

1. Report No. FHWATX 78-225-5		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Land Use Impact of Widening East 29th Street in a Developed Residential Area in Bryan, Texas				5. Report Date October, 1978	
				6. Performing Organization Code	
7. Author(s) Pamela J. Cosby, Jesse L. Buffington				8. Performing Organization Report No. Research Report 225-5	
9. Performing Organization Name and Address Texas Transportation Institute Texas A&M University College Station, Texas 77843				10. Work Unit No.	
				11. Contract or Grant No. Research Study 2-8-78-225	
				13. Type of Report and Period Covered Interim - September 1976 October 1978	
12. Sponsoring Agency Name and Address State Dept. of Highways and Public Transportation 11th and Brazos Austin, Texas 78701				14. Sponsoring Agency Code	
15. Supplementary Notes Research performed in cooperation with DOT, FHWA, and SDHPT. Research Study Title: Economics of Highway Design Alternatives					
16. Abstract <p>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 Bryan, Texas, where East 29th Street was upgraded from a two-lane to a four-lane street. The improvement took place in a developed urban 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 street improvement. Data were collected for a 20-year period including eight years before construction began. Total acres in each type of land use were determined for two "before construction" years, 1958 and 1965, and for two "after construction" years, 1970 and 1977. 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>					
17. Key Words Highways, impact, land use, abutting and nonabutting property			18. Distribution Statement No Restrictions. This document is available to the public through the National Technical Information Service, Springfield, Virginia 22161		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 53	22. Price

LAND USE IMPACT OF WIDENING EAST 29th STREET
IN A DEVELOPED RESIDENTIAL AREA IN BRYAN, TEXAS

by
Pamela J. Cosby
Research Associate

and
Jesse L. Buffington
Associate Research Economist

Research Report 225-5
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

October 1978

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

PREFACE

The authors wish to express appreciation to those who have assisted or facilitated this study. Special acknowledgements are due Mr. James W. Barr and Mr. James R. Farrar, Jr., of the Texas State Department of Highways and Public Transportation.

Mr. D.D. Williamson, Mrs. Peggy Krohn, and Mr. Roger Barnes of District 17 of the Texas SDHPT were most helpful in providing material and data. Officials of the City of Bryan were very cooperative in supplying data from public records. Mr. Joe Marino in the Engineering Department was particularly helpful. Many business people and residents of Bryan provided valuable information for the study.

Ms. Katie N. Womack of the Transportation Economics and Sociology Division of the Texas Transportation Institute performed the valuable service of data collection and reviewing the manuscript. Ms. Nancy J. Hatfield was most helpful in analyzing the population data. Mrs. Karen Spohr receives special thanks for 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 herein. The contents do not necessarily reflect the official views or policies of the Federal Highway Administration. This report does not constitute a standard, 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 Bryan, Texas, where East 29th Street was upgraded from a two-lane to a four-lane street. The improvement took place in a developed urban 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 street improvement. Data were collected for a 20-year period including eight years before construction began. Total acres in each type of land use were determined for two "before construction" years, 1958 and 1965, and for two "after construction" years, 1970 and 1977. 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

The land use data were collected for the East 29th Street Study Area in Bryan, Texas, to determine the uses and rates of change in use before and after the improvement of East 29th Street from a two-lane to a four-lane facility. The study covers a 20-year span from 1958 to 1977. This period includes eight years before construction, three years during which construction took place, and nine years after construction was completed.

The findings are summarized as follows:

1. There have been significant changes in the Study Area as a whole from 1958 to 1977.
 - a. The stage of development was classified as developed in 1958. More development has occurred since that time.
 - b. The predominant land use has remained residential.
 - c. Residential development had the highest absolute increase, but commercial development had the highest percentage increase.
 - d. Most increases occurred between 1965 and 1970, the period in which the street was improved.
 - e. In addition to unimproved land being developed, several tracts changed from one improved use to another.
2. Properties abutting East 29th Street changed use at a faster rate than nonabutting properties,
 - a. The predominant land use on abutting properties remained residential throughout the study period.
 1. Single family residential acreage decreased.
 2. Multiple family residential acreage increased.
 - b. Commercial development had the highest percentage increase on abutting land.
 - c. Abutting public-governmental use also increased.

3. Nonabutting land has also undergone notable changes.
 - a. Residential usage had the highest absolute increase
 1. Single family residential land use decreased slightly between 1970 and 1977 after a previous increase.
 2. Multiple family residential land use increased steadily over the study period.
 - b. Nonabutting commercial land use had a higher percentage increase than other nonabutting uses.
 - c. Public-governmental and semi-public-nonprofit uses also increased slightly on nonabutting land.
4. The period of most change was 1965 to 1970 indicating an effect of the street improvement in the short-run.
 - a. Abutting and nonabutting land use changed at a faster rate in the short-run after period (1965 to 1970) than in the before period (1958 to 1965) or long-run after period (1970 to 1977). This indicates a reaction to the new street design.
 - b. Abutting land use changed at a faster rate than non-abutting in all periods indicating that the street improvement had most effect on abutting property.
5. Changes in the area were affected by factors other than the street improvement.
 - a. The economic conditions in Bryan-College Station, created in part by the growth in population and growth of Texas A&M University, enabled development, particularly the commercial development, to take place.
 - b. More change probably would have occurred if downtown Bryan had remained the commercial center of the county.

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.

TABLE OF CONTENTS

PREFACE	i
ABSTRACT.	ii
SUMMARY OF FINDINGS	iii
IMPLEMENTATION STATEMENT.	v
TABLE OF CONTENTS	vi
LIST OF TABLES.	vii
LIST OF FIGURES	viii
INTRODUCTION.	1
Purpose and Objectives of Study	1
Method of Study	2
Location of Highway Improvement	3
Key Characteristics of Highway Improvement.	5
Source of Data.	7
Definitions	7
CHARACTERISTICS OF AREA STREETS AND ROADS BEFORE AND AFTER IMPROVEMENT OF EAST 29th STREET	9
East 29th Street.	9
Parallel Roads.	12
Intersecting Roads.	12
CHARACTERISTICS OF THE STUDY AREA BEFORE AND AFTER IMPROVEMENT OF EAST 29th STREET	14
Size and Boundaries of the Study Area	14
Land Use Characteristics.	14
Land Use Changes.	19
Overall Study Area.	19
Proximity to East 29th Street	19
Land Use Impediments.	24
Land Use Controls and Plans	28
Socio-Economic Characteristics.	29
IMPACT OF HIGHWAY IMPROVEMENT ON LAND USE IN THE STUDY AREA.	33
Effects on Abutting and Nonabutting Land Use.	33
Other Factors Influencing Change.	38
Influence of Texas Avenue	39
Opinions of Knowledgeable People.	39
CONCLUSIONS.	42

LIST OF TABLES

Table		Page
1	Population Changes in Bryan-College Station, Brazos County, and Texas A&M University, 1950-1977.	4
2	Twenty-Four Hour Traffic Counts on 29th Street and Other Parallel and Intersecting Roads in the Area.	11
3	Changes in Land Use of All Properties by Time Period and Year	20
4	Changes in Land Use of Abutting Properties by Time Period and Year	23
5	Changes in Land Use of Nonabutting Properties by Time Period and Year.	26
6	Comparison of 1970 Socio-Economic Characteristics of Census Tracts 7 and 8 to Bryan-College Station	31
7	Types of Land Use Changes of Abutting Acreage by Time Period	34
8	Types of Land Use Changes of Nonabutting Acreage by Time Period	35
9	Percentage Change in Acres by Period and Land Type	36
10	Percentage Change in Acres by Period and Land Type with the Texas Avenue Changes Omitted	40

LIST OF FIGURES

Figure		Page
1	Map of Bryan-College Station Area Showing the Location of the East 29th Street Study Area	6
2	Design of East 29th Street Before and After Improvement. . . .	10
3	Map of Land Use in the East 29th Street Study Area in 1958 . .	15
4	Map of Land Use in the East 29th Street Study Area in 1965 . .	16
5	Map of Land Use in the East 29th Street Study Area in 1970 . .	17
6	Map of Land Use in the East 29th Street Study Area in 1977 . .	18
7	Graph of Total Annual Changes in Land Use in the East 29th Street Study Area.	21
8	Graph of Annual Changes in Abutting Land Use in the East 29th Street Study Area	25
9	Graph of Annual Changes in Nonabutting Land Use in the East 29th Street Study Area.	27

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 highways and freeways. Much research has been conducted in the past to learn the impact of new highway construction. Little research has been done to show what happens when an existing highway is upgraded. In order to optimize public benefits, highway agencies need information of this kind to help predict what will happen in a particular area when an existing facility is improved.

