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16. Abstract <p>Previous studies of highway construction effects on land use have focused mainly upon the effects of the construction of new highways. In view of a new emphasis upon upgrading and expanding existing facilities rather than building new ones, the need arises for information concerning the land use effects of such improvements. This report relates the findings of research done in Dallas, Texas, where a section of State Highway 352 (Scyene Road) was upgraded from a two-lane concrete roadway with a center stripe and open ditch to two roadways with three lanes going each direction with protected left turns and curbs and gutters. The improvement took place in a developing area where over half of the land was undeveloped. The predominant type of development was single family residential. Land use changes were analyzed for both abutting and nonabutting properties that might have been affected by the road improvement. Data were collected for a period including six years before planning for this specific improvement began up through 1978. Total acreage in each type of land use was determined for 1959 and 1964, which were before the road improvement, and for 1971 and 1978, which were both after the road improvement. Comparisons were made of the types and rates of development before and after the upgrading occurred. The data are reported in narrative, graphic, and tabular form. Causes of development in the area other than the street improvement were also researched and are reported. Highway planners should be able to use this report and subsequent reports of this study to make more accurate predictions of land use changes due to specific highway improvements.</p>					
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LAND USE IMPACT OF IMPROVING
STATE HIGHWAY 352 IN A DEVELOPING
AREA OF DALLAS, TEXAS

by

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Research Report 225-17
Research Study Number 2-8-77-225
Economics of Highway Design Alternatives

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PREFACE

The authors wish to express appreciation to those who have assisted in this study. Special thanks are due Mr. James W. Barr and Mr. James R. Farrar of the Texas State Department of Highways and Public Transportation (SDHPT). Mr. Bill Buglehall, Mr. Don Walden, and Mr. Arnold Breedon of the Dallas/Fort Worth Regional Planning Office of the SDHPT in Grand Prairie were particularly helpful in supplying data and providing assistance. Mr. John Keller, Mr. Frank Fallwell, Mr. Henry Grann, and Mr. W. C. Gromatzky of District 18 of the SDHPT were all extremely helpful and most cooperative in providing information.

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The contents of this report reflect the views of the authors who are responsible for the facts and the accuracy of the data presented within. The contents do not necessarily reflect the official views of the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

ABSTRACT

Previous studies of highway construction effects on land use have focused mainly upon the effects of the construction of new highways. In view of a new emphasis upon upgrading and expanding existing facilities rather than building new ones, the need arises for information concerning the land use effects of such improvements. This report relates the findings of research done in Dallas, Texas, where a section of State Highway 352 (Scyene Road) was upgraded from a two-lane concrete roadway with a center stripe and open ditch to two roadways with three lanes going each direction with protected left turns and curbs and gutters. The improvement took place in a developing area where over half of the land was undeveloped. The predominant type of development was single family residential. Land use changes were analyzed for both abutting and nonabutting properties that might have been affected by the road improvement. Data were collected for a period including six years before planning for this specific improvement began up through 1978. Total acreage in each type of land use was determined for 1959 and 1964, which were before the road improvement, and for 1971 and 1978, which were both after the road improvement. Comparisons were made of the types and rates of development before and after the upgrading occurred. The data are reported in narrative, graphic, and tabular form. Causes of development in the area other than the street improvement were also researched and are reported. Highway planners should be able to use this report and subsequent reports of this study to make more accurate predictions of land use changes due to specific highway improvements.

SUMMARY OF FINDINGS

Data were collected and analyzed for the State Highway 352 (SH 352) study area in Dallas, Texas, to determine the impact upon land use of improving the road from a two-lane facility with a center stripe and open ditches to a six-lane facility with protected left turns and curbs and gutters. Data were collected for 1959, which was six years prior to formal planning for this specific project began; 1964, the year immediately before formal planning began; 1971, the first year after construction was completed; and 1978, the last full year data collection was possible. The period from 1959 to 1964 is called the *before period*. The years 1964 to 1971 make up the *short-run after period*. The *long-run after period* is 1971 to 1978.

The findings are summarized as follows:

1. The street improvement took place in an area southeast of downtown Dallas.
 - a. The area was classified as a developing one throughout the years of study, although development has been slow.
 1. The total study area was thirty-five percent developed in 1959, the first study year.
 2. Forty-five percent of the total study area was developed in 1978, the last study year.
 - b. The predominant type of development has remained single family residential, although a few other changes have occurred.
 1. Over one-fourth of the 755.45 acres in the study area was in single family residential use from 1959 through 1978.
 2. Public/semi-public use more than quadrupled between 1959 through 1978.

3. Both multiple family residential and industrial uses emerged for the first time in this area in 1978.
 4. Commercial acreage and acreage in streets increased somewhat.
2. Properties abutting SH 352 experienced little change.
 - a. The predominant type of abutting development, single family residential, fluctuated between 27.83 and 28.02 acres between 1959 and 1978.
 - b. Commercial acreage increased by only 2.29 acres from 8.58 to 10.87.
 - c. Public/semi-public use on abutting land declined by 0.92 acres from 2.96 to 2.04.
 - d. An additional 1.38 acres were added to streets and roads on abutting land.
 - e. Approximately half of abutting land remained unimproved in 1978.
 3. Nonabutting land underwent relatively more change than abutting, although still not an extensive amount.
 - a. Single family residential acreage increased from 172.85 acres to 211.40 acres.
 - b. Commercial acreage fluctuated ending at only 0.56 acres in 1978.
 - c. Public/semi-public use increased from 1.87 acres to 18.82 acres.
 - d. Industrial and multiple family uses appeared for the first time in 1978.
 - e. Approximately five and one-half acres were added to the nonabutting street and road system.
 - f. Over half of the 661.30 nonabutting acres were still unimproved in 1978.

4. The periods of most change were different for abutting and nonabutting land.
 - a. The average annual rate of change for abutting land was 0.62 percent in the *long-run after period* as compared to 0.43 percent in the *before period* and 0.18 percent in the *short-run after period*.
 - b. The average annual rate of nonabutting land use change was 1.06 percent in the *short-run after period* as compared to 0.30 percent in the *before period* and 0.31 percent in the *long run after period*.
5. Although some change did occur, this has been a slow growth area for several reasons.
 - a. When the first residences were constructed in the 1940's, there was no zoning and also no water and sewer lines.
 1. Property boundaries and lot lines were not always drawn in a manner conducive to optimal development.
 2. Builders and developers shunned this area in favor of areas with water and sewer lines.
 - b. The highway was not in a good location to attract extensive development since it connected two slow to moderate growth areas.
 1. SH 352 begins at Second Avenue in an older section of Dallas that has not had much development in recent years.
 2. The road continues east and ends in Mesquite, Texas, that is one of the smaller outlying towns in the Dallas/Fort Worth SMSA.

- c. Another section of SH 352 to the west of the study section was never improved as planned giving rise to the contention that access is not as good as it would have been.
 - d. Some tracts of land are being held by owners not interested in selling or who have not received an acceptable offer.
 - e. There are physical reasons such as drainage problems and a large electrical transmission line that are said to detract from development potential.
 - f. The socioeconomic characteristics of this moderate to low income area are not conducive to some types of development.
6. The improvement of SH 352 provided better access through this section of Dallas, but did not have much impact on land use.

IMPLEMENTATION STATEMENT

This report relates the findings of a case study on land use changes that have occurred after an existing street was improved. The findings can be implemented immediately by highway agencies in predicting what would happen as a result of a similar street improvement in a comparable area elsewhere.

This case study is one of several being done in Texas cities. The predictive capabilities will be increased after analysis and comparison of data from all areas is accomplished. Those findings will be described in other reports.

METRIC CONVERSION FACTORS
RELEVANT TO THIS REPORT

Approximate Conversions to Metric Measures

<u>U.S. Customary Units Used in Report</u>		<u>Factor (multiply by)</u>		<u>Metric Equivalents</u>
acres	x	0.4	=	hectares
miles	x	1.6	=	kilometers
feet	x	0.3	=	meters

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INTRODUCTION

Purpose and Objective of Study

The near completion of the Interstate Highway System, the completion of many urban freeways, and the increasing shortage of funds for future highway construction have caused state highway agencies to concentrate on upgrading and increasing the capacity of existing streets and highways. Much research has been conducted in the past to learn the impact of new highway construction, but little has been done to indicate what happens when an existing highway is upgraded. In order to optimize public benefits, highway agencies need information of this kind to help predict the consequences of improvement of an existing facility.

One important impact of any highway construction is the changes that occur in adjacent land use. The overall purpose of this study is to determine land use changes in areas where an existing highway or street has been improved. This report presents the findings of investigation in an area of Dallas, Texas, where a section of State Highway 352 (Scyene Road) was improved. Areas with other types of improvements and areas in varying stages of development with different types of predominant land use when improvement began have been studied or are under study. Reports of findings in those areas are available or are forthcoming.

Objectives of this study area are as follows:

- (1) To determine the initial and long-range land use impacts of different highway design changes on existing highways with a minimum of data collection.
- (2) To determine traffic volume changes resulting from various types of improvements.

Method of Study

A "before and after" approach was employed in this study to discover land use changes in the State Highway 352 study area. Since land use could have been affected by anticipation of a better roadway, data were collected for a time well before the improvement of this facility began (the applicable time periods are defined in the Definitions Section).

