, five parks, a country club, a golf course, youth center, and a 750 acre lake.

Appendix

CONSUMER PRICE INDEX

As a means of measuring price changes, constant dollars were calculated and presented in the analysis of this report. The actual dollars were multiplied by the reciprocal of the consumer price index for the United States, as published by the U. S. Department of Commerce, Bureau of Labor Statistics, to arrive at the constant dollar value.

Below is a listing of the consumer price index and its reciprocal for each year involved. The base was 1947-49=100.

Year	Index	Reciprocal
1944	75.2	1.330
1945	76.9	1.300
1946	83.4	1.200
1947	95.5	1.047
1948	102.8	0.973
1949	101.8	0.982
1950	102.8	0.973
1951	111.0	0.901
1952	113.5	0.881
1953	114.4	0.874
1954	114.8	0.871
1955	114.5	0.873
1956	116.2	0.861
1957	120.2	0.832
1958	123.5	0.810
1959	124.6	0.803
1960	126.5	0.791
1961	127.9	0.782
1962	129.3	0.773

Table 22

PRICES OF UNIMPROVED ACREAGE TRACTS IN THE STUDY AND CONTROL AREAS, WAXAHACHIE, TEXAS

Item	Price Per Acre[4]		Difference Between Areas	Percent of Study Area Before Period Price
	Study Area	Control Area		
Before Period (1951-55)	$ 233(17)	$124(31)	$109[2]	
Construction Period (1956-58)	957(30)	169 (9)	788	
After Period (1959-62)	1056(26)	179(24)	876[3]	
Increase Between Periods				
Before & Construction				
Dollars	$ 724	$ 45	$679	291%[4]
Percent	311%	36%	275%[5]	
Construction & After				
Dollars	$ 98	$ 10	$ 88	
Percent	42%	8%	34%[5]	
Before & After				
Dollars	$ 822	$ 55	$767	329%[4]
Percent	353%	44%	309%	
Probable Highway Influence				
Percent[6]	319%			
Dollars[7]	$ 743			

[1]The number of transactions is shown in parentheses.

[2]The S.E. of the difference between the means of the study and control area is $6. This value is significant beyond the 99 percent level; t is equal to 17.97.

[3]The S.E. of the difference between the means of the study and control area is $43. This value is significant beyond the 99 percent level; t is equal to 20.15.

[4,5,6,7]See corresponding footnote under Table 4 for an explanation of this type of measurement.

Table 23

PRICES OF UNIMPROVED ACREAGE TRACTS IN THE STUDY AND CONTROL AREAS OF WAXAHACHIE, TEXAS WEIGHTED BY AREA SOLD IN CONSTANT DOLLARS (1947-49=100)

Study Period	Number of Sales	Number of Acres	Adjusted Price/Acre	Price Changes Between Periods	
				Per Acre	Per Acre
	(Number) Study Area	(Number)	(Dollars)	(Dollars)	(Percent)
Before Period (1951-55)	17	2104	182	104	57
Construction Period (1956-58)	30	939	286	− 30	−10
After Period (1959-62)	26	608	256	74[1]	47[1]
	Control Area				
Before Period (1951-55)	31	3825	129	22	17
Construction Period (1956-58)	9	724	151	− 14	− 9
After Period (1959-62)	24	2062	137	8[1]	6[1]

[1]Changes between the before period (1951-55) and the after period (1959-62) of the study and control areas.

Table 24

PRICES OF ABUTTING AND NONABUTTING UNIMPROVED ACREAGE TRACTS IN THE STUDY AREA AS COMPARED TO THE CONTROL AREA, WAXAHACHIE, TEXAS