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 in Bryan, Texas where East 29th Street has been improved. Areas with other types of highway improvements and those in varying stages of development with different types of predominant land use when improvement began were also 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 East 29th Street Study Area. Since land use could have been affected by anticipation of a better roadway, data were collected for a time well before formal planning for this specific facility began (the applicable time periods are defined in the Definitions section).

A 1958 map from the Brazos Area Plan provided land use for the first "before" year. Although East 29th Street was designated to become a major street in that plan, no formal action was taken to upgrade the roadway until 1966. There are proposed street changes in that plan that have never been implemented. Data were also collected for 1965, the last "before" year before the upgrading process began. The two "after" years for which data were collected are 1970 and 1977.

The land was divided into abutting and nonabutting properties. Abutting properties were those with frontage on East 29th Street. On undeveloped tracts, a section 300 feet back from East 29th Street was designated as abutting property. These two categories of properties were studied separately to determine the differences in land uses and rates of development.

To determine some of the reasons underlying the land use changes in the area, several knowledgeable people were interviewed. Real estate people who were familiar with the area provided information on sales and developments. Appraisers who had testified before the Bryan City Commission at hearings on the improvement were interviewed about their knowledge of past and present land use. These people also provided insight into consideration given to highway design in making decisions about developing the land involved. Other factors which might have influenced changes were also investigated. Among these were: traffic volume, population, and income in the area.

Location of Highway Improvement

The improved portion of East 29th Street is located in the metropolitan area of Bryan-College Station. This metropolitan area is located approximately in the middle of a triangle formed by the Dallas-Fort Worth, San Antonio, and Houston metropolitan areas. As Table 1 shows, the two adjoining cities had an estimated 1977 population of 88,949. Brazos County, in which the two cities are located, was designated as a Standard Metropolitan Statistical Area after the 1970 U.S. Census count.

Although agriculture, agribusiness, and manufacturing are economically important to the area, the major influence on the area's economy is Texas A&M University. With a fall 1977 enrollment of 28,848 and over 15,000 permanent employees, the university had a total economic impact of over \$171 million on Bryan-College Station in 1977.¹ Wages and salaries paid to employees; university expenditures for utilities, services, and supplies; student expenditures for food, housing, and related items; and money spent by people attending athletic events and continuing education programs make up most of the benefits realized by the community. According to the Bureau of the Census, Bryan-College Station is one of the fifteen fastest growing metropolitan areas in the nation. This is due in large part to the growth of Texas A&M. As Table 1 shows, the fall 1977 enrollment was 102 percent greater than the fall 1970 enrollment of 14,316. The rate of growth at Texas A&M is expected to decline and stabilize at approximately 32,000 students in 1982.

Another possible source of economic growth is beginning to emerge in Brazos and surrounding counties. In the small community of Kurten, approximately 15 miles northeast of Bryan-College Station, 32 producing oil wells

¹Statistics provided by the State Department of Highways and Public Transportation.

Table 1. Population Changes in Bryan-College Station, Brazos County, and Texas A&M University, 1950-1977

	1950	Change and % Change 1950-1960	1960	Change and % Change 1960-1970	1970	Change and % Change 1970-1977	1977
Bryan	18,102	9,440 52%	27,542	6,177 22%	33,719	13,385 40%	47,104
College Station	7,925	3,471 44%	11,396	6,280 55%	17,676	24,169 137%	41,845
Brazos County	38,390	6,505 17%	44,895	13,083 29%	57,978	42,570 73%	100,548
Texas A&M (fall enrollment)	6,675	546 8%	7,221	7,095 98%	14,316	14,532 102%	28,848

were drilled during 1977. Drilling is increasing monthly bringing into the county money to pay the wages and salaries of local and imported oilfield workers and to purchase supplies and services from local businesses.

In addition to the oilfield discoveries, a November 1976 report from the U.S. Bureau of Mines states that some 450 millions tons of lignite are commercially recoverable in Brazos and neighboring counties. The discovery and development of these energy sources will undoubtedly attract industry to the area and give the local economy a broader base that is less dependent upon the university.

The growth of the two cities and the university has generated increasing traffic and made greater demands on the street and highway systems. A highway improvement made in anticipation of greater traffic volumes was the widening and resurfacing of a portion of East 29th Street.

The study area, as shown in Figure 1, includes part of the Bryan Central Business District. It is approximately 3.5 miles (5.63 kilometers) from the College Station Central Business District and 3.7 miles (2.30 kilometers) from Texas A&M University.

Key Characteristics of Highway Improvement

To collect data on highway improvements from varying areas, the stage of development of the area before the improvement began was determined.¹ The type of highway, whether it was in a urban or suburban area, and the predominant abutting land use were also determined to describe the setting in which the highway improvement took place.

¹The 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.