Land use data were collected for 1959 and 1964, the two "before" years and 1971 and 1978, the "after" years. On-site inspections aided in identifying the correct land uses.

The land was divided into abutting and nonabutting properties. Abutting properties were defined as those with frontage on SH 352. On undeveloped tracts, a section extending back 300 feet from SH 352 was designated as abutting. Land use changes and rates of land development were determined for each category to facilitate comparison.

To determine reasons underlying the land use changes in the area, several knowledgeable people were interviewed. Real estate salespeople and developers provided information on land developments. City officials who were familiar with the area also provided information about land changes. Other factors which might have influenced land use changes were also investigated. Among these were: traffic volumes, population, and median family income in the area.

Location of the Road Improvement

The improved portion of SH 352 is within the city limits of Dallas, Texas (Figure 1). Dallas is located in Dallas County, one of the eleven counties

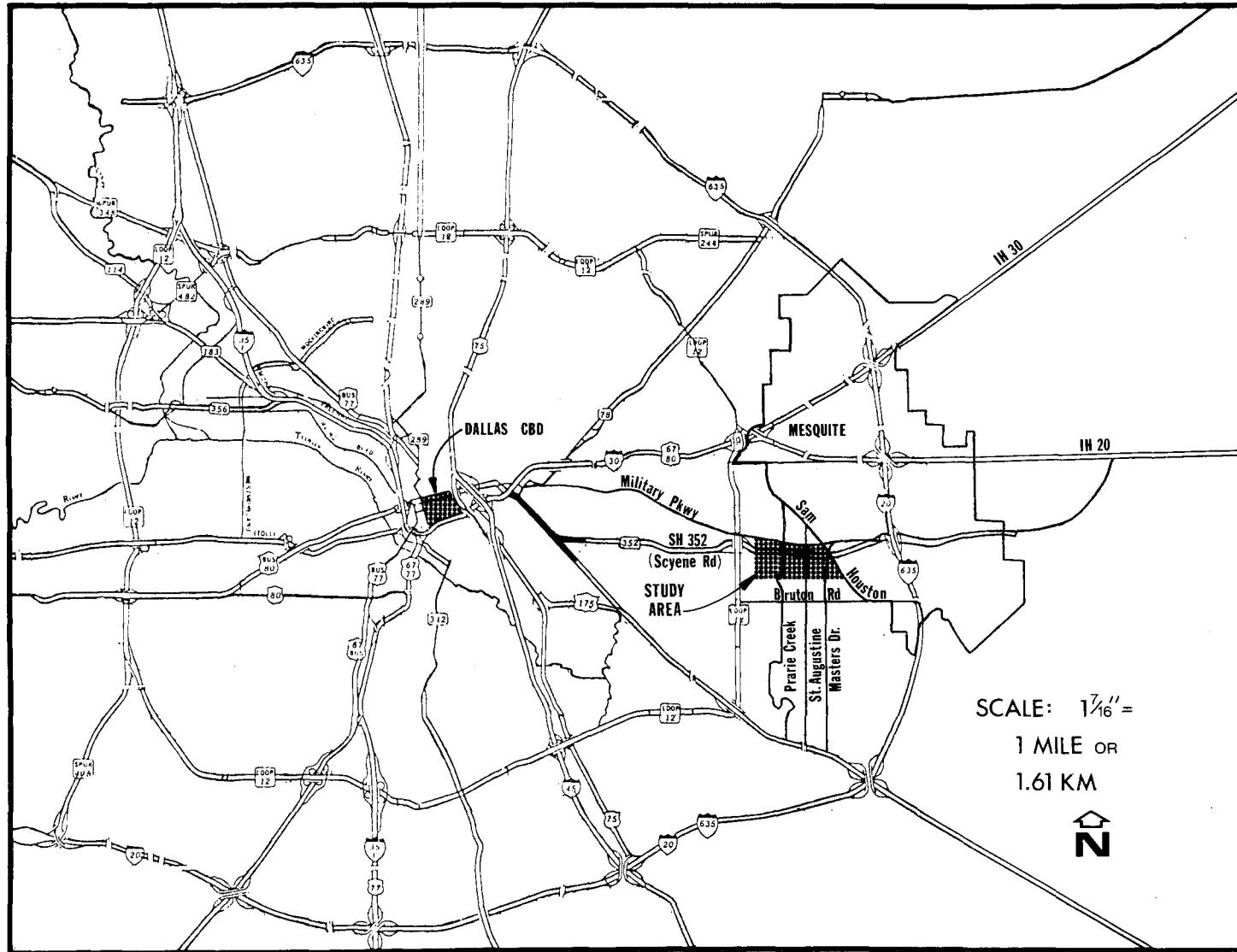


Figure 1. Map of Dallas Showing the Location of the State Highway 352 Study Area.

making up the Dallas/Fort Worth Standard Metropolitan Statistical Area (SMSA). Due to the interdependence between cities and counties in the SMSA, a brief discussion of the SMSA as a whole is presented first with some specific details about Dallas included.

Although the Dallas/Fort Worth SMSA grew at an estimated 8.7 percent between 1970 and 1976, this was somewhat less than the 11.5 percent rate of growth for the state.¹ The cities of Dallas and Fort Worth both lost several residents through out migration to the smaller communities in the SMSA.

The economy of the Dallas/Fort Worth SMSA is well balanced in the areas of manufacturing, trade, transportation, finance, services, and real estate. Manufacturing, the largest contributor to personal income, is comprised primarily of light industry such as electronics, aircraft, apparel, oil-field equipment, food processing, automotive transportation, printing and publishing, and nonelectrical equipment.

The second largest contributor to personal income in the Dallas/Fort Worth area is the wholesale and retail trade sector. Numerous shopping centers, including several regional malls (with greater than 50,000 square feet), are located in the SMSA. Among the many large retail firms is Dallas' original Neiman-Marcus department store, one of the world's best known and most unusual. This area is also the heart of an eleven state wholesale market and distribution network. At the center of the Dallas/Fort Worth wholesale business is the Dallas Market which is the largest wholesale merchandising complex

¹Information on the Dallas/Fort Worth SMSA is from: Austin, Joanne P. "Dallas-Fort Worth: The Southwest Metroplex," Texas Business Review, September 1978.

located at one site in the world. Buyers from all fifty states and approximately 25 foreign countries come to choose from merchandise ranging from wearing apparel to toys and home furnishings. Dallas is ranked number one nationally as a market for summer and winter home furnishings, gifts and floor coverings; number one as a regional toy market; and second as a national apparel market.

Despite the fact that Dallas/Fort Worth has no inland waterway, it is a major crossroad for nearly all types of domestic and international shipping and is the major point of intersection of routes from New York, Los Angeles, Chicago, and Mexico City. In addition to several interstate, state, and federal highways, the area is served by ten railroads, forty-five common carriers, and five major bus lines. But perhaps the primary factor in the transportation network of Dallas/Fort Worth is the Dallas/Fort Worth Regional Airport that opened in January 1974. The airport is the largest in the nation and is reported to be the third busiest handler of scheduled air carrier operations in the world.

The services sector of the economy of Dallas/Fort Worth is also very important with conventions and tourism rated as two of the area's most important industries. The most popular tourist attraction is Six Flags Over Texas, which bypassed the Alamo in 1963 as the number one tourist attraction in Texas. Other attractions include professional and intercollegiate sports, the Texas State Fair, museums, fine restaurants, and excellent shopping facilities. Dallas has been rated first nationally in total number of meetings held in the city. Both Dallas and Fort Worth have large convention centers, exhibit space, and hotel rooms that attract the convention business. Service income is also generated by health and educational facilities including seven

private four-year colleges, one private junior college, and the Baylor University schools of nursing and dentistry.

The finance, insurance, and real estate sector is also very important in the SMSA. Among the over 200 commercial banks in the area are the two largest banks in Texas, located in Dallas. The area has long been recognized as the financial center of the state. The Dallas/Fort Worth area is also the state's leading insurance center with more than 260 insurance companies.

The population of Dallas, as well as that of Fort Worth, increased greatly between 1950 and 1970 (Table 1). According to the Bureau of the Census, the population of both cities then declined between 1970 and 1975 before again increasing by 1977. The metropolitan area as a whole did not lose population and has continued to grow. (The separate Dallas and Fort Worth SMSA's were combined into one SMSA after the 1970 census was taken.) Much of the growth has been in the smaller cities surrounding Dallas and Fort Worth.

Key Characteristics of Study Area

This study area is one of eighteen study sites chosen for analysis of land use changes relative to street improvements. The study areas were chosen according to the following characteristics:

- (1) Stage of development in the area before the improvement,²
- (2) Type of highway or street design change,
- (3) Predominant land use before the improvement, and
- (4) Type of setting (urban or suburban).

²The percentage of total land area already improved with buildings, parks, roads, and streets is used to determine which stage of development the study area falls within. The three stages of development defined in this manner are: undeveloped - 1 to 10% improved, developing - 10% to 80% improved, and developed - 80% to 100% improved.

