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16. Abstract

Previous studies on the effects of highway construction upon 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 effects of such improvements upon land use. This report relates the findings of research done in an area of Arlington, Texas where a section of Collins Street was upgraded from a 40 foot, two-lane road with parallel parking and curbs and gutters to an 84 foot, six-lane road with a continuous left turn lane and curbs and gutters. The improvement took place in a developed area where the predominant land use was 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 the specific improvement began up to the end of 1978. Total acres in each type of land use were determined for two "before construction" years, 1969 and 1974, and for one "after construction" year, 1978. 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.

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LAND USE IMPACT OF IMPROVING COLLINS STREET IN A DEVELOPED AREA OF ARLINGTON, TEXAS

by

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Research Report 225-13
Research Study Number 2-8-77-225
Economics of Highway Design Alternatives

Sponsored by
State Department of Highways
and Public Transportation

in Cooperation with the
Federal Highway Administration
U.S. Department of Transportation

September 1979

Texas Transportation Institute
Texas A&M University
College Station, Texas

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 Bugleholl and Mr. Don Walden of the Dallas/Fort Worth Regional Planning Office of the SDHPT in Grand Prairie were particularly helpful in supplying data and providing assistance. Mr. Burton Clifton, Mr. R. W. Renfro and others of District 2 of the SDHPT in Fort Worth were very cooperative in providing traffic count data and information on the construction and design change of the road.

Officials of the City of Arlington provided valuable information and suggestions. Several business people and residents of Arlington also provided data about the study site and the road improvement.

Members of the Texas Transportation Institute have been most supportive and have offered suggestions and encouragement. Ms. Katie Womack's efforts in securing land use and other data are very much appreciated. Her hard work and perseverance greatly aided this study. Special assistance was provided by Ms. Karen Spohr in typing the manuscript.

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 or policies of the Federal Highway Administration. This report does not constitute a standard, a specification, or regulation.

ABSTRACT

Previous studies on the effects of highway construction upon 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 effects of such improvements upon land use. This report relates the findings of research done in an area of Arlington, Texas where a section of Collins Street was upgraded from a 40-foot, two-lane road with parallel parking and curbs and gutters to an 84-foot, six-lane road with a continuous left turn lane and curbs and gutters. The improvement took place in a developed area where the predominant land use was 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 five years before planning for the specific improvement began up to the end of 1978. Total acres in each type of land use were determined for two "before construction" years, 1969 and 1974, and for one "after construction" year, 1978. 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.

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.

SUMMARY OF FINDINGS

Data were collected and analyzed for the Collins Street study area in Arlington, Texas, to determine the impact upon land use of improving the road from a two-lane facility with parallel parking to a six-lane facility with a continuous left turn lane. Data were collected for 1969, which was six years before formal planning for this project began; 1974, which was the year immediately before formal planning began; and 1978, the last full year data collection was possible.

The findings are summarized as follows:

1. The area in which the street improvement took place was an established section of Arlington.
   a. The area has been classified as developed throughout the study years, 1969 through 1978.
      1. The total study area was 84 percent developed in 1969.
      2. Ninety-two percent of the total area was developed in 1974.
      3. In 1978, 96 percent of the area was developed.
   b. The predominant type of development has remained single family residential, but there have been changes in land use.
      1. Fifty-seven percent of the study area has remained in single family use throughout the study years.
      2. Commercial development, which is mostly in the southern end of the study area, has more than quadrupled.
      3. Public and semi-public use has increased slightly.
      4. A few additional acres were added to the network of streets.
2. Properties abutting Collins Street experienced a small amount of change between 1969 and 1978.

a. The predominant (when measured in terms of acreage) type of abutting land use, public and semi-public, remained constant at 24.12 acres (9.76 hectares). In terms of numbers of structures, single-family residential was the predominant land use.

b. Single family residential use remained constant at 8.62 acres (3.49 hectares).

c. Commercial acreage increased from 3.10 acres (1.25 hectares) in 1969 to 13.02 acres (5.27 hectares) in 1974 and to 13.92 acres (5.63 hectares) in 1978.

3. Nonabutting land experienced several notable changes in use.

a. The predominant type of use, single family residential, remained constant from 1969 through 1978, at 202.97 acres (82.14 hectares).

b. Multiple family residential use increased from none in 1969, to 10.85 acres (4.39 hectares) in 1974, and 14.72 acres (5.96 hectares) in 1978.

c. Commercial acreage increased almost five times the 4.39 acres (1.78 hectares) in 1969, to 10.88 acres (4.40 hectares) in 1974, and 20.95 acres (8.48 hectares) in 1978.

d. Public and semi-public and street uses also increased slightly on nonabutting land.

4. The period of most change for both abutting and nonabutting property was the before period.

a. Abutting land changed use at an average annual rate of 3.34 percent in the before period as compared to 0.38 percent in the after period.

b. The average annual rate of change for nonabutting land was 1.57 percent in the before period and 1.18 in the after period.

5. Land use changes were primarily affected by factors other than the improvement of Collins Street.
   a. Two other streets, Arkansas Lane and Spur 303, had influence on the commercial and multiple family developments in the southern section of the study area.
   b. The growing economy of the entire Dallas/Fort Worth Metroplex helped create a situation conducive to the development that has occurred in the study area before and after the improvement of Collins Street.
6. Although the improvement of Collins Street helped create an area more attractive for development, the impact on land use was not extensive.
   a. Most of the development in this area occurred in the period before the road improvement began and was most likely not influenced by the road change.
   b. Other street improvements had as much or more influence on the location of recent developments as the Collins Street improvement.
   c. The road improvement is viewed as a positive influence, because if the street had not been widened the resulting congestion would have been a deterrent to development.

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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 relates the findings of investigation in an area of Arlington, Texas, where a section of Collins Street was improved. Areas with other types of street 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 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 Collins Street 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 1969 and 1974, the two "before" years and for the "after" year, 1978. 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 FM 157. On undeveloped tracts, a section extending 300 feet from FM 157 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 use changes. Other factors which might have influenced land use 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 Collins Street is located within the city limits of Arlington, Texas (Figure 1). Arlington is located in the eastern edge of Tarrant County, one of the eleven counties making up the Dallas/Fort Worth Standard Metropolitan Statistical Area. Arlington is positioned nearly midway