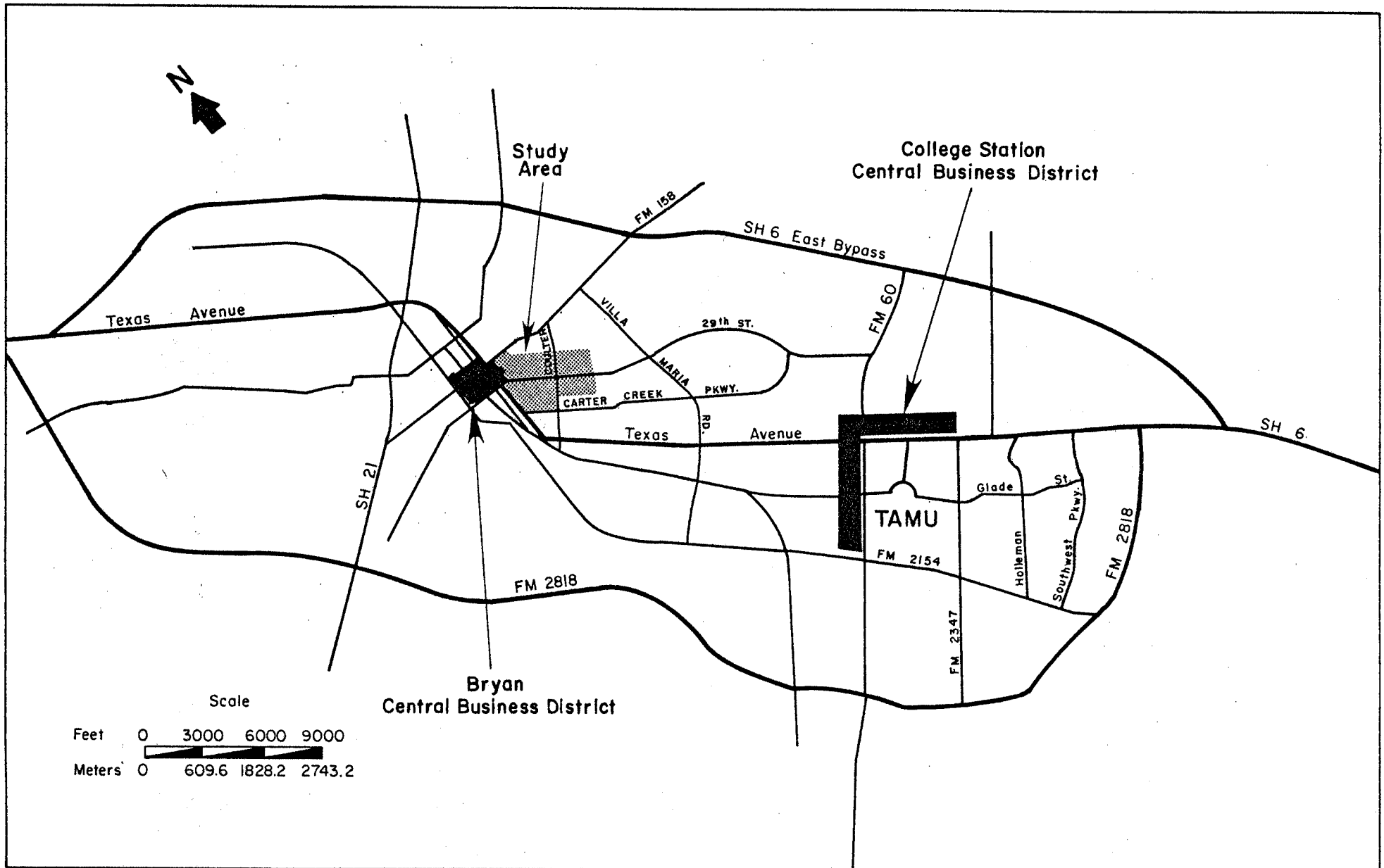


Figure 1. Map of the Bryan-College Station Area Showing the Location of the East 29th Street Study Area

Since the East 29th Street Study Area was 80 percent improved, the stage of development before the improvement began was "developed." The area was predominantly residential with many of the single family houses being some of Bryan's oldest. The improvement was made upon a two-lane city street. The area was apparently stable since most of the residences were being kept in reasonably good order.

Source of Data

Data on the planning and construction of the improvement on East 29th Street were collected from minutes of the Bryan City Commission and from files of the City Engineer's Office. The State Department of Highways and Public Transportation was the source of traffic volume data.

Land use data were collected from files and maps at the District Office of the SDHPT; from city directories of Bryan-College Station; from personal interviews with realtors, planners, and city officials; and from detailed on-site inspection of the area. The 1970 U.S. Census and population projections made by the SDHPT were sources of population and socioeconomic data.

Definitions

Land use categories assigned to the properties are as follows:

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

Residential-Multiple Family - tract improved with duplexes or apartment complexes.

Residential-Mobile Home - tract improved with mobile home.

Commercial-Traffic-Serving - tract improved with a commercial business deriving much of its income by serving traffic, e.g. motels, service stations, and restaurants.

Commercial-Nontraffic-Serving - tract improved with a commercial business other than traffic-serving businesses.

Public-Governmental - tract improved with governmental office, park, public owned utility, etc.

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

Unimproved - land that has not been developed for any particular use, land that is presently unused, and agricultural land.

Data for 1958 were not available to break down residential development into the sub-categories of single family, multiple family, and mobile homes or to break down commercial development into traffic-serving or nontraffic-serving.

Time periods used in the analysis are as follows:

Before Period - the period from 1958 to 1965 which ends the year before formal planning and construction began.

Short-Run After Period - the period which includes changes that occurred since the end of 1965 through 1970. This period includes the construction years, 1966 through 1968.

Long-Run After Period - the period which includes changes that occurred since the end of 1970 through 1977.

CHARACTERISTICS OF AREA STREETS AND ROADS BEFORE
AND AFTER IMPROVEMENT OF EAST 29TH STREET

East 29th Street

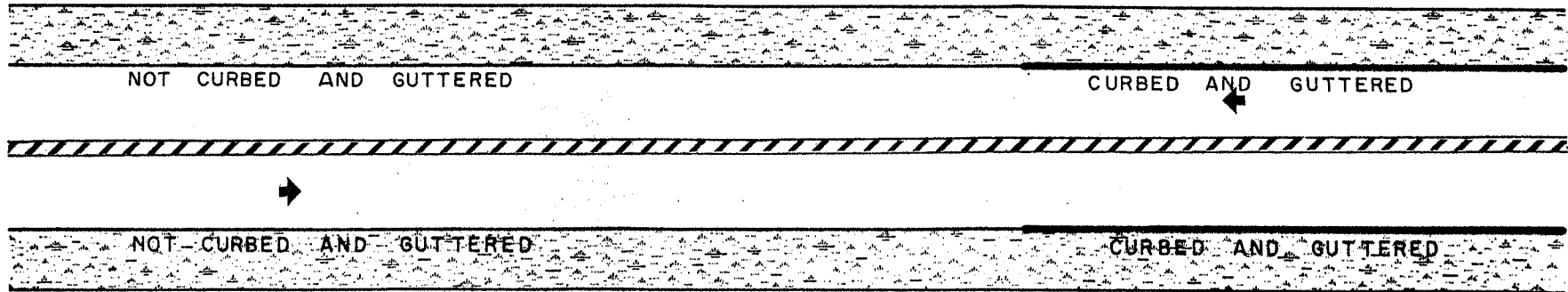
East 29th Street extends from Texas Avenue in Bryan to the city limits of College Station. The street actually extends to FM 60 but is called Tarrow Road within College Station. The section of 29th Street that this study focuses upon extends from Luza Street to the intersection with Texas Avenue.

The improvement upon the study section of the street was accomplished by two separate projects. The first of these projects was authorized by the Bryan City Commission in early 1966. This construction encompasses a section from Villa Maria Road to Coulter Drive which includes part of the study section from Luza Street to Coulter Drive. The contract was let in June of 1966 and the project was completed in June of 1967. This section was previously 28 feet (8.52 meters) wide and was not curbed and guttered. It is now 41 feet (12.50 meters) wide with curbs and gutters.

The second project covered a section from Coulter Drive to Sims Street which includes the remainder of the study section from Coulter Drive to Texas Avenue. This project, which was authorized in March 1967, changed that street section from 28 feet (8.52 meters) wide to 41 feet (12.50 meters) wide. There were previously curbs and gutters on part of this section from Haswell Drive to Texas Avenue. The improvement added curbs and gutters to the rest. The contract was let in April 1967, and construction was completed in February 1968. Figure 2 shows the changes made on the two sections.