Table 1. Population and Percentage Change in Population for Dallas, Fort Worth, and the SMSA^a

	1950	Change and % Change 1950-1960	1960	Change and % Change 1960-1970	1970	Change and % Change 1970-1975	1975	Change and % Change 1975-1977	1977
Dallas	434,462	245,222 56%	679,684	164,717 24%	844,401	31,604 -4%	812,797	31,731 4%	844,528
Dallas SMSA	614,799	468,802 76%	1,083,601	472,533 44%	1,556,134	-	b	b	b
Fort Worth	278,778	77,490 28%	356,268	37,208 10%	393,476	35,112 -9%	358,364	9,629 3%	367,993
Fort Worth SMSA	361,253	211,962 59%	573,215	188,870 33%	762,085	-	b	b	b
Dallas-Fort Worth SMSA	b	-	b	-	2,378,353	158,595 7%	2,536,948	136,252 5%	2,623,200

^aData from the Bureau of the Census, U.S. Department of Commerce Publications.

^bPrior to 1970, the Dallas and Fort Worth SMSA's were separate. After the 1970 Census Count, one area was designated as the Dallas-Fort Worth SMSA combining the two separate SMSA's plus some additional territory.

Using these characteristics, different types of study sites have been selected that will permit analyses of various design changes and the resulting impacts on land use. The key characteristics of the SH 352 area are as follows:

- (1) The stage of area development--*developing*
- (2) Type of highway design change--from two-lane, undivided road with open ditches to six-lane, raised median with protected left turns and curbs and gutters,
- (3) Predominant land use before the improvement--unimproved, and
- (4) Type of setting--urban.

Sources of Data

The source of information on the design change and construction dates for the road improvement was the District 18 Office of the SDHPT in Dallas. Data on planning and justification of the design change were provided by personnel of the District 18 Office and from planners with the City of Dallas.

The Dallas-Fort Worth Regional Planning Office of the SDHPT in Grand Prairie was the major source of land use information. The City of Dallas also provided some land use information and data on zoning. The U.S. Soil Conservation Service Office in Dallas also contributed to the collection of land use data by making aerial maps available. On-site inspection and city directories also helped in the determination of the correct land uses. Interviews with real estate developers, SDHPT personnel, city planners and other city officials, county officials, residents of the area, and property owners also provided information on land use and changes that have taken place in this area.

Traffic volume data were obtained from the SDHPT and the City of Dallas. The U.S. Census was the source of population and other socioeconomic data.

Definitions

The following land use categories and time periods were used in this study:

Single-Family Residential - tract improved with occupiable house for one family.

Multiple-Family Residential - tract improved with duplex or apartment complexes designed to house two or more families.

Commercial - tract improved with a commercial business.

Public/Semi-Public - tract improved with a governmental office, park, public-owned utility, church, or other nonprofit organization.

Industrial - tract improved for manufacturing, product storage, etc.

Streets and Roads - land improved with a street or road; includes land dedicated as right-of-way.

Unimproved - land which has not been developed for any particular use; also includes previously developed land that is presently vacant or unused and land used for agricultural purposes.

Time periods used in the analysis are as follows:

Before Period - the period from 1959 to 1964 which ends the year before the road improvement began.

Short-Run After Period - the period which includes changes that occurred since the end of 1964 through 1971. This period includes the year in which the improvement occurred.

Long-Run After Period - the period which includes changes that occurred since the end of 1971 through 1978.

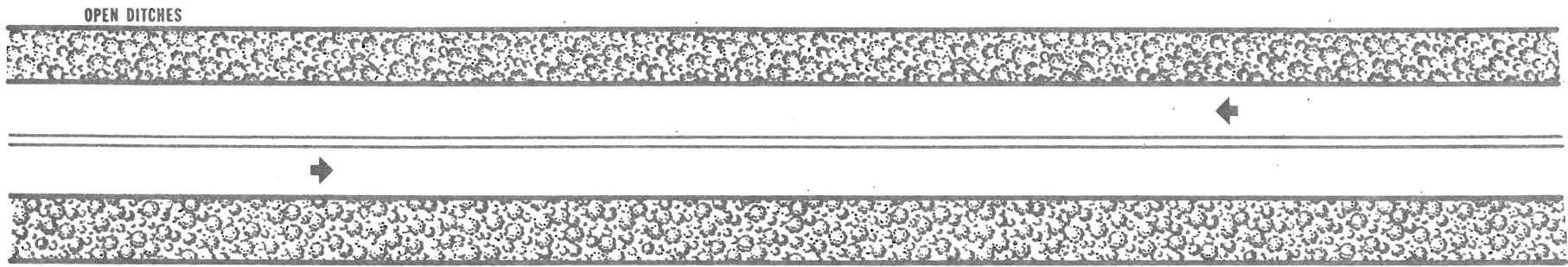
CHARACTERISTICS OF AREA STREETS AND ROADS BEFORE AND
AFTER IMPROVEMENT OF STATE HIGHWAY 352

State Highway 352 is a major east-west thoroughfare in Dallas as shown in Figure 1. It begins at Second Avenue and continues on to Mesquite, Texas. The section of SH 352 that this study concentrates on begins at Pleasant Drive and extends east approximately two miles to Sam Houston Road.

The improvement changed this section from a two-lane concrete roadway with a center stripe and open ditch to two roadways, both with three lanes going each direction (Figure 2). Protected left turn lanes at intersections and curbs and gutters were constructed. The order initiating investigation, planning, and engineering was issued in 1965. The contract for construction was let in 1968, and the project was completed in 1970. No right-of-way had to be acquired since the state already owned sufficient acreage.

Traffic counts for a location west of Don Street, which represents the western end of the study area, show a total increase of 70 percent between 1958 and 1978 (Table 2). The increase for the *before period*, 1958 to 1964, was 30 percent. A 13 percent increase occurred in the *short-run after period*, 1964 to 1971, and a 17 percent increase occurred between 1971 and 1978, the *long-run after period*. The counts ranged from a low of 7,870 vehicles per day in 1958, to a high of 14,650 vehicles per day in 1977. The improvement of the road did not appear to accelerate the increase in traffic. Only three counts were available to indicate traffic volume in the eastern section of the study area. At a point east of Prairie Creek, SH 352 had 5,571 vehicles per day in 1966, 7,874 in 1970, and 12,593 in 1973.

Before Period Design



After Period Design

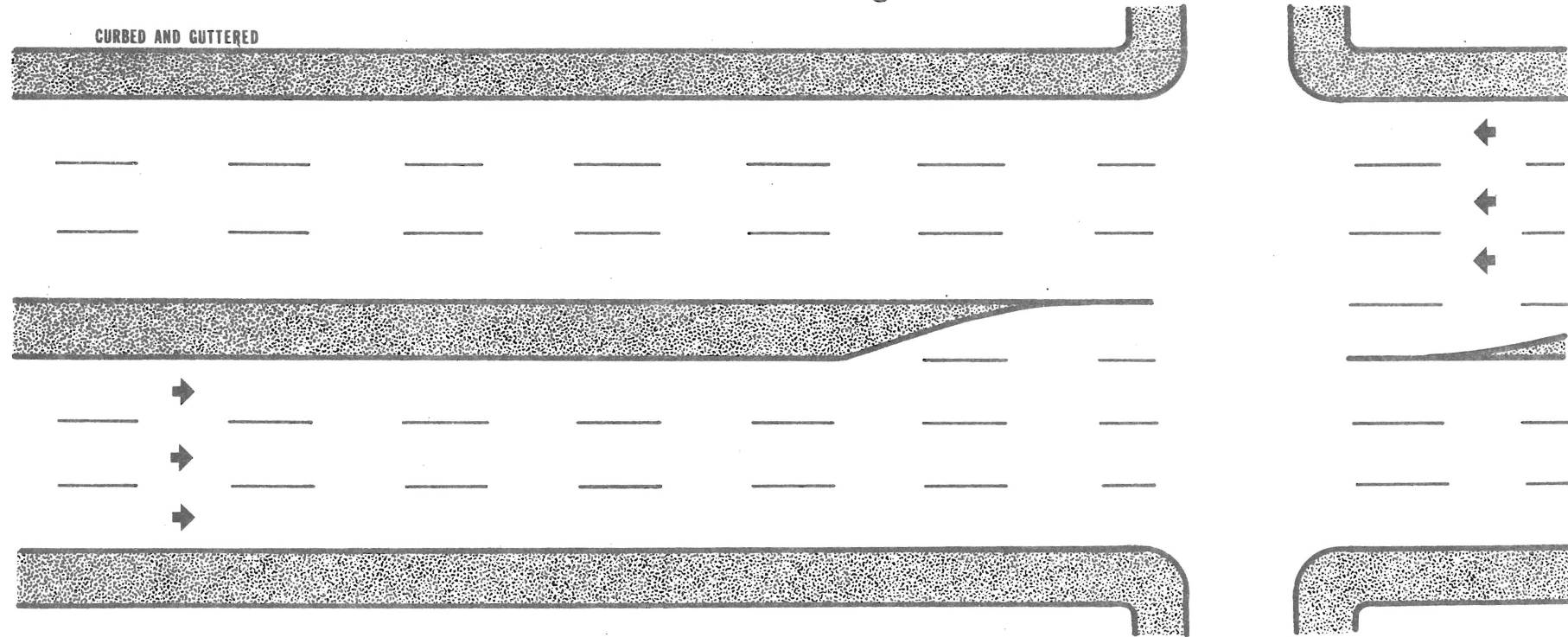


Figure 2. Design of State Highway 352 Before and After Improvement

Table 2. Twenty-Four Hour Traffic Counts on State Highway 352 and Other Parallel and Intersecting Streets