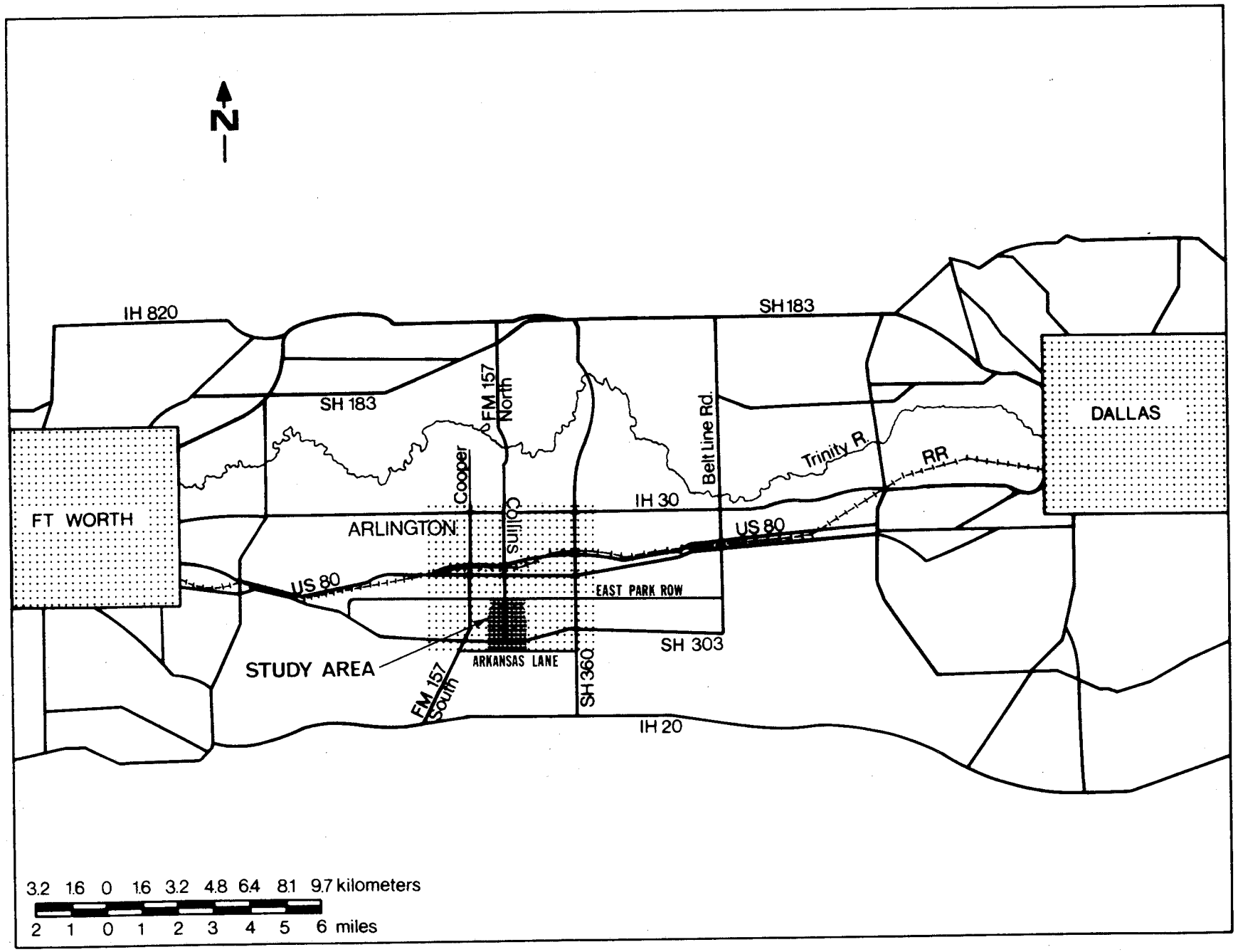

Figure 1. Map of the Dallas-Fort Worth Area Showing the Location of the Collins Street Study Area in Arlington.

between Dallas and Fort Worth in this largest SMSA in Texas. Due to the interdependence between cities and counties in the SMSA, a brief discussion of the SMSA as a whole is presented first followed by a more specific description of Arlington.

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 recorded increases in total population but lost 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 in the area is the original Neiman-Marcus department store, one of the world's best known and 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

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

Dallas Market which is the largest wholesale merchandising complex 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.

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 motor 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 Dallas/Fort Worth economy 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. 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.

Arlington, located approximately midway between Dallas and Fort Worth has emerged from being a small agricultural service center to being an integral part of the SMSA. The city, benefiting from its central location, has attracted major industrial, retail, and entertainment developments.

The population of Arlington has increased from 7,692 in 1950 to 90,643 in 1970 (a 1,078 percent increase) and to 160,000 in 1978 (a 77 percent increase since 1970), as shown in Table 1. The population is projected to reach 170,000 in 1980 and 208,600 in 1985. Although many Arlington residents work within the city, numerous residents work in Dallas or Fort Worth but prefer Arlington as a place to live.

There are over 350 industrial firms in Arlington making and distributing numerous products. Among the largest is an automobile assembly plant.

Entertainment facilities at Six Flags Over Texas Amusement Park and the Texas Ranger Baseball Park are important contributors to income in Arlington. Six Flags attracts more tourists than any other recreational facility in the state.

City retail sales almost tripled between 1960 and 1970 increasing from $64,978,000 to $190,594,000. The increase was even greater between 1970 and 1978, when sales increased over fourfold to $799,572,000.

Key Characteristics of Street Improvement

The 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:

Table 1. Population and Percentage Change in Population for Arlington, 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
Arlington	7,692	37,083 482%	44,775	45,868 102%	89,723	-	b
Dallas	434,462	245,222 56%	679,684	164,717 24%	844,401	-	b
Dallas SMSA	614,799	468,802 76%	1,083,601	472,533 44%	1,556,134	-	c
Fort Worth	278,778	77,490 28%	356,268	37,208 10%	393,476	-	b
Fort Worth SMSA	361,253	211,962 59%	573,215	188,870 33%	762,085	-	c
Dallas-Fort Worth SMSA	c	-	c	-	2,378,353	158,595 7%	2,536,948

[a]Data from the Bureau of the Census, U.S. Department of Commerce Publications.
[b]Data unavailable.
[c]Prior 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.

(1) Stage of area development,

(2) Type of highway or street,

(3) Predominant land use, and

(4) Type of setting (urban or suburban).

These factors were determined for the period of time prior to the beginning of the street improvement project. 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.

Since the Collins Street area was 84 percent improved in 1969, the stage of development before the improvement began was *developed*.[2] The primary type of improvement was single-family residential. The study area is located within the Arlington city limits.

Sources of Data

The source of information on the design change and construction dates of the road improvement was the District 2 Office of the SDHPT in Fort Worth. Data on the planning and justification of the design change were provided by personnel of the District Office and from planners with the City of Arlington.

The Dallas-Fort Worth Regional Planning Office of the SDHPT in Grand Prairie was the major source of land use information. The city of Arlington Planning Office also provided some land use data and data on zoning. On-site inspection and city directories helped determine the correct land uses. Interviews with real estate developers, city planners and officials, area

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[2]The 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* - 0 to 10% improved, *developing* - 10% to 80% improved, and *developed* - 80% to 100% improved.

residents, and property owners also provided background information on land use plans for the road improvement.

Traffic volume data were obtained from the City of Arlington, District 2 Office and the Dallas-Fort Worth Regional Planning Office of the SDHPT. The Arlington Chamber of Commerce and the U.S. Census provided population and other socio-economic 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-Governmental - tract improved with a governmental office, park, public owned utility, etc.

Semi-Public-Nonprofit - tract with improvements such as churches, nonprofit clubs, or other non-profit organizations.

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 1969 to 1974 which ends the year before formal planning and construction began.

After Period - the period from the end of 1974 through 1978.

CHARACTERISTICS OF AREA STREETS AND ROADS BEFORE AND AFTER IMPROVEMENT OF COLLINS STREET

Collins Street

Collins is a city maintained street that extends north and south through Arlington. As shown in Figure 1, the section of Collins that this study focuses upon extends from Arkansas Lane to Spur 303.

The improvement changed the study section from a 40-foot (12.19 meters) asphalt surface with two lanes and parallel parking to an 84-foot (35.60 meters) concrete surface with six lanes and a continuous left turn lane (Figure 2). The street had curbs and gutters before and after the improvement.

Formal approval for the investigation, planning, and engineering on this project was issued in August 1975. The contract was let in July of 1977, and the project was completed in November 1977. Forty feet of right-of-way were acquired to increase the total width to 100 feet. The total length of the improved section was .92 miles (1.48 kilometers).

Traffic counts for most locations on Collins Street within the study area have steadily increased in recent years (Table 2). A point just north of Arkansas Lane, the southern boundary of the study area, had counts of 9,500 in 1973, and 10,584 in 1974. The counts increased to 12,220 in 1976, and 16,330 in 1977. A point just south of Park Row Street, which represents the northern section of the study area, had increases from 14,500 in 1973 to 16,260 in 1975 and 17,232 in 1977. In the early 1970's, the counts on Collins in the northern section of the study area were considerably higher than the counts in the southern section, but in 1977 the counts were more similar for all locations.