Traffic count data shown in Table 2 indicate an increase in volume on East 29th Street occurring during the study period. A point just northwest

Before Period Design



After Period Design

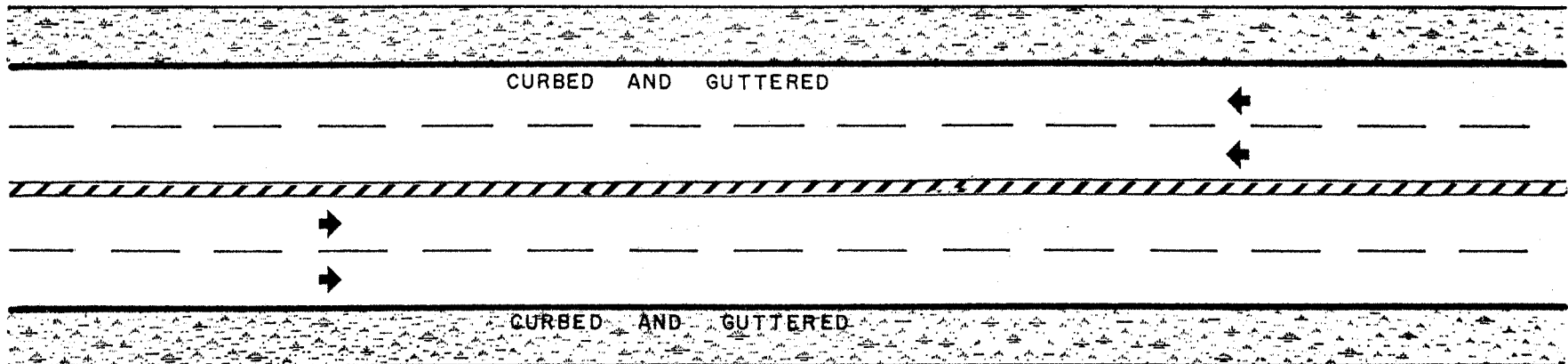


Figure 2. Design of East 29th Street Before and After Improvement

Table 2. Twenty-Four Hour Traffic Counts on 29th Street and Other Parallel and Intersecting Streets in the Area

Location of Traffic Counts	<u>1957</u>	Change and Percent Change 1957-1970	<u>1970</u>	Change and Percent Change 1970-1977	<u>1977</u>	Change and Percent Change 1957-1977
STUDY ROUTE						
29th Street						
Southeast of Texas	1,270	4,400 (346%)	5,670	-	-	-
Northwest of Haswell	1,780	3,540 (199%)	5,320	2,400 (45%)	7,720	5,940 (334%)
Southeast of Haswell	-	-	5,150	2,250 (44%)	7,400	-
Northwest of Coulter	1,370	3,760 (274%)	5,130	2,640 (51%)	7,770	6,400 (467%)
Southeast of Coulter	1,370	4,430 (323%)	5,800	3,170 (55%)	8,970	7,600 (555%)
Parallel Streets						
32nd Street (Carter Creek Parkway)						
Southeast of Texas	930	570 (61%)	1,500	210 (14%)	1,710	780 (84%)
Northwest of Coulter	870	-	-	-	3,200	2,330 (268%)
Intersecting Streets						
Texas Avenue						
South of 29th	14,940	8,790 (59%)	23,730	-2,050 (-9%)	21,680	6,740 (45%)
South of 28th	14,710	8,007 (54%)	22,717	143 (0.6%)	22,860	8,150 (55%)
North of 25th	12,340	7,150 (58%)	19,490	-	-	-
Coulter Drive						
Northeast of Texas	4,520	2,750 (61%)	7,270	-770 (-11%)	6,500	1,980 (44%)
Southeast of 33rd	-	-	7,160	-660 (-9%)	6,500	-
Southeast of 32nd	-	-	6,270	380 (6%)	6,650	-
Southwest of 29th	2,780	2,426 (87%)	5,206	804 (15%)	6,010	3,230 (116%)
Northeast of 29th	2,500	-	-	-	-	-
Haswell Drive						
Southwest of 29th	-	-	320	140 (44%)	460	-
Northeast of 29th	1,080	-260 (-24%)	820	440 (54%)	1,260	180 (17%)

of Haswell Drive had an increase of 199 percent from 1957 to 1970, and a 45 percent increase from 1970 to 1977. This is an average yearly increase of 17 percent for the 20-year span. A point just southeast of Coulter Drive showed a 323 percent increase from 1957 to 1970, and a 55 percent increase from 1970 to 1977. The average yearly increase was 28 percent for that location.

Parallel Roads

Three blocks south of East 29th Street is 32nd Street. This street, which also traverses a primarily residential area, is an alternative route for East 29th. It begins at an intersection with East 29th Street and then curves and runs parallel until it too intersects Texas Avenue. A point on 32nd Street just southeast of Texas Avenue showed a 61 percent increase in traffic volume from 1957 to 1970. A similar place on East 29th Street just southeast of Texas Avenue had a 346 percent increase for the same period. Data for 1977 were not available for those locations. Points just north of Coulter Drive on these two streets show that 32nd Street had a 268 percent increase from 1957 to 1977 and East 29th Street had a 467 percent increase for the same period.

Intersecting Roads

Although Texas Avenue and East 29th Street are parallel for over half the length of the East 29th Street study section, they also intersect. Texas Avenue takes a sharp right turn which permits the intersection with 29th Street. Many of the same destinations can easily be reached by taking either route.

A point on Texas Avenue just south of the intersection of 29th Street and Texas had a 59 percent increase in traffic volume from 1957 to 1970 but

a nine percent decrease from 1970 to 1977. A point on Texas Avenue, south of 28th Street, had a 54 percent increase between 1957 to 1970 and a small 0.6 percent increase between 1970 and 1977. The improvement of East 29th Street and the increased traffic volumes on 29th Street may account for some part of the decreasing volumes on Texas Avenue, but there are other factors that are more likely to be the cause of the decrease. A by-pass on the east side of Bryan-College Station directs traffic away from the cities and thus away from Texas Avenue. Also, the decline of downtown Bryan as the major center of commerce of the county has resulted in decreased traffic for this section of Texas Avenue. Growth of the metropolitan area has occurred mainly in south Bryan and in College Station, away from the section of Texas Avenue in this study area.

The other main streets intersecting the study portion of East 29th Street, besides Texas Avenue, are Coulter Drive and Haswell Drive. Both are two-lane streets in predominantly residential areas.

Coulter Drive has had increasing traffic volumes between 1970 and 1977 at points near 29th Street but decreasing volumes for points near Texas Avenue. As illustrated in Table 2, a point just southwest of East 29th Street had a 15 percent increase while a location just northeast of Texas Avenue had an 11 percent decrease for the 1970 to 1977 time period. This is consistent with the decreasing rates of growth in traffic volumes on Texas Avenue and the increasing rates on East 29th Street.

The sparse data available for Haswell Drive indicate increasing volumes between 1970 and 1977. A point southwest of East 29th Street had a 44 percent increase and a point northeast of East 29th Street had a 54 percent increase during that period.

CHARACTERISTICS OF THE STUDY AREA BEFORE AND AFTER IMPROVEMENT OF EAST 29TH STREET

Size and Boundaries of the Study Area

The East 29th Street Study Area encompasses approximately 256 acres (103.60 hectares). An area on each side of the street was chosen to provide data on both abutting and nonabutting properties. The southerly side of the area extends back approximately 900 feet (274.32 meters) from East 29th Street to Bennett Street, and approximately 1500 feet (457.2 meters) to 32nd Street. The northerly portion extends approximately 900 feet (274.32 meters) to 27th Street. A small portion near Texas Avenue extends north to 26th Street. Luza Street on the easterly side and Texas Avenue to the west form the other boundaries of the Study Area. These boundaries were chosen to include three blocks on each side of East 29th Street. The size difference among blocks created the differing widths on each side of the street and the irregular shape of the Study Area.

Land Use Characteristics

Figures 3 and 4 show the "before" land uses for 1958 and 1965 respectively. The "after" land uses are indicated in Figures 5 and 6 for 1970 and 1977.