Location of Traffic Count	1958	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
STUDY ROUTE State Highway 352 West of Don East of Prairie Creek	7,870	8,010		11,900	9,780	10,200	10,440	10,600 5,571	9,590	9,190	9,480	10,220 7,874	11,510	12,750	13,110 12,593	13,440	14,140	14,120 7,874	14,650	13,410
PARALLEL STREETS Military Parkway West of Prairie Creek East of St. Augustine Bruton Road West of Pleasant West of Prairie Creek East of St. Augustine			7,273 7,648			8,570 6,767		5,058				10,240 5,700	7,450		4,371		7,502	6,512		
							13,159	17,575		15,053			17,783 16,112 9,856		18,761	16,370		15,606		
								8,029							9,590			8,738		
INTERSECTING STREETS Prairie Creek South of SH 352 Sam Houston South of SH 352 North of SH 352								6,536					8,716	9,630	9,332			12,146	10,930	
						1,588	1,928		3,143	3,718			2,859 2,953	2,470	1,014	1,911		2,283	2,180	

Parallel Roads

Military Parkway forms the northern boundary of this study area. This parallel street has had generally lower traffic counts than State Highway 352 (Table 2). The counts for this road have also not increased like those on SH 352. A point west of Prairie Creek had a count of 7,273 in 1961 and only 7,502 in 1975. A location east of St. Augustine had generally declining counts ranging from 7,648 in 1961 to 6,512 in 1976. The improvement of SH 352 may have attracted traffic that otherwise would have used Military Parkway.

The portion of Bruton Road that parallels SH 352 is not within the study area but is an alternate route and is somewhat more heavily traveled. The counts on the western end of the road range from 17,575 in 1966, to a high of 18,761 in 1973, and down to 15,606 in 1976. Another count in the westerly section shows steady increases from 13,159 in 1965, to 16,370 in 1974. The easterly portion of this section of Bruton Road was much less heavily traveled with counts ranging in the 8,000's and 9,000's of vehicles per day.

Intersecting Roads

Prairie Creek Road at a point just south of SH 352 experienced increases in traffic volumes from 6,536 in 1966 to 12,146 in 1976 (Table 2). Sam Houston Road had vacillating counts at points both north and south of SH 352. The counts ranged from under 2,000 in the mid-sixties to over 3,000 in the late sixties and back down to around 2,000 in the mid-seventies. Sufficient traffic data was not available to permit extensive comparison between intersecting roads.

CHARACTERISTICS OF THE STUDY AREA BEFORE AND AFTER IMPROVEMENT OF STATE HIGHWAY 352

Size and Boundaries of the Study Area

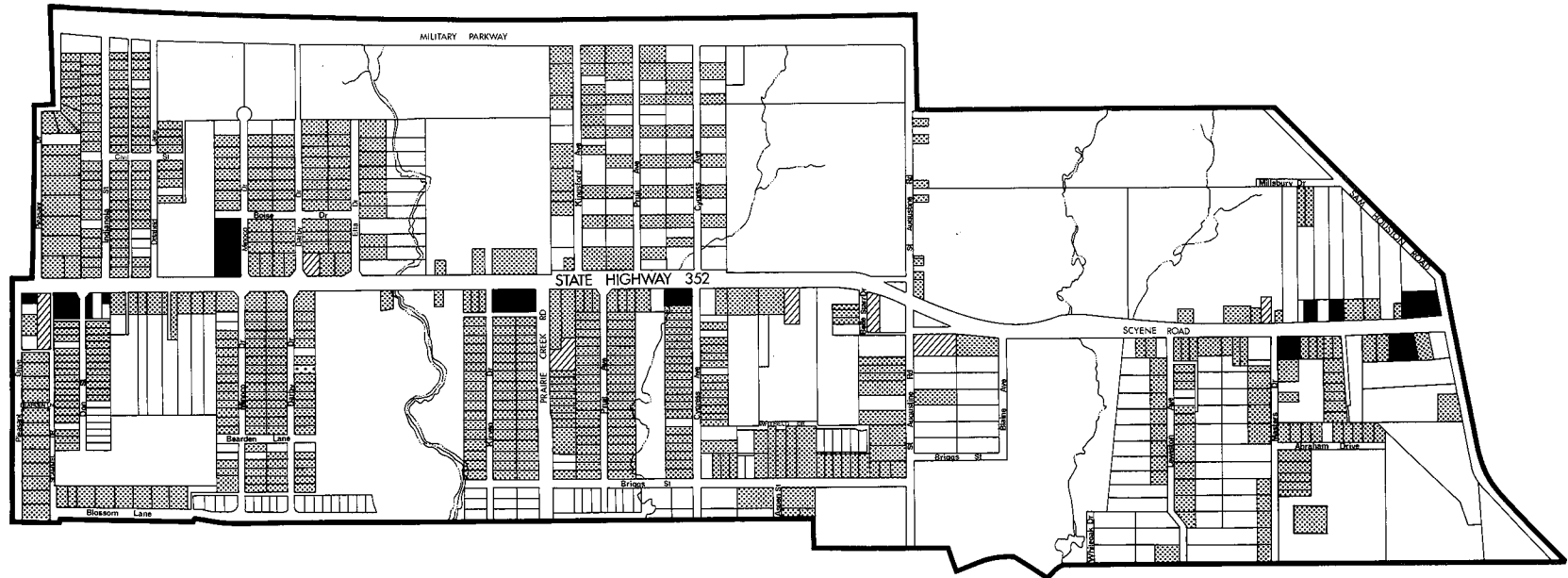
The study area encompasses approximately 755.45 acres. An area was chosen to include approximately three blocks (or the equivalent distance) of land on each side of SH 352, thus including both abutting and nonabutting land. Pleasant Drive and Sam Houston Road form the eastern and western boundaries, respectively. Military Parkway forms the northern boundary, and the southern boundary is drawn along residential-type streets and property lines. The study area extends approximately 1,800 feet on each side of SH 352 and is approximately 10,000 feet long.

Land Use Characteristics

As indicated in the maps in Figures 3, 4, 5, and 6, this study area contains several types of land use. In 1959, 35 percent of the total study area was developed. Single family residential was by far the predominant type of land development and remained so throughout the years of study (Table 3). Single family residential use increased between 1959 and 1978, and there were also increases in commercial, industrial, public/semi-public, and multiple family residential uses. Approximately seven acres were also added to the street and road system in the area. Forty-four percent of the area had been improved by the end of 1978.

Land Use Changes

There has not been a great deal of change in this area, and almost half of the area's land remains unimproved. However, there have been some



LAND USE LEGEND

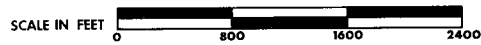
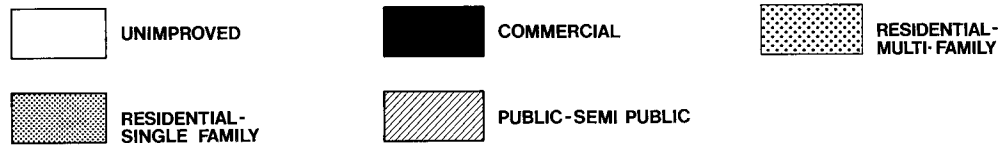
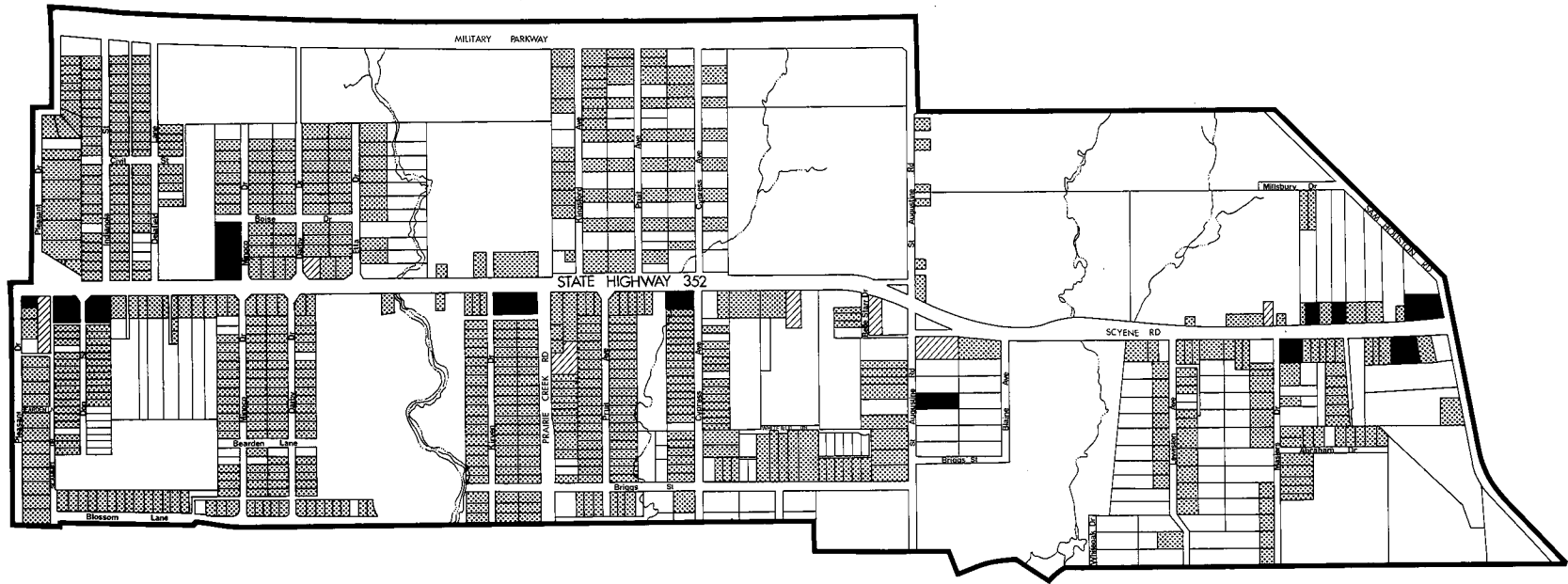