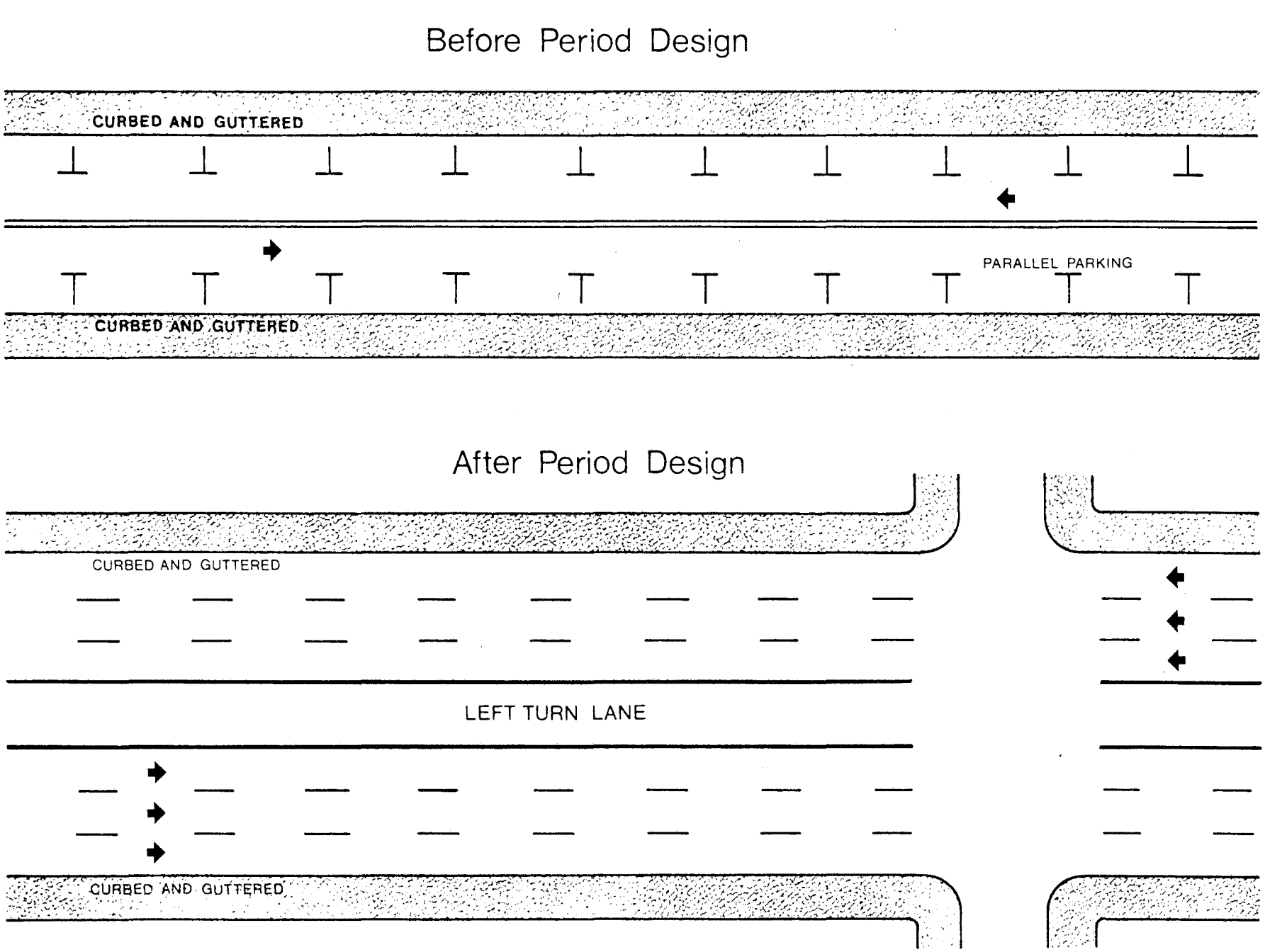


Figure 2. Design of Collins Street Before and After Improvement.

Table 2. Twenty-Four Hour Traffic Counts on Collins Street and Other Intersecting and Parallel Streets

Location of Traffic Count	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
STUDY ROUTE										
Collins Street										
South of Arkansas Lane						7,690		12,790	16,220	
North of Arkansas Lane					9,500	10,584		12,220	16,330	
North of Spur 303					13,530		14,850	16,200	15,530	
North of Kelly Terrace									15,880	
South of Park Row Street					14,500		16,260		17,232	
North of Park Row Street				17,080	19,630				16,634	
North of Study Area					18,400	20,726		18,750		
INTERSECTING STREETS										
Arkansas Lane										
West of Cooper Street							10,344	10,270	14,770	
West of Collins Street							13,346		16,027	18,975
East of Collins Street							13,289		15,455	19,191
West of SH 360							8,020	8,040		
East of SH 360							6,665	4,070	4,670	8,230
Spur 303										
At Center Street	26,150	24,880	27,650	30,350	31,990	31,740	27,830	22,370	23,340	
East of Cooper Street					33,620	33,220		18,490		
West of Collins Street					33,370				25,465	
East of Collins Street									21,770	
West of SH 360							17,700	22,174		
East of SH 360								18,710	21,075	
Park Row Street										
West of Collins				16,490	18,340		15,710		17,448	13,209
East of Collins							15,380		20,565	17,828
PARALLEL STREETS										
Cooper Street										
South of Spur 303	11,750	13,200	13,950	15,290	15,880	15,600	17,680	15,690	15,930	
North of Spur 303				15,870	19,150				16,790	
South of Park Row							23,360			
North of Park Row				21,310				27,260	27,260	
State Highway 360										
South of Arkansas						4,770				
North of Arkansas								13,100		
North of Spur 303								18,420	20,910	

Intersecting Streets

Arkansas Lane, which forms the southern boundary of the study area, has also had increasing traffic counts at most locations in recent years. Two locations on Arkansas near Collins Street had counts slightly over 13,000 in 1974, and counts of approximately 19,000 in 1978.

Spur 303, which is parallel to and north of Arkansas Lane, has had fluctuating traffic counts since the late 1960's. The counts at the location of Spur 303 and Center Street increased from 26,150 in 1969, to 31,990 in 1973, and then declined to 23,340 in 1977. The counts for the location just west of Collins Street also declined from 33,370 in 1973 to 24,465 in 1977.

Park Row Street, the northern boundary of the study area, has also had fluctuating traffic counts in the last few years. A point west of Collins had counts that fluctuated from 16,490 vehicles per day in 1972, to 18,340 in 1973, and 13,209 in 1978. A point just east of Collins had higher counts in 1977 and 1978 than the point on the west side. Those counts were 20,565 in 1977 and 17,828 in 1978.

Parallel Streets

Cooper Street is west and parallel to Collins Street and is an alternate route for those traveling to points north and south. Cooper Street is also FM 157 from just north of Spur 303 to Abrams Street. FM 157 provides connection between Interstate 20 and Interstate 30. Cooper Street also disects the University of Texas at Arlington Campus. When it was possible to compare like points on Cooper and Collins Streets, the counts were higher on Cooper. This is exemplified by the counts for points just north of Spur 303 on both streets. The 1973 count on Collins was 13,530 as compared to 19,150 on Cooper. The 1977

counts for those locations were 15,530 for Collins and 16,790 for Cooper. Larger discrepancies between counts for the two streets occurred in the more northern locations. Counts in 1975 for locations on both streets just south of Park Row Street were 16,260 for Collins and 23,360 for Cooper. The 1977 counts for those locations were 17,232 for Collins and 27,260 for Cooper.