The Study Area was classified as developed for both "before" years. Both abutting and nonabutting development consisted primarily of residences. Some commercial development had occurred, mainly along Texas Avenue. The remainder of developed property was in public or semi-public use. The predominant type of land use remained residential for both abutting and nonabutting property throughout the study period. Commercial, public, and semi-public development all increased.

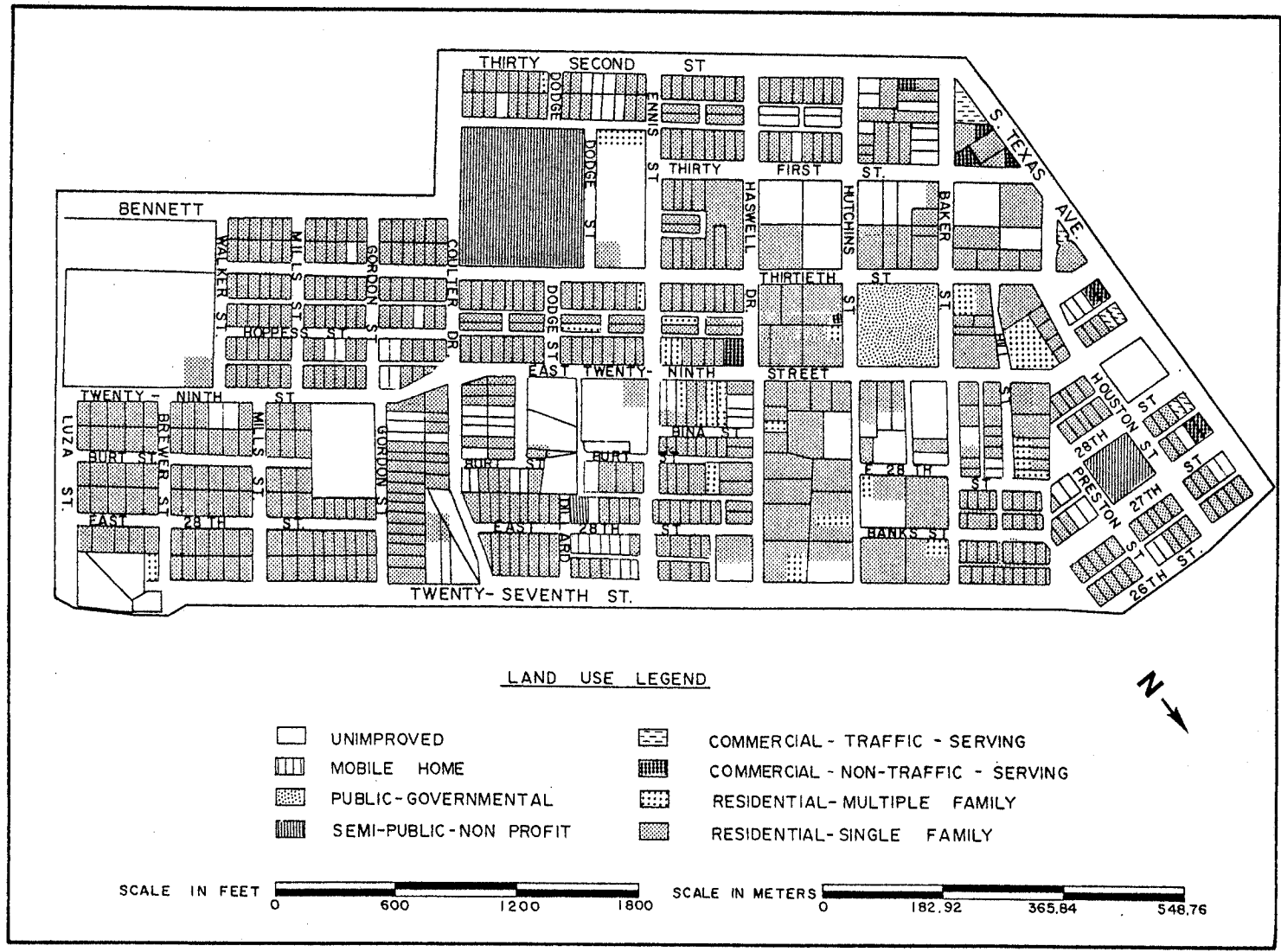


Figure 4. Land Use in the East 29th Street Study Area in 1965

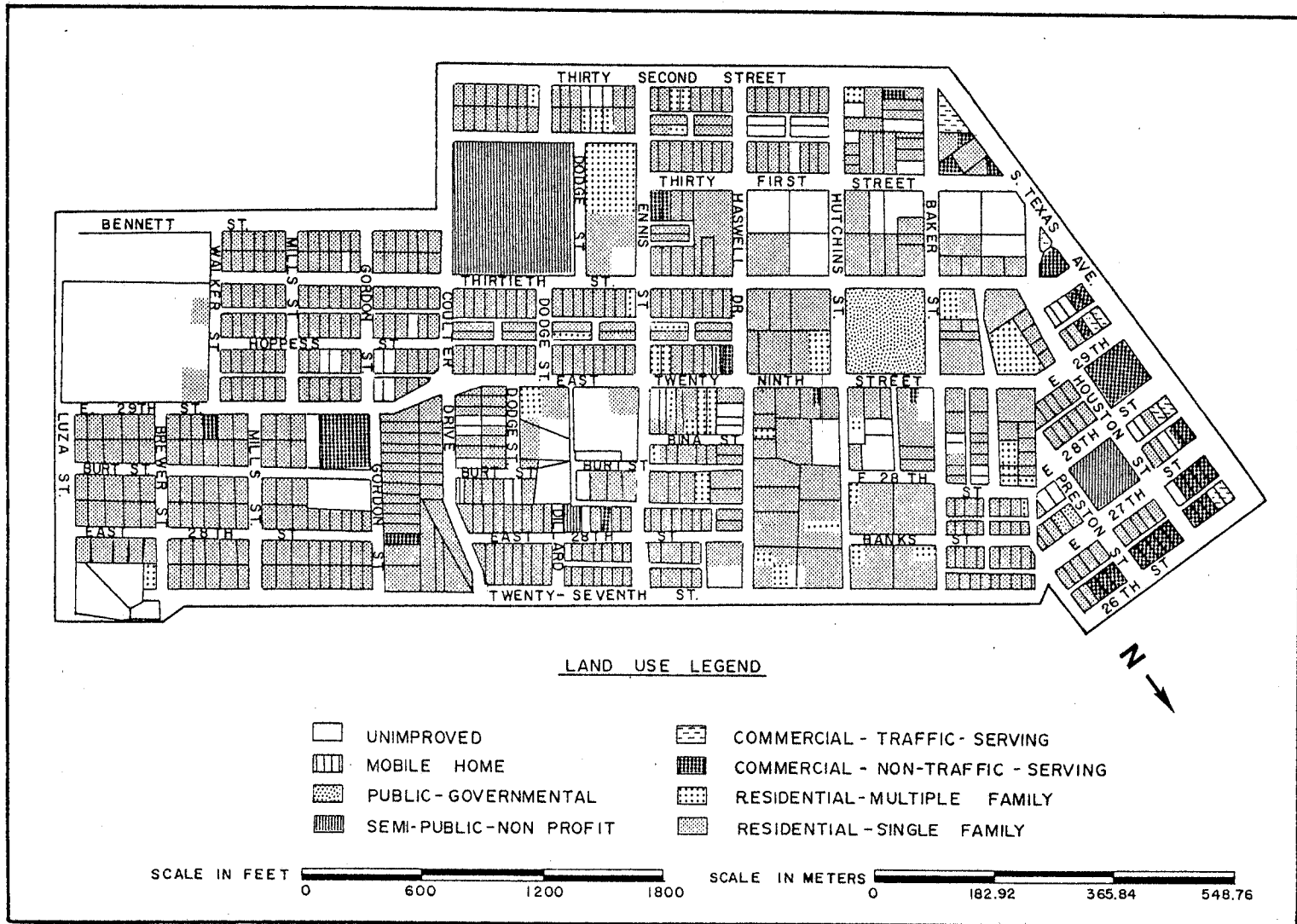


Figure 5. Land Use in the East 29th Street Study Area in 1970

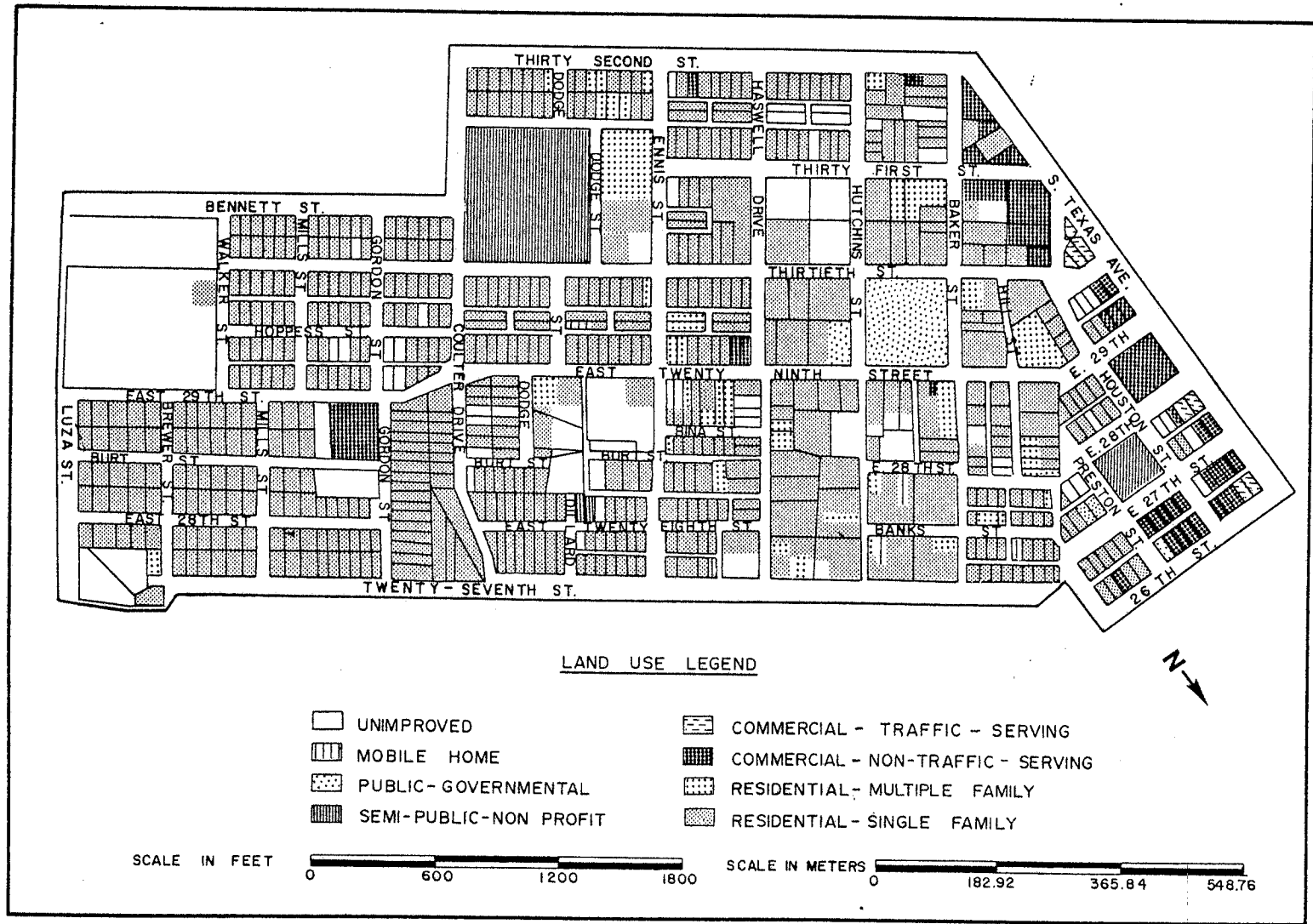


Figure 6. Land Use in the East 29th Street Study Area in 1977

Land Use Changes

Although the East 29th Street Study Area has had less growth than many other areas of Bryan-College Station, there have been several changes. Land use changes are discussed first on an overall basis and then in terms of proximity to East 29th Street.

Overall Study Area

As indicated in Table 3, most of the 132.14 acres (53.48 hectares) of land improved for a use other than streets was in residential use in 1958. Residential remained the dominant use throughout the entire study period. Multiple family-residential use gained a larger share of the residential category for each year that data were available. Commercial, public-governmental, and semi-public nonprofit uses all gained in acreage with commercial development having the most significant increase between 1965 and 1970. Commercial acreage increased over 200 percent in that period. Unimproved land decreased by a total of 38 percent with most of this decrease occurring between 1965 and 1970. Figure 7 charts changes in total improved acres by type of land use.

Proximity to East 29th Street