Figure 3. Land Use in the State Highway 352 Study Area in 1959



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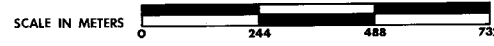
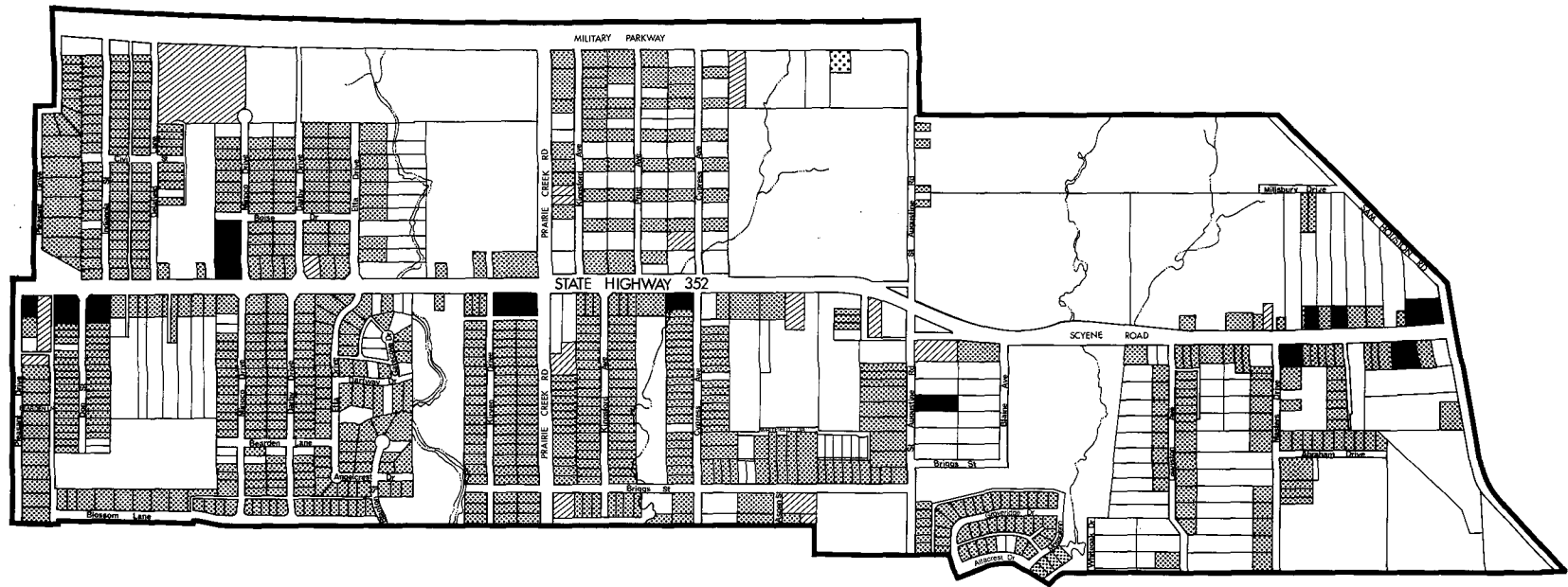


Figure 4. Land Use in the State Highway 352 Study Area in 1964



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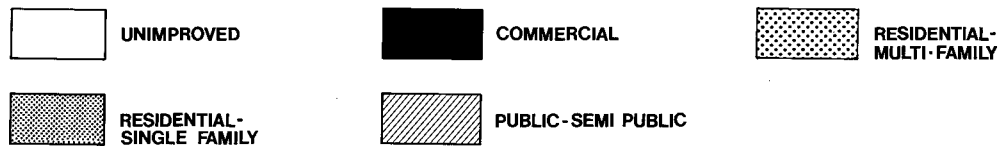
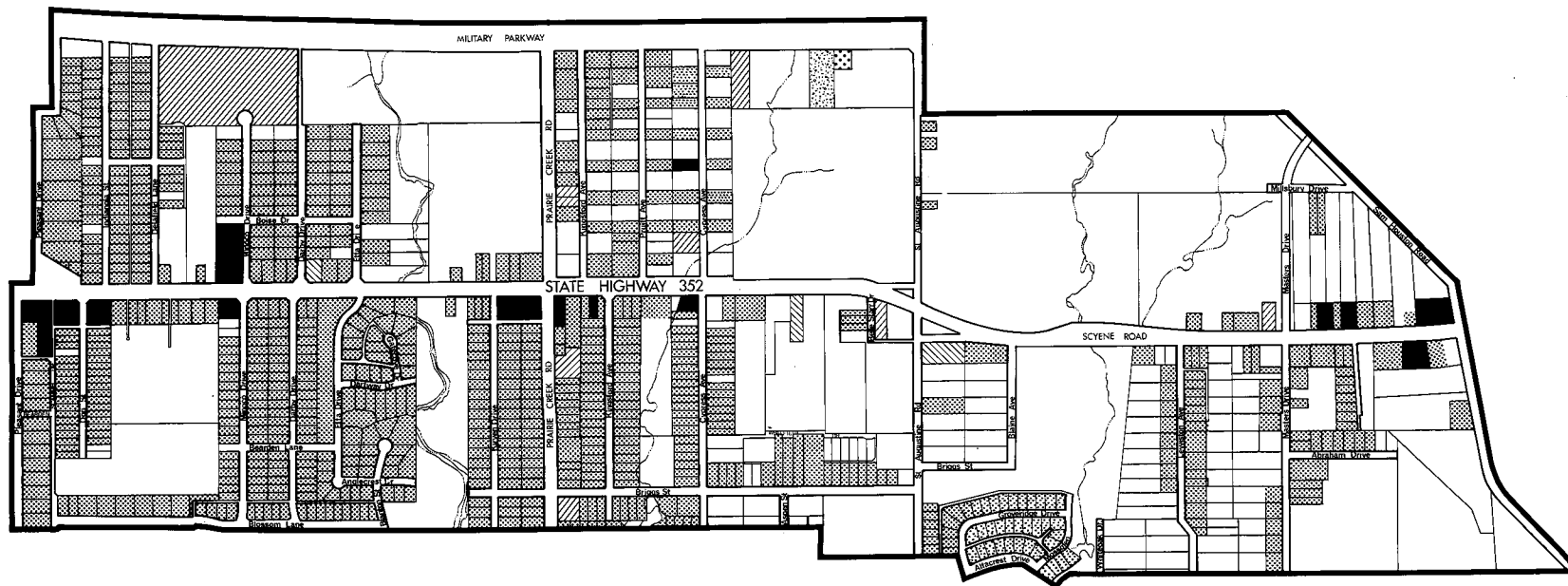


Figure 5. Land Use in the State Highway 352 Study Area in 1971



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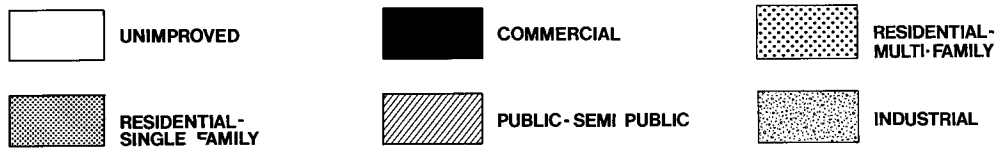


Figure 6. Land Use in the State Highway 352 Study Area in 1978

Table 3. Changes in Land Use of All Properties
by Time Period and Year

Land Use and Type of Change	Total Acres by Time Period and Year ^a			
	Before		After	
	1959	1964	1971	1978
Residential-Single Family	211.59	206.73	233.49	239.42
Absolute Change	+6.05	+26.76	+5.93	
Percent Change	+3%	+13%	+3%	
Residential-Multiple Family	0	0	0	0.43
Absolute Change	0	0	0	+0.43
Percent Change	0	0	0	-
Commercial	8.58	9.73	10.72	11.43
Absolute Change	+1.15	+0.99	+0.71	
Percent Change	+13%	+10%	+7%	
Public and Semi-Public	4.82	4.82	17.07	20.86
Absolute Change	0	+12.25	+3.79	
Percent Change	0	+254%	+22%	
Industrial	0	0	0	1.95
Absolute Change	0	0	0	+1.95
Percent Change	0	0	0	-
Streets and Roads	52.64	53.54	59.51	59.59
Absolute Change	+0.90	+5.97	+0.08	
Percent Change	+2%	+11%	+0.1%	
Unimproved	488.73	480.63	434.66	421.77
Absolute Change	-8.10	-45.97	-12.89	
Percent Change	-2%	-10%	-3%	
Total Acres	755.45	755.45	755.45	755.45

^aOne acre equals .4046856 hectares.

noteworthy changes that are discussed in terms of their location relative to SH 352.