Item	Price Per Acre[1]			Difference Between Areas			Percentage of Respective Parts of Study Area's Before Period Price	
	Study Area Abutting	Study Area Nonabutting	Control Area	Abutting Versus Nonabutting	Abutting Versus Control Area	Nonabutting Versus Control Area	Abutting	Nonabutting
Before Period (1951-55)[2]	$ 195 (9)	$ 277 (8)	$124(31)	$ 82	$ 71	$153		
Construction Period (1956-58)	1345(16)	512(14)	169 (9)	833	1176	343		
After Period (1959-62)[3]	1078(13)	1032(13)	179(24)	46	899	853		
Increase Between Periods								
Before & Construction								
Dollars	$1150	$ 235	$ 45	$ 915	$ 1105	$190		
Percent	590%	85%	36%	505%	554%[5]	49%[5]	567%[4]	69%[4]
Construction & After								
Dollars	$−267	$ 520	$ 10	$−787	$−277	$510		
Percent	− 20%	102%	8%	−122%	− 28%[5]	94%[5]		
Before & After								
Dollars	$ 883	$ 755	$ 55	$ 128	$ 828	$700		
Percent	453%	273%	44%	180%	409%[5]	229%[5]	425%[4]	253%[4]
Probable Highway Influence								
Percent[6]	417%	241%						
Dollars[7]	$ 813	$ 668						

[1]The number of transactions is shown in parentheses.

[2]The S.E. of the difference between the means of the study area (abutting) and the study area (nonabutting) is $22. t is equal to 3.75. The S.E. of the difference between the means of the study area (nonabutting) and the control area is $11. t is equal to 14.5. The S.E. of the difference between the means of the study area (abutting) and the control area is $6. t is equal to 12.13. The differences between the means of each set were significant beyond the 99 percent level.

[3]The S.E. of the difference between the means of the study area (abutting) and the study area (nonabutting) is $123. This value is significant beyond the 10 percent level; t is equal to 0.38. The S.E. of the difference between the means of the study area (nonabutting) and the control area is $84. This value is significant beyond the 99 percent level; t is equal to 10.12. The S.E. of the difference between the means of the study area (abutting) and the control area is $30. This value is significant beyond the 99 percent level; t is equal to 30.14.

[4,5,6,7]See the corresponding footnote under Table 4 for an explanation of this type of measurement. However, the study area is divided into abutting and nonabutting land in this table.

Table 25

PRICES OF ABUTTING AND NONABUTTING UNIMPROVED ACREAGE TRACTS IN THE WAXAHACHIE, TEXAS STUDY AREA WEIGHTED BY AREA SOLD IN CONSTANT DOLLARS (1947-49=100)

Study Period	Number of Sales	Number of Acres	Adjusted Price/Acre	Price Changes Between Periods	
				Per Acre	Per Acre
	(Number)	(Number)	(Dollars)	(Dollars)	(Percent)
	Abutting				
Before Period (1951-55)	9	1281	179	175	98
Construction Period (1956-58)	16	609	354	413	117
After Period (1959-62)	13	25	767	588[1]	328[1]
	Nonabutting				
Before Period (1951-55)	8	823	187	−26	−14
Construction Period (1956-58)	14	330	161	73	45
After Period (1959-62)	13	583	234	47[1]	25[1]

[1]Changes between the before period (1951-55) and the after period (1959-62) of the study area abutting and nonabutting.

Table 26

PRICES OF UNIMPROVED SUBDIVISION LOTS IN THE STUDY AND CONTROL AREAS, WAXAHACHIE, TEXAS

Item	Price Per Square Foot[1]		Difference Between Areas	Percent of Study Area's Before Period Price
	Study Area	Control Area		
Before Period (1951-55)[2]	$ .0391(26)	$.0667(26)	$ .0276	
Construction Period (1956-58)	.0476(14)	.0710(12)	.0234	
After Period (1959-62)[3]	.0538(13)	.0880 (3)	.0342	
Increase Between Periods				
Before & Construction				
Dollars	$ .0085	.0043	$ .0042	10.7%[4]
Percent	21.7%	6.4%	15.3%[5]	
Construction & After				
Dollars	$ .0062	$.0170	$−.0108	
Percent	13.0%	23.9%	− 10.9%[5]	
Before & After				
Dollars	$ .0147	$.0213	$−.0066	−16.9%[4]
Percent	37.6%	31.9%	5.7%[5]	
Probable Highway Influence				
Percent[6]	−5.6%			
Dollars[7]	$−.0022			

[1]The number of transactions is shown in parentheses.