State Highway 360 is also a parallel street to Collins and is to the east. It also is a direct connection between Interstate 20 and Interstate 30 and provides direct access from Interstate 20 to the Dallas/Fort Worth Airport. Very few counts were available to indicate the traffic volume on SH 360, however, a 1977 count for just north of Spur 303 was considerably higher than the count for Collins Street just north of Spur 303. The counts were 20,910 for SH 360 and 15,530 for Collins.

The traffic volumes on Cooper Street and SH 360 indicate that Collins is not the major north-south thoroughfare. However, the Collins Street counts have steadily increased, whereas, the counts for Cooper Street leveled off and have remained primarily between 15,000 and 16,000 since 1972. The improvement of Collins has probably been a factor in attracting traffic.

CHARACTERISTICS OF THE STUDY AREA BEFORE AND AFTER IMPROVEMENT OF FARM TO MARKET ROAD 157

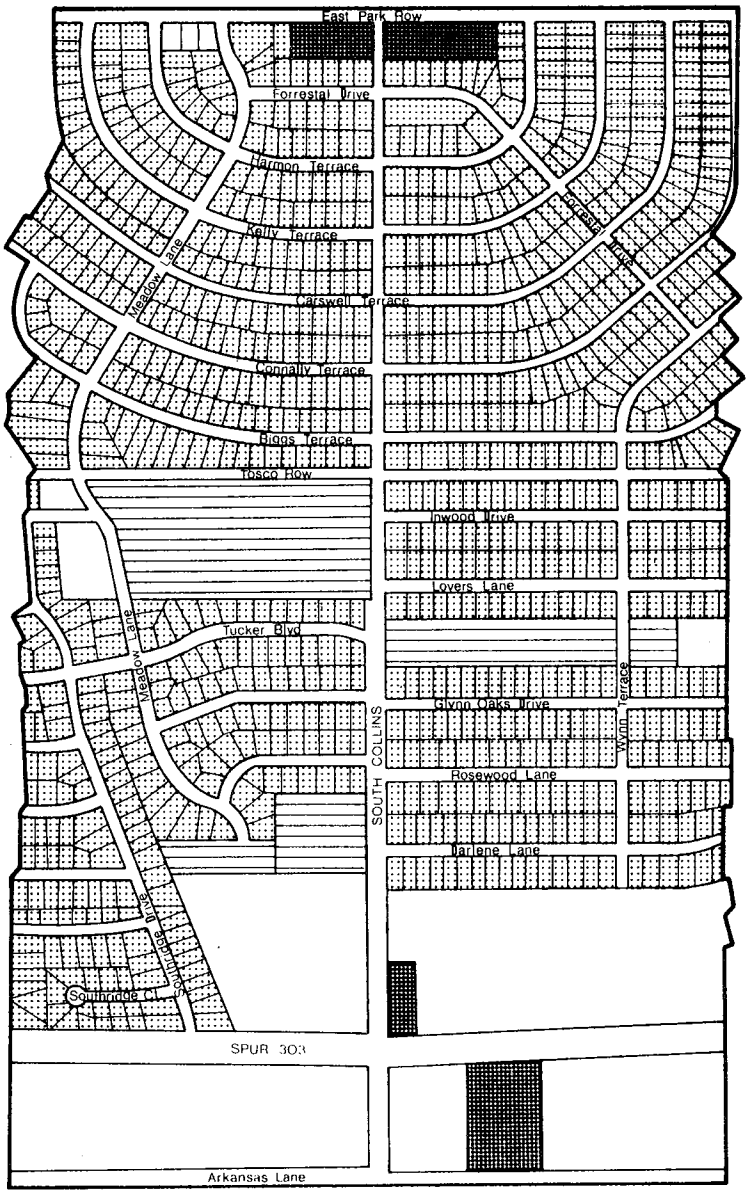
Size and Boundaries of the Study Area

The Collins Street Study Area encompasses approximately 373 acres (150.95 hectares). An area on each side of the street was chosen to include approximately three blocks (or the equivalent distance) of land on each side of Collins Street, thus including both abutting and nonabutting land. Arkansas Lane marks the southern boundary of the study area, and Park Row Street forms the northern boundary. The eastern and western boundaries were drawn primarily along property lines and streets. The study area extends approximately 1,500 feet (457.20 meters) to the east and west of Collins Street.

Most of the single-family residences in the study area are over 30 years old having been built just after World War II. The majority have wood or asbestos siding exteriors and have been kept in a good state of repair.

Land Use Characteristics

As indicated in the land use maps in Figures 3, 4, and 5, the majority of the land in the study area had remained single family residential throughout the years of study. In 1969, the first year for which data were collected, 84 percent of the total study area was improved. The percentage of improved land increased to 92 percent in 1974, the year before the street improvement began, and to 96 percent in 1978, the year after the project was completed. The increases in developed land were the additions of several commercial and multiple family residential developments. Public and semi-public use presently constitutes most acreage on abutting land, although there are more single family residences when number of structures is considered. Single family residential



LAND USE LEGEND

UNIMPROVED

COMMERCIAL

RESIDENTIAL - SINGLE FAMILY

RESIDENTIAL - MULTI-FAMILY

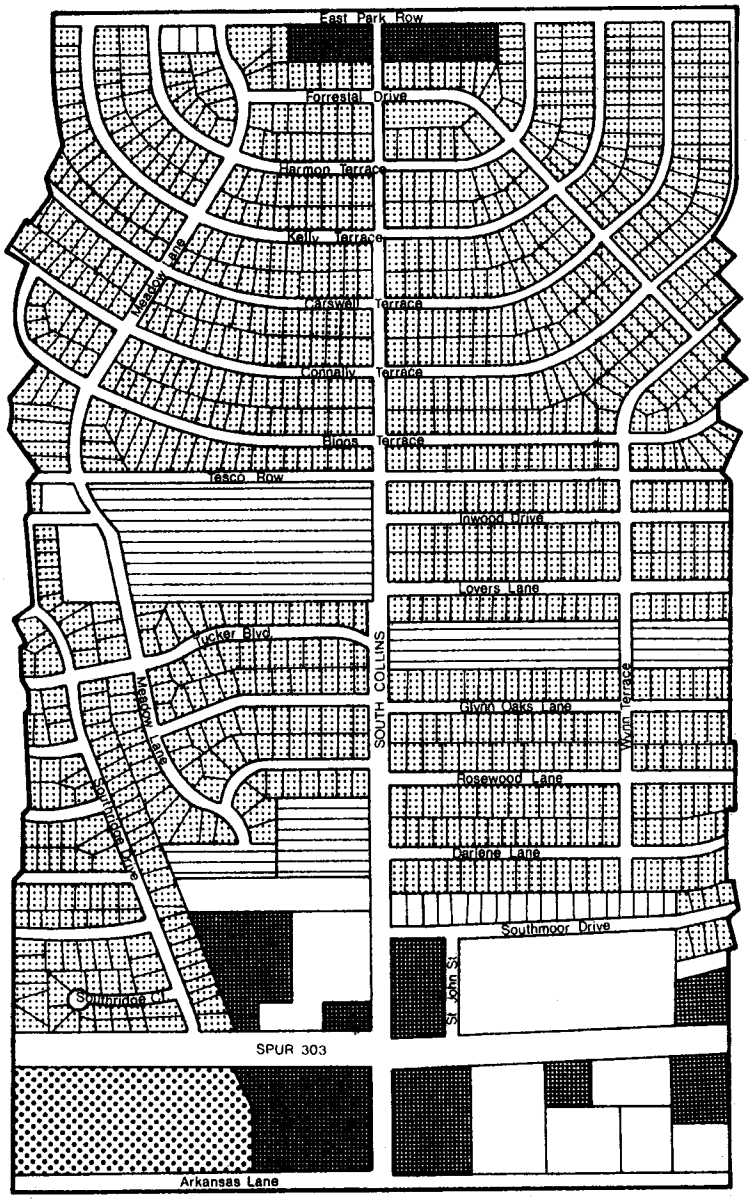
PUBLIC / SEMI-PUBLIC

N

SCALE IN FEET 0 600 1200 1800

SCALE IN METERS 0 18288 36576 54864

Figure 3. Land Use in the Collins Street Study Area in 1969.