Tracts of land were classified according to their location relative to East 29th Street. Tracts with frontage on East 29th Street were classified as abutting. Whole abutting tracts were included in order to avoid division of a development. For example, an apartment complex with frontage on East 29th Street might extend back a few hundred feet from the street but would be classified as abutting because it was one development. A 300 feet (91.44 meters) deep section of undeveloped tracts was considered abutting. Three

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		
	1958	1965	1970	1977	
Commercial-Traffic-Serving	c	1.03	1.32	.93	
Absolute Change	-		-.29	-.39	
Percent Change	-		-28%	-30%	
Commercial-Nontraffic-Serving	c	1.77	7.86	10.75	
Absolute Change	-		6.09	2.89	
Percent Change	-		344%	37%	
Total Commercial	3.98	2.80	9.18	11.68	
Absolute Change	-1.18		6.38	2.5	
Percent Change	-30%		228%	27%	
Residential-Single Family	c	112.13	114.44	113.17	
Absolute Change	-		2.31	-1.27	
Percent Change	-		2%	-1%	
Residential-Multiple Family	c	5.51	9.45	11.03	
Absolute Change	-		3.94	1.58	
Percent Change	-		72%	17%	
Residential-Mobile Homes	c	0	.23	.36	
Absolute Change	-		.23	.13	
Percent Change	-		-	57%	
Total Residential	114.41	117.64	124.12	124.56	
Absolute Change	3.23		6.48	.44	
Percent Change	3%		6%	0.4%	
Public-Governmental	3.91	3.91	4.20	4.88	
Absolute Change	0		.29	.68	
Percent Change	0%		7%	16%	
Semi-Public-Nonprofit	9.84	10.23	10.23	10.23	
Absolute Change	.39		0	0	
Percent Change	4%		0%	0%	
Streets	72.61	72.61	73.29	73.29	
Absolute Change	0		.68	0	
Percent Change	0%		1%	0%	
Unimproved	51.56	49.12	35.29	31.77	
Absolute Change	-2.44		-13.83	-3.52	
Percent Change	-5%		-28%	-10%	

^aTotal acreage equals 256.31 acres (633.36 hectares).

^bOne acre equals .4046856 hectares.

^cData unavailable for 1958.

hundred feet was chosen to be consistent with other study areas of this project, and also because the largest development abutting 29th Street is approximately 300 feet (91.44 meters) deep. All other land in the Study Area was labeled nonabutting.