[2]The S.E. of the difference between the means of the study and control area is $0.0020. This value is significant beyond 99 percent level; t is equal to 14.07.

[3]The S.E. of the difference between the means of the study and control area is $0.0073. This value is significant beyond the 99 percent level; t is equal to 4.67.

[4,5,6,7]See corresponding footnote under Table 4 for an explanation of this type of measurement.

Table 27

PRICES OF UNIMPROVED SUBDIVIDED LOTS IN THE STUDY AND CONTROL AREAS OF WAXAHACHIE, TEXAS, WEIGHTED BY AREA SOLD IN CONSTANT DOLLARS (1947-49=100)

Study Period	Number of Sales	Number of Sq. Ft.	Adjusted Price/Sq. Ft.	Price Changes Between Periods	
				Per Sq. Ft.	Per Sq. Ft.
	(Number)	(Number)	(Dollars)	(Dollars)	(Percent)
		Study Area			
Before Period (1951-55)	26	350,950	0.039	−0.001	− 3
Construction Period (1956-58)	14	170,211	0.038	−0.002	− 5
After Period (1959-62)	13	165,478	0.036	−0.003[1]	− 8[1]
		Control Area			
Before Period (1951-55)	26	528,495	0.045	0.013	29
Construction Period (1956-58)	12	128,743	0.058	0.009	16
After Period (1959-62)	2	19,429	0.067	0.022[1]	49[1]

[1]Changes between the before period (1951-55) and the after period (1959-62) of the study and control areas.

Table 28

PRICES OF IMPROVED SUBDIVISION LOTS IN THE STUDY AND CONTROL AREAS, WAXAHACHIE, TEXAS

Item	Price Per Square Foot[1]		Difference Between Means	Percent of Study Area's Before Period Price
	Study Area	Control Area		
Before Period (1951-55)[2]	$.317(43)	$ .462(65)	$ .145	
Construction Period (1956-58)	.366(27)	.527(20)	.161	
After Period (1959-62)[3]	.482(31)	.482(42)	.000	
Increase Between Periods				
Before & Construction				
Dollars	$.049	$ .065	$−.016	− 5.0%[4]
Percent	15.5%	14.1%	1.4%[5]	
Construction & After				
Dollars	$.116	$−.045	$ .161	
Percent	31.7%	− 8.5%	40.2%[5]	
Before & After				
Dollars	$.165	$ .020	$ .145	45.7%[4]
Percent	52.1%	4.3%	47.9%[5]	
Probable Highway Influence				
Percent[6]	46.8%			
Dollars[7]	$.148			

[1]Number of transactions is shown in parentheses.

[2]The S.E. of the difference between the means of the study and control area is $0.0065. This value is significant beyond the 99 percent level; t is equal to 22.27.

[3]In this instance there is no difference between the means of the study and control area.

[4,5,6,7]See corresponding footnote under Table 4 for an explanation of this type of measurement.

Table 29

PRICES OF IMPROVED SUBDIVIDED LOTS IN THE STUDY AND CONTROL AREAS OF WAXAHACHIE, TEXAS, WEIGHTED BY AREA SOLD IN CONSTANT DOLLARS (1947-49=100)

Study Period	Number of Sales	Number of Sq. Ft.	Adjusted Price/Sq. Ft.	Price Changes Between Periods	
				Per Sq. Ft.	Per Sq. Ft.
	(Number)	(Number)	(Dollars)	(Dollars)	(Percent)
		Study Area			
Before Period (1951-55)	43	560,150	0.243	0.070	29
Construction Period (1956-58)	27	334,110	0.313	0.060	19
After Period (1959-62)	31	399,750	0.373	0.130[1]	53[1]
		Control Area			
Before Period (1951-55)	65	848,700	0.316	0.039	12
Construction Period (1956-58)	20	288,164	0.345	0.022	− 6
After Period (1959-62)	42	639,440	0.323	0.007[1]	2[1]

[1]Changes between the before period (1951-55) and the after period (1959-62) of the study and control areas.