LAND USE LEGEND

UNIMPROVED

COMMERCIAL

RESIDENTIAL - SINGLE FAMILY

RESIDENTIAL - MULTI-FAMILY

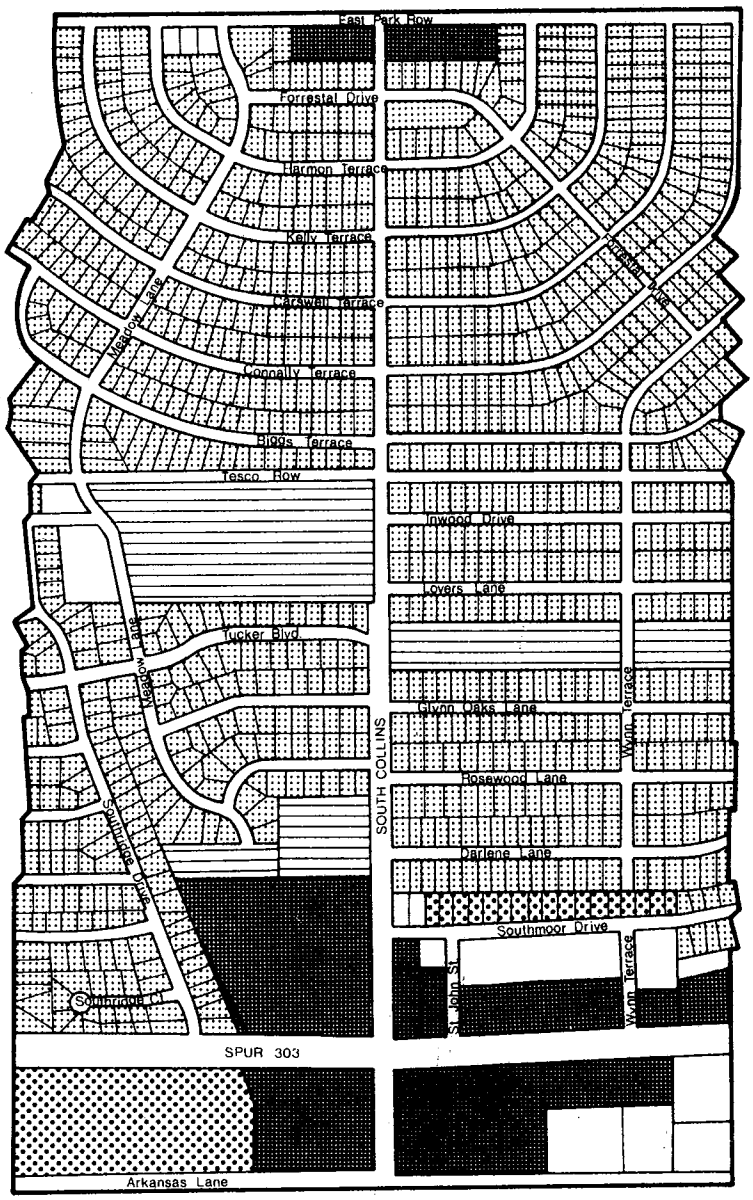
PUBLIC / SEMI-PUBLIC

N

SCALE IN FEET 0 600 1200 1800

SCALE IN METERS 0 182.88 365.76 548.64

Figure 4. Land Use in the Collins Street Study Area in 1974.



LAND USE LEGEND

UNIMPROVED

COMMERCIAL

RESIDENTIAL - SINGLE FAMILY

RESIDENTIAL - MULTI-FAMILY

PUBLIC / SEMI-PUBLIC

N

SCALE IN FEET 0 600 1200 1800

SCALE IN METERS 0 182.88 365.76 548.64

Figure 5. Land Use in the Collins Street Study Area in 1978.

use is most prominent on nonabutting property in terms of both acreage and number of structures.

Land Use Changes

Although the Collins Street Study area was mostly developed in the first year for which data were collected, there have been changes and additions that are important and warrant investigation. The changes that occurred are discussed first in terms of the total study area and then in terms of proximity to Collins Street.

Overall Study Area

In 1969, the only large expanses of land left undeveloped were in the southern section of the study area near Spur 303 and Arkansas Lane. There was both abutting and nonabutting land on each side of Collins Street that had remained vacant. By 1974, several developments had occupied part of that vacant land. There were new commercial establishments on both sides of Collins Street and a new multiple family complex in the southwestern portion of the study area. By 1978, more businesses and multiple family units had been built in the southern portion of the study area. With the exception of the addition of a small amount of semi-public use, land use in the northern two-thirds of the study area did not change at all from 1969 through 1978. In total, 46.42 acres (18.79 hectares) of the study area were improved between 1969 through 1978. This represents 12 percent of total acreage. Among the acres involved in change were 3.16 acres (1.28 hectares) of streets that were added to the existing network (Table 3).

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

Land Use and Type of Change	Total Acres by Time Period and Year[b]		
	Before		After
	1969	1974	1978
Commercial	7.49	23.90	34.87
Absolute Change	+16.41	+10.97	
Percent Change	+219%	+46%	
Residential-Single Family	211.59	211.59	211.59
Absolute Change	0	0	
Percent Change	0	0	
Residential-Multiple Family	0	10.85	24.12
Absolute Change	+10.85	+3.87	
Percent Change	+100%	+36%	
Public and Semi-Public	26.64	27.80	27.80
Absolute Change	+1.16	0	
Percent Change	+4%	0	
Streets	67.03	69.66	70.19
Absolute Change	+2.63	+0.53	
Percent Change	+4%	+1%	
Unimproved	60.27	29.22	13.85
Absolute Change	-31.05	-15.37	
Percent Change	-52%	-53%	

[a]Total acreage equals 373.02 acres (150.96 hectares).

[b]One acre equals .4046856 hectares.

Proximity to Collins Street

Tracts of land were classified according to their location relative to Collins Street. Tracts with frontage on Collins were classified as abutting with whole abutting tracts being included to avoid division of a development. The tracts were classified according to property lines in 1978. In previous study areas, a section 300 feet deep from the right-of-way was designated as abutting on portions that were unimproved. However, since the only unimproved tract in 1978 was delineated by lot lines, the 300-foot rule was not applied in this study area. The size of the tracts in 1978 was used to determine the amount of abutting land. All tracts not having frontage on Collins Street were classified as nonabutting.

The division of the land into these two categories permits a comparative analysis to determine which type of land underwent most change. It is expected that abutting properties would be most affected by a highway improvement, but the nonabutting land use could have also been influenced.

Abutting Properties. In 1969, which was six years before formal planning for the highway improvment began, 81 percent of abutting land was improved. Between 1969 and 1974, abutting property experienced a surge of development when several new businesses were constructed in the southern section of the study area (Table 4). Ninety-eight percent of abutting acreage had been improved by the end of 1974.

The years from 1974 to 1978 make up the after period. Abutting property experienced only a small amount of change in that period when more businesses were constructed. The percentage of improved abutting land was 99.6 percent in 1978. Only one small lot remains undeveloped. Changes in abutting acreages by type of land use are charted in Figure 6.