The division of property into these two categories was done to facilitate comparison. Although the improved street may have influenced land use changes on nonabutting properties, it is expected that abutting properties would have been most affected. This could be proved or disproved by examining the two groups separately.

As Table 4 indicates, almost three-fourths of abutting land use was already improved in 1958. Residential development had occurred on almost half of the total abutting acreage. A small amount of commercial acreage and a public school tract made up the remainder of abutting development in 1958.

The only development on abutting property between 1958 and 1965, the "before" period, was an increase in residential acreage of .33 acres. The area was a stable residential one at that time.

By 1970 abutting commercial and residential acreages had begun to fluctuate. Some developed land changed uses, as well as previously unimproved land becoming developed. Some land that had been single family residential became commercial or multiple family. But, likewise, a small amount of commercial land became residential. The net results of the changes during the period from 1965 to 1970 were a 2.80 acre (1.13 hectares), or 718 percent, increase in nontraffic-serving commercial development and a 1.02 acre (0.41 hectares), or six percent, increase in residential acreage. Multiple family housing contributed most to the residential acreage increase.

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	
	1958	1965	1970	1977
Commercial-Traffic-Serving	c	.29	.29	0
Absolute Change	-	0	-.29	
Percent Change	-	0%	-100%	
Commercial-Nontraffic-Serving	c	.39	3.19	3.36
Absolute Change	-	2.80	.17	
Percent Change	-	718%	5%	
Total Commercial	.68	.68	3.48	3.36
Absolute Change	0	2.80	-.12	
Percent Change	0%	412%	-3%	
Residential-Single Family	c	16.39	16.44	15.91
Absolute Change	-	.05	-.53	
Percent Change	-	.3%	-3%	
Residential-Multiple Family	c	2.01	2.85	2.79
Absolute Change	-	.84	-.06	
Percent Change	-	42%	-2%	
Residential-Mobile Homes	c	0	.13	0
Absolute Change	-	.13	-.13	
Percent Change	-	-	-100%	
Total Residential	18.07	18.40	19.42	18.70
Absolute Change	.33	1.02	-.72	
Percent Change	2%	6%	-4%	
Public-Governmental	3.91	3.91	3.91	4.49
Absolute Change	0	0	.58	
Percent Change	0%	0%	15%	
Streets	4.41	4.41	4.41	4.41
Absolute Change	0	0	0	
Percent Change	0%	0%	0%	
Unimproved	10.83	10.50	6.68	6.94
Absolute Change	-.33	-3.82	.26	
Percent Change	-3%	-36%	4%	

^aTotal abutting acreage equals 37.90 acres (15.34 hectares).

^bOne acre equals .4046856 hectares.

^cData unavailable for 1958.

During the period from 1970 to 1977 all improved land use categories lost acreage except non-traffic-serving commercial and public-governmental. This was due to land changing uses and the burning of a single family residence. Changes in abutting acreages by type of land use are charted in Figure 8.

Nonabutting land was over 80 percent developed in 1958. As indicated by Table 5, the development was primarily residential with some commercial and semi-public-nonprofit development included.

During the "before" period, 1958 through 1965, commercial acreage decreased by 36 percent, and residential acreage increased by three percent. Semi-public-nonprofit acreage increased four percent.

The next five years, 1965 through 1970, evidenced a commercial acreage increase of 167 percent. Residential acreage increased by six percent in 1970. This resulted from an increase in multiple family housing and mobile homes but a decrease in single family housing. Public-governmental acreage also increased slightly.

Nonabutting commercial development increased by 46 percent between 1970 and 1977. The increase was due entirely to nontraffic-serving commercial development since traffic-serving acreage decreased slightly. Total residential acreage increased although single family development decreased again. There was continued growth in multiple family housing and mobile home acreage. No other changes in acreages occurred in this period between 1970 and 1977. Changes in nonabutting acreages by type of land use are charted in Figure 9.

Land Use Impediments

Factors which could have influenced land use changes were researched to determine their effects in the East 29th Street Study Area. Some of the

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		
	1958	1965	1970	1977	
Commercial-Traffic-Serving	c	.74	1.03	.93	
Absolute Change	-		.29	-.10	
Percent Change	-		39%	-10%	
Commercial-Nontraffic-Serving	c	1.38	4.67	7.39	
Absolute Change	-		3.29	2.72	
Percent Change	-		238%	58%	
Total Commercial	3.30	2.12	5.70	8.32	
Absolute Change		-1.18	3.58	2.62	
Percent Change		-36%	167%	46%	
Residential-Single Family	c	95.74	98.90	97.26	
Absolute Change	-		2.26	-.74	
Percent Change	-		2%	-1%	
Residential-Multiple Family	c	3.50	6.60	8.24	
Absolute Change	-		3.10	1.54	
Percent Change	-		89%	23%	
Residential-Mobile Homes	c	0	.10	.36	
Absolute Change	-		.10	.26	
Percent Change	-		-	260%	
Total Residential	96.34	99.24	104.70	105.86	
Absolute Change		2.90	5.46	1.16	
Percent Change		3%	6%	1%	
Public-Governmental	0	0	.29	.39	
Absolute Change	0		.29	0	
Percent Change	0%		-	-	
Semi-Public-Nonprofit	9.84	10.23	10.23	10.23	
Absolute Change		.39	0	0	
Percent Change		4%	0%	-	
Streets	68.20	68.20	68.88	68.88	
Absolute Change		0	.68	0	
Percent Change		0%	1%	-	
Unimproved	40.73	38.62	28.61	24.83	
Absolute Change		-2.11	-10.01	-3.78	
Percent Change		-5%	-26%	-13%	

^aTotal nonabutting acreage equals 218.41 acres (88.39 hectares).

^bOne acre equals .4046856 hectares.

^cData unavailable for 1958.