Proximity to SH 352

Tracts of land were classified according to their location relative to SH 352. Tracts with frontage on the road were classified as abutting. A section 300 feet deep was considered abutting on undeveloped tracts. All other land was classified as nonabutting.

Although the improved facility could have influenced land use changes on nonabutting properties, it is expected that abutting properties would be most affected. The division of land into the abutting and nonabutting categories permits comparison.

Abutting Properties. In 1964, the first year of the *before period*, 47 percent of the 94.15 abutting acres were improved (Table 4). There were 27.83 acres in single family residential use, 8.58 acres of commercial use, 2.96 acres of public or semi-public use, and 4.75 acres in streets and roads. Slightly over 50 acres were unimproved.

During the *before period*, 1959 to 1964, total abutting acreage in single-family use decreased very slightly. Commercial use and streets and road acreage increased slightly while public/semi-public use remained the same. Only 1.02 acres of unimproved land became developed.

The *short-run after period* was also a time of little change on abutting land. Single family residential use increased by 1.04 acres and 0.40 acres were added to streets and roads. These changes decreased unimproved land by 1.44 acres.

The *long-run after period* had slightly more change than the other periods, however, the changes were still not extensive. Single family

Table 4. Changes in Land Use of Abutting Properties
by Time Period and Year

Land Use and Type of Change	Total Acres by Time Period and Year ^a			
	Before		After	
	1959	1964	1971	1978
Residential-Single Family	27.83	27.66	28.70	28.02
Absolute Change	-0.17		+1.04	-0.68
Percent Change	-1%		+4%	-2%
Commercial	8.58	8.87	8.87	10.87
Absolute Change	+0.29		0	+2.00
Percent Change	+3%		0	+23%
Public and Semi-Public	2.96	2.96	2.96	2.04
Absolute Change	0		0	-0.92
Percent Change	0		0	-31%
Streets and Roads	4.75	5.65	6.05	6.13
Absolute Change	+0.90		+0.40	+0.08
Percent Change	+19%		+7%	+1%
Unimproved	50.03	49.01	47.57	47.09
Absolute Change	-1.02		-1.44	-0.48
Percent Change	-2%		-3%	-1%
Total Acres	94.15	94.15	94.15	94.15

^aOne acre equals .4046856 hectares.

residential use decreased by 0.68 acres and public/semi-public use decreased by 0.92 acres. Commercial use increased by two acres and 0.08 acres were added to streets and roads. The net result of all the changes was only a 0.48 acre decrease in unimproved land. Changes in abutting acreages by type of land use are charted in Figure 7.

Nonabutting Properties. In 1959, 34 percent of the 661.30 nonabutting acres were improved (Table 5). The vast majority of improvements were single family residences. The remainder was a small amount of public/semi-public improvements and 47.89 acres of streets and roads.

During the *before period*, 6.22 acres were added to single-family residential use and 0.86 acres to commercial use. Thirty-five percent of nonabutting land had been developed by the end of the before period, 1964.

Several changes occurred in the *short-run after period*, 1964 to 1971. Single family residential acreage increased by 25.72 acres (14 percent) and public/semi-public use increased by 12.25 acres (659 percent). Commercial use also increased slightly and more acres were committed to use for streets and roads. Unimproved land decreased by 44.53 acres (10 percent). Forty-one percent of nonabutting land had been developed by the end of the *short-run after period*.

The *long-run after period* also experienced several changes but of much less magnitude than in the previous period. Single family residential use increased by 6.61 acres (3 percent) and multiple family residential use began with 0.43 acres. Public/semi-public use increased by 4.71 acres (33 percent) and industrial use emerged for the first time with 1.95 acres. Commercial use decreased by 1.29 acres (70 percent) leaving only 0.56 acres in that use. Forty-three percent of nonabutting land had been developed by the end of 1978. In comparison, there has been much more change on nonabutting land than on

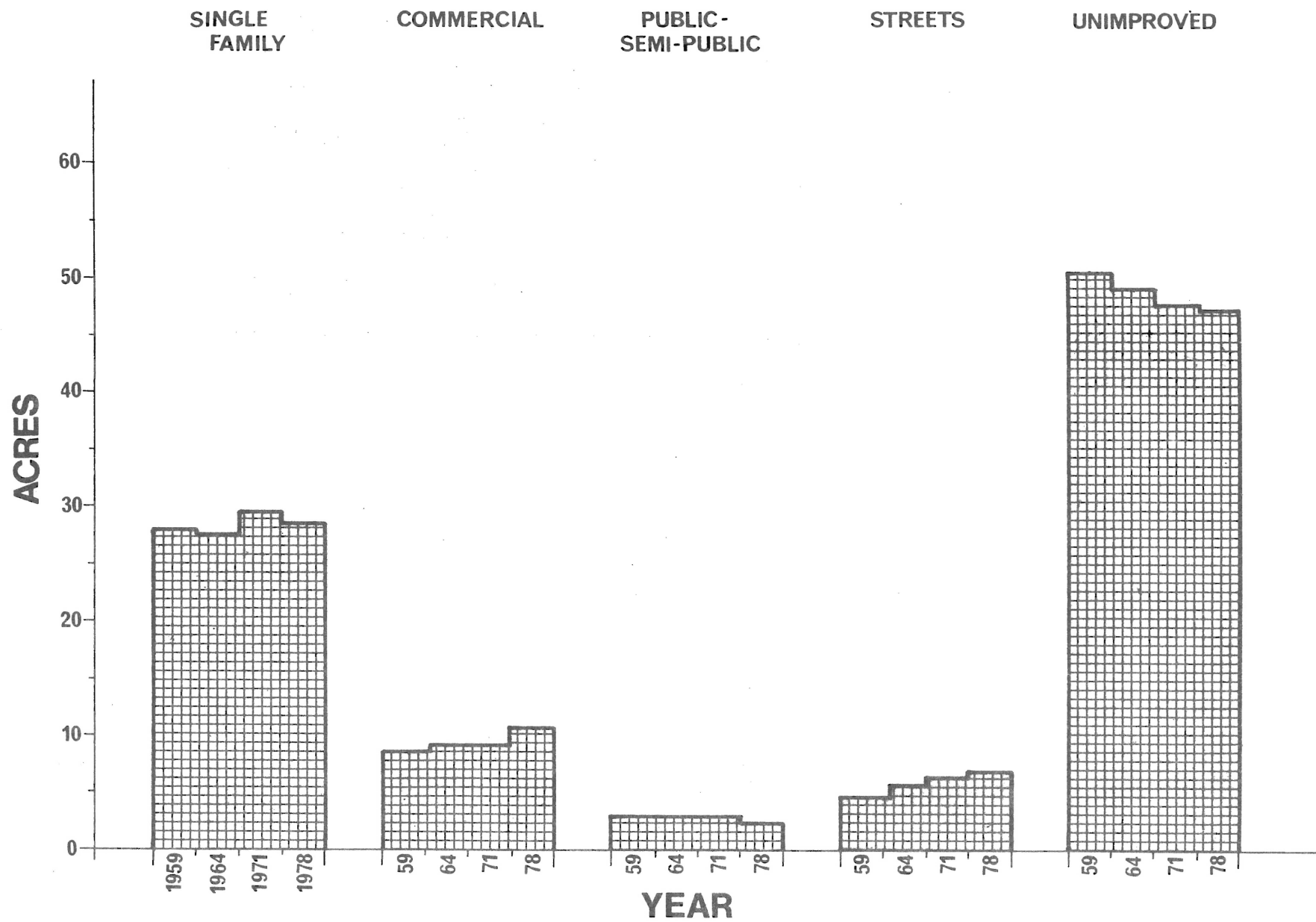


Figure 7. Changes in Abutting Land Uses in the State Highway 352 Study Area

Table 5. Changes in Land Use of Nonabutting Properties
by Time Period and Year

Land Use and Type of Change	Total Acres by Time Period and Year ^a			
	Before		After	
	1959	1964	1971	1978
Residential-Single Family	172.85	179.07	204.79	211.40
Absolute Change	+6.22	+25.72	+6.61	
Percent Change	+4%	+14%	+3%	
Residential-Multiple Family	0	0	0	0.43
Absolute Change	0	0	+0.43	
Percent Change	0	0	-	
Commercial	0	0.86	1.85	0.56
Absolute Change	+0.86	+0.99	-1.29	
Percent Change	-	+115%	-70%	
Public and Semi-Public	1.86	1.86	14.11	18.82
Absolute Change	0	+12.25	+4.71	
Percent Change	0	+659%	+33%	
Industrial	0	0	0	1.95
Absolute Change	0	0	+1.95	
Percent Change	0	0	-	
Streets and Roads	47.89	47.89	53.46	53.46
Absolute Change	0	+5.57	0	
Percent Change	0	+12%	0	
Unimproved	438.70	431.62	387.09	374.68
Absolute Change	-7.08	-44.53	-12.41	
Percent Change	-2%	-10%	-3%	
Total Acres	661.30	661.30	661.30	661.30

^aOne acre equals .4046856 hectares.

abutting. This is accounted for, in part, by the vastly greater area of non-abutting land. A better comparison is made in a later section when change is put on an annual rate basis. Nonabutting land use changes are shown in Figure 8.