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

Land Use and Type of Change	Total Acres by Time Period and Year[b]		
	Before		After
	1969	1974	1978
Commercial	3.10	13.02	13.92
Absolute Change	+9.92	+0.90	
Percent Change	+320%	+7%	
Residential-Single Family	8.62	8.62	8.62
Absolute Change	0	0	
Percent Change	0	0	
Public and Semi-Public	24.12	24.12	24.12
Absolute Change	0	0	
Percent Change	0	0	
Streets	12.97	13.07	13.07
Absolute Change	+0.10	0	
Percent Change	+0.8%	0	
Unimproved	11.18	1.16	0.26
Absolute Change	-10.02	-0.90	
Percent Change	-90%	-78%	

[a]Total acreage equals 59.99 acres (24.28 hectares).

[b]One acre equals .4046856 hectares.

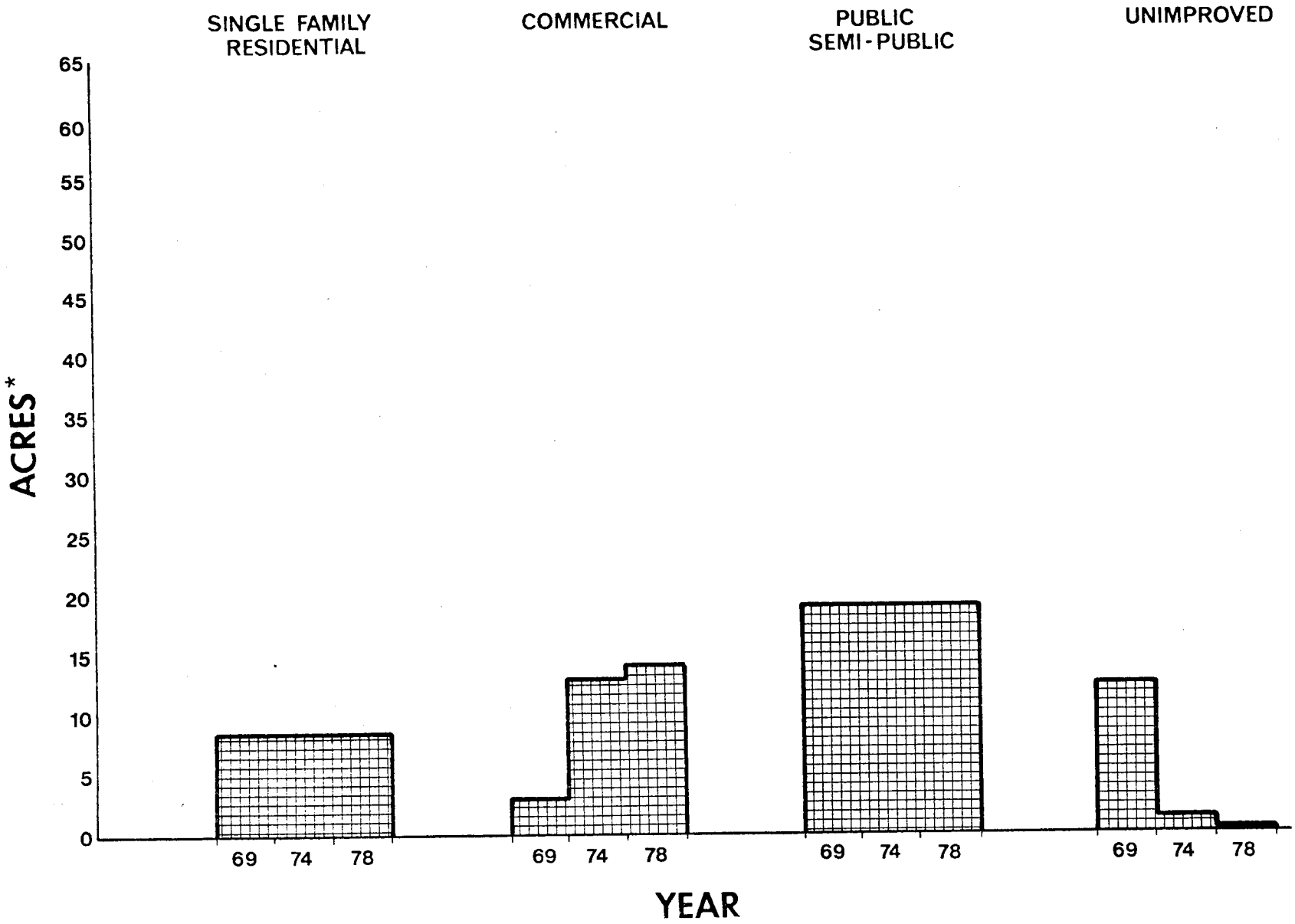


Figure 6. Changes in Abutting Land Uses in the Collins Street Study Area

*One acre equals .4046856 hectares.

Nonabutting Properties. Nonabutting land was 84 percent improved in 1969. As on abutting property, development on nonabutting land increased very noticeably in the before period, 1969 to 1974 (Table 5). Increases in commercial and public or semi-public uses accounted for part of the new development, but the greatest amount of newly improved acreage was due to the construction of a multiple family complex. Some new streets were also constructed in the study area during the before period. Nonabutting land was 91 percent improved in 1974.

Development continued to occur on nonabutting land in the after period, 1974 to 1978. The number of acres being committed to commercial use was higher than in the before period, and the acreage of multiple family use also increased. A small amount of unimproved acreage was also converted to streets. Nonabutting land was 96 percent improved in 1978. Changes in nonabutting acreages by type of land use are charted in Figure 7.

Land Use Impediments

The Collins Street study area had been almost totally developed for many years before the improvement of the street began. The development that has occurred has been in the southern section of the study area near Spur 303 and Arkansas Lane. The only impediments to land use that were discovered were the deed restrictions for the residential areas that deter any change of use. Some of that property might possibly have changed from residential to commercial use otherwise.

Other Factors Influencing Change

The growth of the entire Dallas-Fort Worth Metroplex has certainly been a primary factor in the growth of all of Arlington as well as in the Collins

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

Land Use and Type of Change	Total Acres by Time Period and Year[b]		
	Before		After
	1969	1974	1978
Commercial	4.39	10.88	20.95
Absolute Change		+6.49	+10.07
Percent Change		+148%	+93%
Residential-Single Family	202.97	202.97	202.97
Absolute Change		0	0
Percent Change		0	0
Residential-Multiple Family	0	10.85	14.72
Absolute Change		+10.85	+3.87
Percent Change		+100%	+36%
Public and Semi-Public	2.52	3.68	3.68
Absolute Change		+1.16	0
Percent Change		+46%	0
Streets	54.06	56.59	57.12
Absolute Change		+2.53	+0.53
Percent Change		+5%	+0.9%
Unimproved	49.09	28.06	13.59
Absolute Change		-21.03	-14.47
Percent Change		-43%	-52%

[a]Total acreage equals 313.03 acres (126.68 hectares).

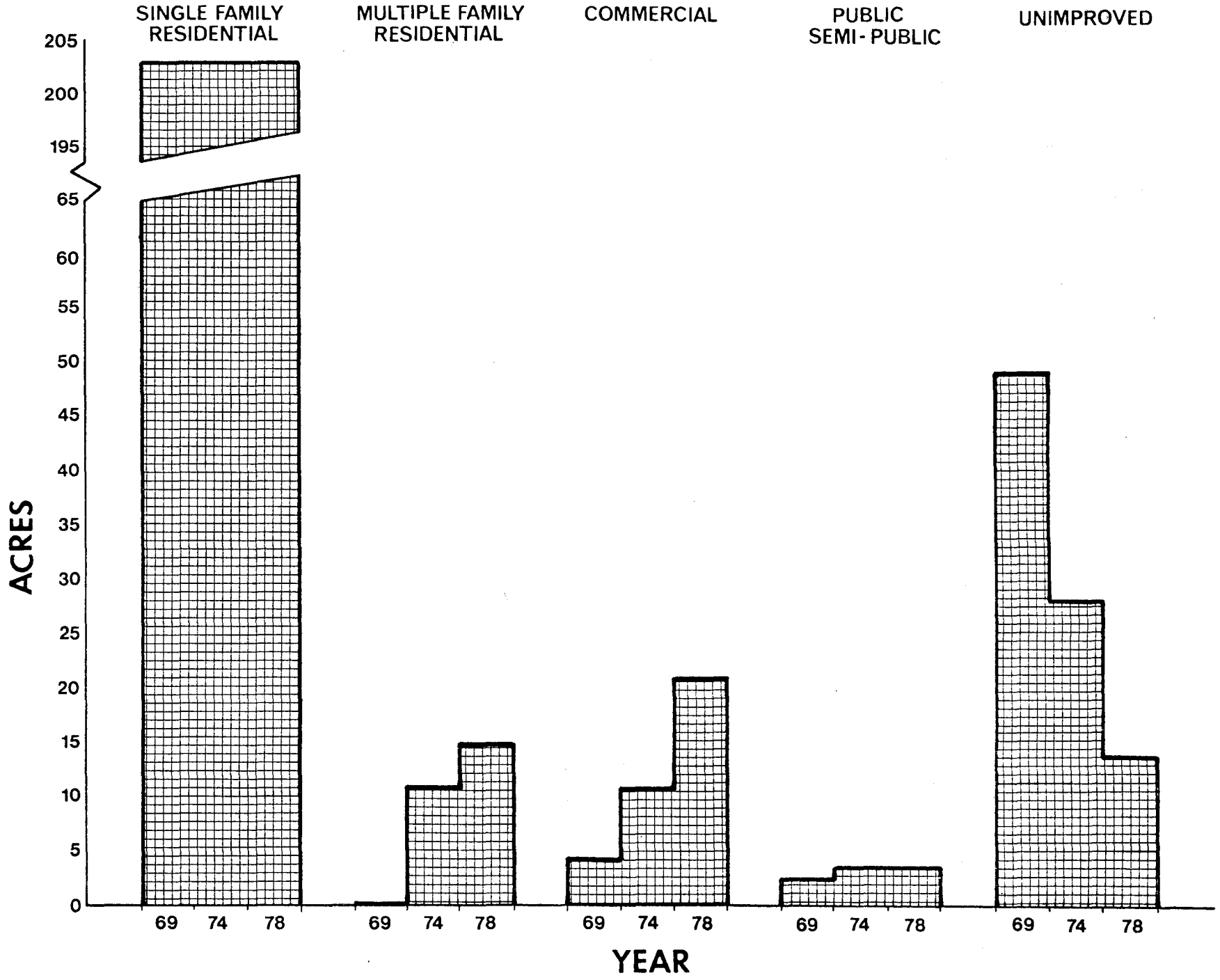


Figure 7. Changes in Nonabutting Land Uses in the Collins Street Study Area

*One acre equals .4046856 hectares.

Street study area. Being centrally located between the two large cities makes Arlington an ideal place for businesses, industries and residences. The continued development in the study area reflects the general expansionary trend of the Metroplex's economy.

Land Use Controls and Plans

Land use is regulated in Arlington by zoning. Most of the Collins Street study area has been zoned for single family residences since well before 1969, the first year for which land use data were collected for this study. Commercial zoning was present in the 1960's in most of the locations that are currently in commercial use. The only zoning changes that have occurred from 1968 to 1978 were: (1) a change from a low density multiple family zoned tract to local business zoning, (2) a change from a single family zone tract to a local business zoned tract, and (3) a change from a single family zone to a residential zone that could include duplexes. All of these zone changes occurred on land in the southern portion of the study area just north of Spur 303. The land involved in the changes is now being used for the purpose for which it was rezoned, with the exception of a small amount of commercially zoned land that has remained vacant.

Two land use plans for Arlington were available to determine if development in the study area has occurred as projected. A plan entitled the *Arlington Plan*, published in 1964, predicted that land use would develop very similarly to what has actually happened. The area was projected to be mainly single family with public or semi-public tracts in their present locations, commercial tracts in the extreme northern and southern ends of the improved section of Collins Street, and multiple family housing in the southern section. Less commercial development was predicted than has actually occurred and part of the multiple

family housing is not in the exact location as predicted, but, on the whole, the *Arlington Plan* foretold what the Collins Street study area was going to look like in future years.

The other plan, published in 1971 and entitled *Arlington, Texas, Urban Development Framework*, had less detail but also projected the area to remain mostly single family residential with commercial and multiple family residential uses in the southern portion. More commercial development was shown in this plan than in the previous one. The latter plan more closely resembles the commercial development that has actually occurred. Overall, both plans were good indications of what was to actually occur. This is due, of course, somewhat to the fact that the area was already mostly developed when these plans were formulated leaving only a relatively small amount of land use to speculate about. These plans were predictions based on existing land use, land development trends, age of existing improvements, amount of unimproved land available for improvement, and amenities offered for various types of developments.

Socio-Economic Characteristics

Selected socio-economic characteristics were investigated to reveal differences between the study area, Arlington as a whole, and the Fort Worth SMSA, which contains Arlington. Data from 1960 and 1970 were used to determine changes in these characteristics.

Census tract data were used to estimate the statistics of the Collins Street study area. Since approximately half of the study area was located in Census Tract 228 and the other half in Census Treact 229, the two tracts were combined to create one area. Having statistics for one area allows a more simplified and meaningful comparison than having two sets of data to represent the study area. Population and numbers of employees in various job classifications

for each census tract were summed together. The other characteristics that were represented by medians were averaged using a weighted average method based on population in each census tract.

The population for the census tracts combined was 7,107 in 1960, and 12,379 in 1970 (Table 6). This was a 74 percent increase which was less than the 105 percent increase in Arlington but greater than the 33 percent increase in the Fort Worth SMSA. It is not unexpected that this area would have a slower rate of growth than Arlington as a whole since much of this area was already developed when other parts of Arlington were experiencing rapid growth.

The median school years completed for the census tracts were very similar to those for Arlington and higher than those for the SMSA. The median family in the census tract experienced a greater rate of increase in income between 1960 and 1970 than the median family in the city or SMSA. Median family income was $11,587 in 1970 in the census tracts, $10,218 in Arlington, and $10,101 in the SMSA. The median value of owner occupied residences was higher in Arlington than in the census tracts and the SMSA in 1960 and 1970. This reflects the relative age of homes in the census tracts to homes elsewhere in Arlington. The median value of homes in the SMSA was considerably lower than in the other two areas of comparison.

The percentage increase between 1960 and 1970 in the number of people employed was 125 percent for the census tracts, 151 percent for the city, and 45 percent for the SMSA. The census tracts gained employees in the professional and managerial ranks with increases of 168 percent in the professional category and 210 percent in the managerial category. Arlington also had sizeable increases in these categories, and while the SMSA also showed increases, they were much less than in the census tracts and Arlington.