Land Use Impediments

There are several factors that have contributed to the fact that over half of this total study area has remained undeveloped. When the first residential structures were built back in the 1940's there was no zoning and also no sewer and water lines. The area did not develop extensively at that time because builders avoided it in favor of other areas with more amenities. Due to the lack of zoning and planning, property boundaries and lot lines were not always drawn in a manner conducive to continued development. The resulting lack of access and other problems were deterrents to extensive growth.

Another possible deterrent to development is that the portion of SH 352 west of this study area was never improved. This may be depressing development in the study area because access to the Central Business District (CBD) is not as good as it otherwise would have been.

Some land in the area is being held by owners not interested in selling or who have not received an acceptable offer. There is also a drainage problem in the area that may detract from the development potential. Another physical barrier to development is the electric transmission line running along the southern side of Military Parkway that may be a hinderance to some types of development.

A final possible reason for the lack of growth in the area is the characteristics of the existing structures and the socioeconomic conditions of the residents. Many of the structures are relatively old and of moderate quality.

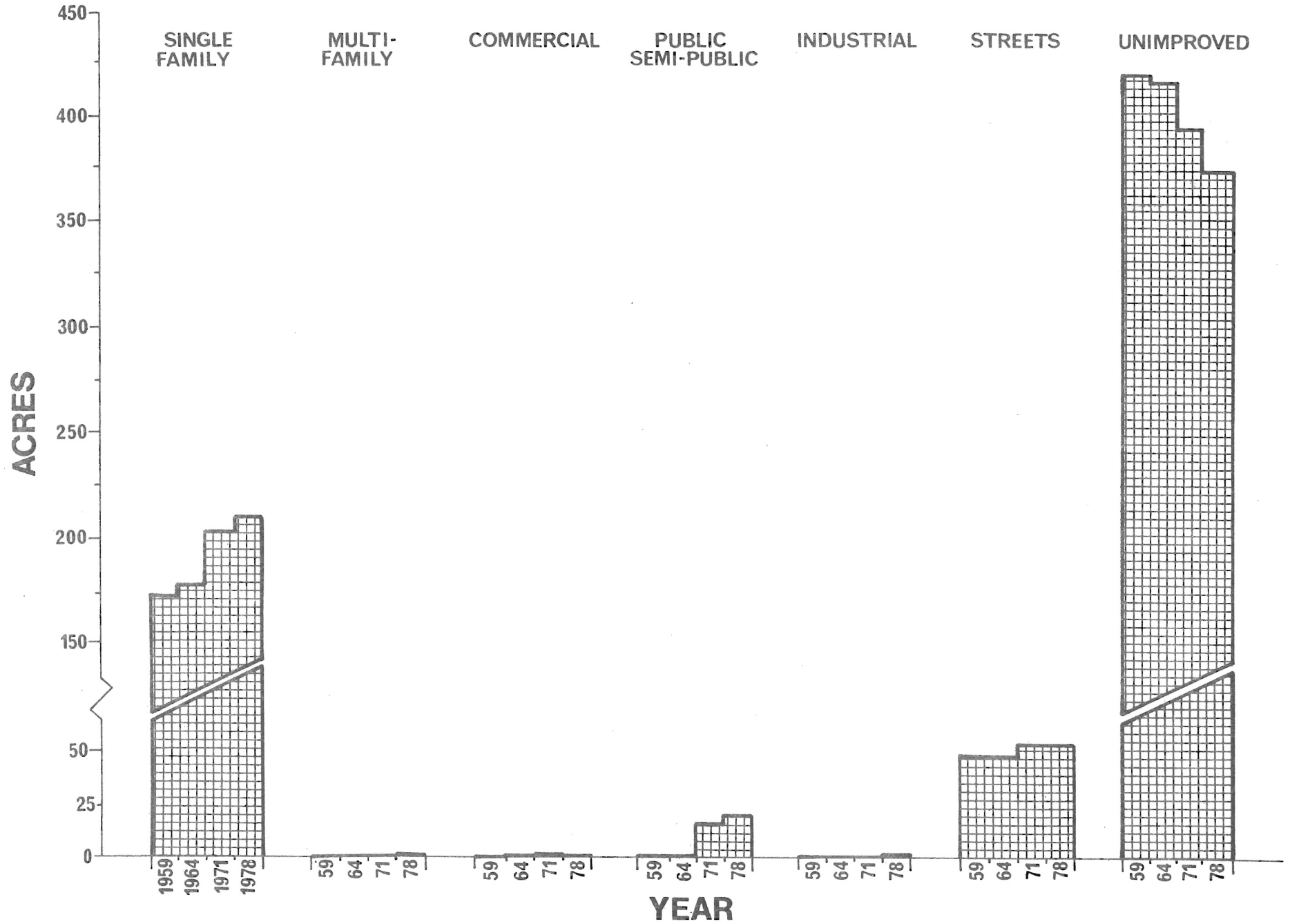


Figure 8. Changes in Nonabutting Land Uses in the State Highway 352 Study Area

It is considered a moderate to low-income area, and many of the residents are senior citizens. Some of the residents also live in government-subsidized housing. These characteristics do not create an area that has high potential for growth, particularly in commercial activity. Some other types of development may also have been deterred for those reasons.

Zoning may also have prevented some types of development from occurring in recent years. It is discussed in a later section.

Influence of Other Major Roads

Several roads intersect this area that have also had an effect on land use. Perhaps the most important is Buckner Boulevard, which is just west of the study area. Considerably more development has been occurring along Buckner in the last ten years than along SH 352. Buckner was improved early in 1963. Developers who were interested in this general area of Dallas may have located along Buckner instead of SH 352.

Prairie Creek Road intersects SH 352 in the western half of the study area. The portion of Prairie Creek Road south of SH 352 was upgraded from a two-lane to six-lane road in 1964 and 1965. The road was extended north of SH 352 to Military Parkway in 1966. Masters Street was improved and extended about ten years later, in 1975 and 1976. These two major streets may also have had some impact on land use in the study area.

Other streets and roads in the area probably also have had impacts on the area's land use. For example, almost all of the commercial development is located at intersections of SH 352 and other streets. The only industrial and a large part of the public/semi-public development are located on Military Parkway. Although these streets are important, due to the way this study area

is defined, SH 352 is the most important thoroughfare and the focal point in terms of roads.

Land Use Controls and Plans

Land use is regulated in Dallas by zoning. This study area is zoned primarily single family and multiple family residential with some commercial zones along SH 352 and other major roads in the area. A few requests for commercial zoning of small tracts on abutting land were denied, but, otherwise, some changes in zoning have occurred to accommodate development. In fact, some zoning changes have been made without any resulting changes in land use. There are several large tracts zoned for multiple family structures in the eastern half of the study area with no such development presently existing. Those tracts received the multiple family zoning in the late 1960's and early 1970's. In summary, zoning does not appear to have been a major force in land use changes in this area.

Two land use plans for Dallas were available to determine if development in the study area has occurred generally as projected. In a 1957 report called *Thoroughfares*, prepared for the Dallas Area Master Plan Committee of the Department of City Planning, a plan for future land use indicated that the study area would be all residential by 1980. A 1967 Dallas-Fort Worth Regional Transportation Study report also indicated that the study area would be totally residential in 1985. No distinctions were made between single family and multiple family residential in either plan.

The existing land use does not deviate greatly from the two plans. The development in the area is still primarily residential and the current zoning indicates expectations of more residential use.

Socio-Economic Characteristics

Selected socio-economic characteristics were investigated to reveal differences between the general location that the study area is in, Dallas as a whole, and the Dallas SMSA. Census tract data for 1960 and 1970 gives an indication of the relative growth in population and changes in other characteristics (Table 6). The four census tracts within which the study area lies represents over twice as much area as the study area alone.

Population and the number in each employment category were summed for all four census tracts. Of course, these figures are higher than they would have been if the study area could have been separated out, but they do provide information as to the trends in the study area and nearby vicinity. For the data given as medians, an average weighted by population of each census tract was derived for each characteristic.

The data shows that population in this section grew faster than that in Dallas or the SMSA. Dallas had a 24 percent increase in population between 1960 and 1970; the SMSA had a 44 percent increase; and the census tracts had a 61 percent increase. The study area itself is believed to have grown at a slower rate. Data collected by the Dallas/Fort Worth Regional Planning Office of the SDHPT on a serial zone basis indicated a 23 percent increase in population between 1964 and 1970 in an area that much more closely represents the study area. The median school years completed in the census tracts had a higher rate of increase than those in the city and SMSA although the number of years completed was not as high in the census tracts in either 1960 or 1970. The median resident of the census tracts had completed 11.5 years in 1970 as compared to 12.2 years in both the city and SMSA.