Table 6. Comparison of 1960 and 1970 Socio-Economic Characteristics of Census Tracts 228 and 229 to Arlington and the Fort Worth SMSA[a]

	SMSA			Arlington			Census Tracts[b]		
	1960	% Change	1970	1960	% Change	1970	1960	% Change	1970
Population	573,215	+33%	762,085	44,775	+105%	91,685	7,107	+74%	12,379
Median School Years Completed	11.4	+6%	12.1	12.3	+2%	12.6	12.4	+1%	12.5
Median Family Income	$5,617	+80%	$10,101	$6,574	+55%	$10,218	$6,295	+84%	$11,587
Median Income of Families and Unrelated Individuals	$4,952	+74%	$8,607	$6,024	+44%	$8,690	$6,258	+77%	$11,048
Median Value of Owner Occupied Residences	$8,800	+162%	$13,100	$10,900	+58%	$17,200	$10,071	+47%	$14,826
Median Rent Paid by Tenants	$65	+55%	$90	$78	+71%	$133	c	-	$149
Total Employed	214,782	+45%	310,567	16,005	+151%	40,136	2,357	+125%	5,314
Professional, Technical, and Kindred Workers	28,126	+75%	49,284	2,932	+206%	8,977	395	+168%	1,057
Managers and Administrators	20,944	+24%	26,056	1,421	+155%	3,628	171	+210%	530
Sales Workers	35,220	-29%	24,959	2,839	+15%	3,266	237	+59%	377
Clerical and Kindred Workers	17,017	+251%	59,658	1,418	+512%	8,678	409	+173%	1,118
Craftsmen, Foremen, and Kindred Workers	30,833	+53%	47,072	2,757	+102%	5,576	486	+43%	694
Operatives	33,680	+59%	53,682	2,464	+120%	5,412	405	+123%	902
Laborers	5,782	+146%	14,250	166	+711%	1,347	44	+350%	198
Service Workers	18,649	+68%	31,314	1,042	+193%	3,058	114	+273%	425
Private Household Workers	10,345	+59%	4,292	398	-51%	194	21	-38%	13

[a]Data from the Bureau of the Census, U.S. Department of Commerce Publications.
[b]Census tracts 228 and 229 were combined to form one area.
[c]Data unavailable.

All categories of employees in the Census Tracts increased except the private household workers category. This was also true for Arlington, although the various categories increased by rates different from those for the census tracts.

In general, the median census tract resident in 1970 had almost the same education and a higher income than the residents of Arlington as a whole. These characteristics for the SMSA were lower than in the census tract or city. The census tracts' median value of housing was lower than in Arlington but higher than in the SMSA.

IMPACT OF HIGHWAY IMPROVEMENT ON LAND USE IN THE STUDY AREA

To examine the impact on land use of the Collins Street improvement, two types of data were used. These types are:

(1) land use changes in the area, and

(2) opinions of people knowledgeable about the area.

Effects on Abutting and Nonabutting Land

Improving and changing the design of a road may affect some types of land use more than others. Therefore, the specific shifts in land use should be examined for each time period. Table 7, which shows changes in absolute acreage, indicates not only changes from unimproved to an improved use but also changes from an improved use back to unimproved. These changes can 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 adjust for differences in lengths of time periods and for the larger acreage in the nonabutting category, thereby permitting a more meaningful comparison. These changes are discussed first for abutting property and then for nonabutting.

Abutting Property. As indicated by Table 7, there has not been a lot of land use change in this area. Most of the changes that did take place occurred in the before period, 1969 through 1974. The average annual rate of change for abutting land was 3.34 percent in the before period as compared to 0.38 percent in the after period (Table 8). This means that an average of 3.34 percent of abutting land changed use in each year of the before period. Almost all of the changes on abutting land were due to unimproved land being put to commercial use.

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

Type of Land Use Change	Before Period 1969-1974		After Period 1974-1978	
	Abutting	Nonabutting	Abutting	Nonabutting
Unimproved to Commercial	9.92	9.85	0.90	10.07
Unimproved to Multiple Family	0	10.85	0	3.87
Unimproved to Streets	0.10	0.53	0	0.53
Commercial to Unimproved	0	3.36	0	0.29
Total Land Changing Use	10.02	24.59	0.90	14.76
Improved Land	0	3.36	0	0.29
Unimproved Land	10.02	21.23	0.90	14.47

[a]One acre equals .4046856 hectares.

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

Type of Land Use Change	Before Period 1969-1974		After Period 1974-1978	
	Abutting	Nonabutting	Abutting	Nonabutting
Unimproved to Commercial	3.31	0.64	0.38	0.80
Unimproved to Multiple Family	0	0.69	0	0.31
Unimproved to Streets	0.03	0.03	0	0.05
Commercial to Unimproved	0	0.21	0	0.02
Total Land Changing Use	3.34	1.57	0.38	1.18
Improved Land	0	0.21	0	0.02
Unimproved Land	3.34	1.36	0.90	1.16

[a]One acre equals .4046856 hectares.

Nonabutting Properties. The before period was the time of most change for nonabutting land also. The average annual rate of change was 1.57 percent in the before period and 1.18 percent in the after period. Changes on nonabutting land primarily involved unimproved land changing to commercial or multiple family uses. On nonabutting land there were also some changes from commercial use back to unimproved when some old businesses were removed. Although total nonabutting acreage changing use was lower in the after period than in the before period, changes from unimproved to commercial usage increased slightly.

Influence of Other Roads

It is evident from the location of the more recent development, that Spur 303 and Arkansas Lane influenced the location decisions of the commercial and multiple family developments (Figures 3, 4, and 5). Spur 303 was upgraded to a multi-laned, raised median facility in 1967, and Arkansas Lane was improved to a two-lane, raised median facility in 1973-1974. It is not possible to disentangle the effects on land use of Collins Street and those of the other two roads.

Opinions of Knowledgeable People

Numerous people were interviewed who had knowledge of the Collins Street area. A better understanding was obtained as to why the road improvement was undertaken and what the land use impacts were.

Officials from the City of Arlington including engineers, planners, and a former mayor, agreed that the street was widened due to congestion. They also agreed that improving an existing facility would encourage land development. However, due to the lack of vacant land, the impact in the Collins Street area

was slight. There was not a concensus among the city officials as to the impact upon the residential sections of the study area. One official thought the improvement might be beneficial to the residential sections by spreading out the traffic and providing easier access to and from the area. Others thought the greater traffic volume would detract from the residential character of the neighborhood. One person expressed the belief that the increasing traffic on Collins Street would diminish the access for people in the area by making it harder for them to cross Collins or to enter it.

The engineers and other members of the State Department of Highways and Public Transportation that were interviewed also believe that improving an existing facility affects land use. It was stressed that the amount of change depends upon the type of existing land use and the design change of the road. The amount of impact was thought to be greatest in areas with a lot of vacant land. Therefore, the impact on land use in the Collins Street area was said to be less than in some other areas where road improvements have occurred.

The real estate people interviewed were divided in their opinions of the highway improvement's impact. Some thought it had encouraged land use change somewhat, but one person said that the Collins Street improvement had not had an influence. The development that has occurred was attributed to being located along or near Spur 303 instead. It was also pointed out that deed restrictions for the residential areas prevented land use change even if it was desired.

In general, the majority of those interviewed thought the road improvement was a positive influence on land use change. The improvement was thought to have encouraged the development of most of the remaining vacant land.

Conclusions

The Collins Street study area was already mostly developed when the improvement of the street occurred. Due to the lack of vacant land and the enforcement of deed restrictions governing the use of the existing residential areas, relatively little land use change has occurred. The commercial and multiple family developments that have been built are near Spur 303 and Arkansas Lane where the influence of those two roads cannot be discerned from the Collins Street influence. Most of the commercial and multiple family development occurred in the period before the street improvement occurred. Therefore, the impact of the Collins Street improvement does not appear to have been extensive. However, the street improvement is viewed as a positive factor in that it probably made the area more attractive for the commercial and multiple family development that occurred in the after period. If the street had not been widened, the traffic congestion that would likely have occurred would have been a deterrent to development.