Table 6. Comparison of 1960 and 1970 Socio-Economic Characteristics of Applicable Census Tracts to Dallas and the Dallas SMSA^a

Socio-Economic Characteristics	SMSA			Dallas			Census Tracts ^b		
	1960	% Change	1970	1960	% Change	1970	1960	% Change	1970
Population	1,083,601	+44%	1,556,134	679,684	+24%	844,280	5,110	+61%	8,244
Median School Years Completed	11.8	+3%	12.2	11.8	+3%	12.2	10.6	+8%	11.5
Median Family Income	\$5,925	+76%	\$10,405	\$5,976	+68%	\$10,019	\$5,915	+87%	\$11,084
Median Income of Families and Unrelated Individuals	\$5,083	+68%	\$8,542	\$5,079	+57%	\$7,984	\$5,746	+82%	\$10,454
Median Value of Owner Occupied Residences	\$10,800	+54%	\$16,600	\$11,300	+46%	\$16,500	\$9,599	+67%	\$16,060
Total Employed	441,828	+51%	665,510	287,430	+30%	374,209	1,952	+88%	3,662
Professional, Technical, and Kindred Workers	51,364	+100%	102,672	32,176	+71%	55,033	102	+242%	349
Managers and Administrators	51,088	+24%	63,352	31,169	+17%	36,398	163	+47%	239
Sales Workers	38,863	+55%	60,224	26,652	+34%	35,596	138	+189%	399
Clerical and Kindred Workers	80,320	+78%	142,843	55,029	+51%	83,157	406	+131%	938
Craftsmen, Foremen, and Kindred Workers	55,259	+57%	86,845	33,016	+29%	42,558	410	+82%	747
Operatives	65,904	+48%	97,574	40,157	+33%	53,245	424	+27%	538
Laborers	21,220	+57%	33,355	12,613	+39%	17,492	41	+261%	148
Service Workers	37,239	+78%	66,320	27,190	+52%	41,426	139	+119%	304
Private Household Workers	14,763	-17%	12,325	11,184	-17%	9,304	8	-25%	6

^aData from the Bureau of the Census, U.S. Department of Commerce Publications.

^bCensus tracts 0090-A, 0090-B, 120, and 121 from the 1960 census and tracts 90.01, 90.02, 120 and 121 from the 1970 census were used to provide summations on weighted averages.

The census tracts had a lower median family income in 1960 but a higher median family income in 1970 than Dallas or the SMSA indicating family incomes were increasing at a faster rate in the census tracts. Median income of families and unrelated individuals was higher in both 1960 and 1970 and increased by a greater percent. The median value of an owner occupied residence was lower in the census tracts in both years.

The number of people employed in the census tracts increased by a greater percentage than in the city and SMSA. Also, the numbers employed in white collar type positions increased by greater percentages in the census tracts than in the other two areas of comparison.

These characteristics are believed to be somewhat higher than those for the study area. However, they do give an indication of the types of socio-economic changes that took place in the area surrounding SH 352 in a period that includes the years in which the road was improved.

IMPACT OF THE HIGHWAY IMPROVEMENT ON LAND USE IN THE STUDY AREA

To examine the impact of the improvement of SH 352, two types of data were used. These types were:

- (1) land use changes in the area, and
- (2) opinions of people knowledgeable about the area.

Effects on Abutting and Nonabutting Land

Specific shifts in land use during each time period were examined. Table 7, which shows changes in absolute acres, indicates not only changes from unimproved land to some improved use but also changes from one type of improvement to another or reversions back to an unimproved state. These changes point out important aspects of land use transformation that may be, in part, a result of the road improvement. Table 8 is expressed in terms of percentage changes for each land use type and time period. The percentages are adjusted for differences in lengths of time periods and for the larger acreage in the nonabutting category. This permits a more meaningful comparison between the abutting and nonabutting categories. These changes are discussed first for abutting property and then for nonabutting.

Abutting Property. Table 7 indicates that the most abutting changes, in terms of number of acres, occurred in the long-run after period. Over half of those changes were due to conversions from one type of improved use to another, rather than land becoming improved for the first time. When the changes are put on an average annual percentage basis, the *long-run after period* still leads in the amount of land use change (Table 8). An average of 0.62 percent of abutting land changed use each year during the *long-run after period* as compared to 0.43 percent in the *before period* and 0.18 percent in

Table 7. Absolute Changes in Land Use of Abutting and Nonabutting Acreage by Time Period and Type of Land Use Change

Type of Land Use Change	Before Period		Short-Run After Period		Long-Run After Period		Total After Period	
	1959-1964		1964-1971		1971-1978		1964-1978	
	Abutting	Nonabutting	Abutting	Nonabutting	Abutting	Nonabutting	Abutting	Nonabutting
	* ----- Acres -----							
Single Family to Public	0	0	0	1.63	0	0	0	1.63
Single Family to Commercial	0	0.86	0	0.22	1.08	0	1.08	0.22
Single Family to Streets	0.90	0	0	0	0	0	0	0
Single Family to Unimproved	0	0.86	0.43	0.36	0.17	0	0.60	0.36
Public to Commercial	0	0	0	0	0.92	0	0.92	0
Public to Single Family	0	0	0	0	0	0.34	0	0
Commercial to Single Family	0	0	0	0	0	0.86	0	0.86
Commercial to Multiple Family	0	0	0	0	0	0.43	0	0.43
Unimproved to Single Family	0.82	7.94	0.34	29.24	1.71	5.41	2.05	34.65
Unimproved to Commercial	0.29	0	0	0.77	0	0	0	0.77
Unimproved to Public	0	0	0	10.62	0	5.05	0	15.67
Unimproved to Industrial	0	0	0	0	0	1.95	0	1.95
Unimproved to Streets	0	0	0.40	5.57	0.17	0	0.57	5.57
Total Land Changing Use	2.01	9.66	1.17	48.41	4.05	14.04	5.22	62.45
Improved Land	0.90	1.72	0.43	2.21	2.17	1.63	2.60	3.84
Unimproved Land	1.11	7.94	0.74	46.20	1.88	12.41	2.62	58.61

*One acre equals 0.4046856 hectares.

Table 8. Average Annual Percentage Changes in Land Use of Abutting and Nonabutting Acreage by Time Period and Type of Land Use Change

Type of Land Use Change	Before Period		Short-Run After Period		Long-Run After Period		Total After Period	
	1959-1964		1964-1971		1971-1978		1964-1978	
	Abutting	Nonabutting	Abutting	Nonabutting	Abutting	Nonabutting	Abutting	Nonabutting
	----- Percent -----							
Single Family to Public	0	0	0	0.04	0	0	0	0.02
Single Family to Commercial	0	0.03	0	0.01	0.16	0	0.08	0.002
Single Family to Streets	0.19	0	0	0	0	0	0	0
Single Family to Unimproved	0	0.03	0.07	0.01	0.03	0	0.05	0.004
Public to Commercial	0	0	0	0	0.14	0	0.07	0
Public to Single Family	0	0	0	0	0	0.01	0	0.004
Commercial to Single Family	0	0	0	0	0	0.02	0	0.01
Commercial to Multiple Family	0	0	0	0	0	0.01	0	0.01
Unimproved to Single Family	0.17	0.24	0.05	0.63	0.26	0.12	0.16	0.37
Unimproved to Commercial	0.06	0	0	0.02	0	0	0	0.01
Unimproved to Public	0	0	0	0.23	0	0.11	0	0.17
Unimproved to Industrial	0	0	0	0	0	0.04	0	0.02
Unimproved to Streets	0	0	0.06	0.12	0.03	0	0.04	0.06
Total Land Changing Use	0.43	0.30	0.18	1.06	0.62	0.31	0.40	0.68
Improved Land	0.19	0.06	0.07	0.06	0.33	0.04	0.20	0.05
Unimproved Land	0.24	0.24	0.11	1.00	0.29	0.27	0.20	0.63

the *short-run after period*. The *total after period* averaged a 0.40 percentage change per year.

The amount of change on abutting land has been very small, and any impact of the road improvement is not clear. The slight increase in rate of change in the last time period may suggest the beginning of renewed interest in this area as a location for development.

Nonabutting Properties. The period of most nonabutting change, both in terms of absolute acres and average annual percentage change, was the *short-run after period*. The average annual percentage change was 1.06 as compared to 0.30 in the *before period* and 0.31 in the *long-run after period*. This increase in land use change may have been, in part, a response to the improvement of SH 352 and other major streets in the area, that provided better access. Most of the nonabutting land use change involved land becoming improved for the first time although there was some change in each period from one improved use to another.

Opinions of Knowledgeable People

Numerous interviews were conducted with people who had knowledge of this study area. A better understanding was gained of why the road was improved and of the land use changes that have taken place.

Several people from the State Department of Highways and Public Transportation were interviewed about the design change of the road and the results of the change. The road was improved to better move traffic to and from the Central Business District (CBD) and Mesquite, Texas. The officials of the SDHPT thought that the impact of the road improvement had been minimal, if any.

Officials of the City of Dallas, primarily in the areas of planning and zoning, were also questioned. They also said that the road improvement has

had little impact upon land use. Other characteristics of the area were said to have overshadowed the positive aspects of the road improvement, thus impeding new development (these characteristics are discussed in the Land Use Impediments section).

Numerous other people including realtors, investors, and land owners were asked their opinions about the land use effects of the road improvement. No one thought it had been an important factor in the change or lack of change.

Conclusions

The SH 352 study area has not undergone extensive land use change in the last two decades. Almost half of the total area remains unimproved. The predominant type of development has remained single family residential throughout the years of this study.

Nonabutting development may have been encouraged slightly by the road improvement since the rate of change more than tripled between the *before* and *short-run after periods*. However, compared to other study areas, the rates of change are small. Abutting land did not show a pronounced increase in the rate of change, although it was slightly higher in the *long-run after period* than in the *before period*.

Based on the relatively low rates of change, in spite of the fact that there was ample land available for development, and on the opinions of people knowledgeable about the area; the road improvement is judged to have had little impact upon land use. The new road design did provide better access through this section of Dallas, but other factors overrode any notable effect on land use that might have otherwise occurred.