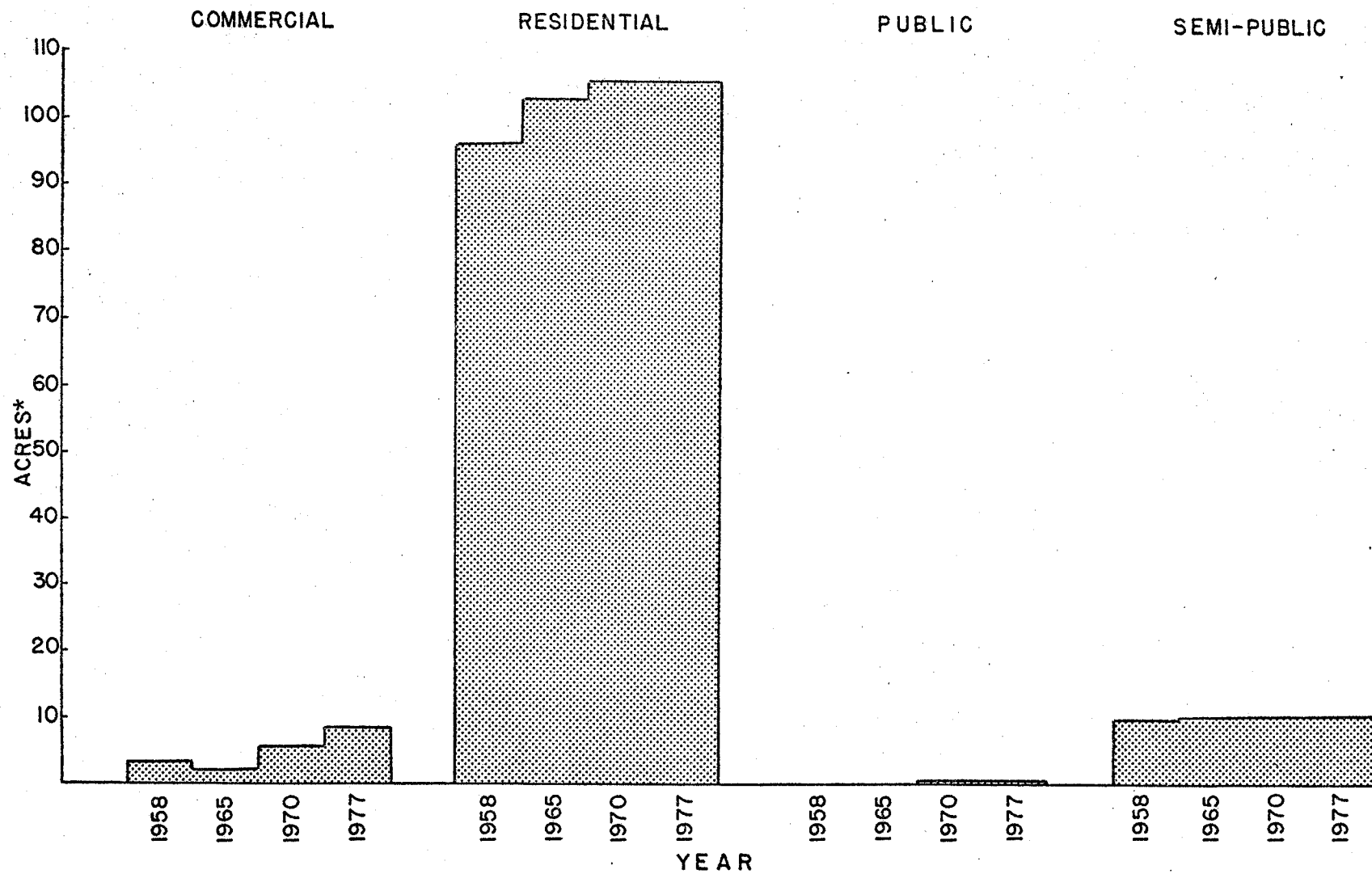


Figure 9. Changes in Nonabutting Land Uses in the East 29th Street Study Area

*One acre equals .4046856 hectares.

impediments found in other case studies in this project were not found in this area. Because the area is an old, established one, the availability of utilities was no problem to potential developers. Utilities were readily available. There were no large expanses of land not easily accessed by a street, eliminating an access problem.

An impediment to development or change discovered in this area was the unwillingness of land owners to have their land developed or to change uses. The owner of the largest tract that has remained vacant has been reluctant to have the tract developed. There is one single family house on the tract, and there was one other that had burned, but the majority of the tract has remained unimproved. Also in the area are many of the oldest homes in Bryan on large tracts that owners have chosen to keep residential. Some of these lots might have otherwise been converted to commercial use due to their proximity to Texas Avenue. Several property owners were present at hearings held by the City Commission to protest the improvements made upon the street. They felt that the four-lane street would jeopardize the value of their land and create a situation less desirable for residences. The ties to the neighborhood are a factor in helping to preserve the residential character of much of this area.

Land Use Controls and Plans

Bryan does not have zoning and has no legal means of controlling land use. Plats are required for new areas or areas that are being redeveloped in a manner which does not utilize the lots as previously platted. When approving these plats, the city has the authority to impose certain restrictions, e.g., location and number of curb openings, type and amount of parking, and set-back distance from the street; but the city cannot dictate

the type of land use. Deed restrictions are the only legal means of controlling land use in Bryan, and property owners or neighbors would likely instigate an action to prevent a nonconforming use, not the city.

Although the city has no means of enforcement, there have been plans formulated for land use. The Brazos Area Plan, published in 1958, forecasted little change with the East 29th Street Study Area remaining primarily residential through 1980, with some commercial development fronting Texas Avenue. The Comprehensive Bryan Plan published in 1970 indicated that the area was to remain primarily residential with much of the development becoming multiple-family residential by 1990. Some commercial development along Texas Avenue and East 29th Street was also expected to occur.

These plans were predictions of what was expected to occur based on factors such as existing land use, age of improvements, and amenities offered for various types of development. More change has occurred than was predicted in the Brazos Area plan. Most notably, none of the commercial development along East 29th Street and only part of the present commercial development on Texas Avenue was predicted. Development has occurred very similarly to that predicted in the Bryan Comprehensive Plan, although it did not predict as much commercial development as has occurred. However, the improvement of East 29th Street had already occurred when the Comprehensive Bryan Plan was released and may have been a consideration in predicting land use nearby. The Brazos Area Plan proposed improvement of the street but proposed a six-lane street by 1980, instead of the four-lane street that exists.

Socio-Economic Characteristics

Socio-economic characteristics of an area can have significant effects on the use made of the area's land. Selected characteristics were

investigated to reveal significant differences, if any, between the study area and Bryan (as a whole) or Brazos County.

The 29th Street Study Area in Bryan is fairly equally divided between Census Tracts 7 and 8. All land in the Study Area northwest of Coulter Drive is in Census Tract 7, and all land in the Study Area southeast of Coulter is in Census Tract 8. To accurately describe the study area as a whole, it is necessary to discuss each tract separately, highlighting any differences that were found to exist either between tracts, or in comparison to the City of Bryan or Brazos County in 1970.

On the whole, Tract 7 was very comparable to the City of Bryan regarding basic socio-economic indicators (Table 6). Median number of school years completed was slightly higher than the figure for the city, as was the percent of high school graduates; the differences, however, were only marginal. Brazos County statistics were also markedly similar to those for Tract 7, particularly those describing educational attainment. Median family income and median income of families and unrelated individuals were higher in Tract 7 than in either the city or the county, yet the median value of owner occupied residences was found to be lower in the census tract than in the other areas. The largest discrepancy was with the percent of families falling below poverty level; in Tract 7, only 6 percent of families fell into that category, compared to roughly 16 percent in both Bryan and Brazos County.

The occupational breakdown presented in Table 6 indicated that Census Tract 7 had a higher percentage of white-collar workers (professional, managerial, sales, and clerical workers) than did the city or Brazos County as a whole.

Table 6. Comparison of 1970 Socio-Economic Characteristics of Census Tracts 7 and 8 to Bryan-College Station.

	SMSA (Brazos County)	Bryan	College Station	Tract 7	Tract 8
<u>Population</u>	57,978	33,719	17,676	2,632	4,399
Median School Years Completed	12.2	11.9	15.8	12.2	12.7
Percent High School Graduates	54.5	49.6	82.9	53.7	65.5
Median Family Income	\$7,636	\$7,775	\$7,849	\$8,454	\$10,559
Median Income of Families and Unrelated Individuals	\$4,002	\$6,341	\$1,824	\$6,747	\$9,703
Median Value Owner Occupied Residences	\$13,000	\$12,200	\$18,500	\$11,600	\$18,900
Median Rent Paid by Tenants	\$74	\$64	\$87	\$68	\$84
Percent Families Below Poverty Level	16.6	16.0	14.1	5.9	4.3
<u>Occupations</u>					
Total Employed, 16 Years and Over	21,909	13,120	6,354	1,152	1,820
Percent Professional, Technical, and Kindred Workers	24.8	20.3	39.4	19.10	24.40
Percent Managers and Administrators except Farm	8.5	10.0	6.0	15.80	14.29
Percent Sales Workers	6.6	7.4	5.5	5.64	12.09
Percent Clerical and Kindred Workers	17.3	17.4	17.9	22.05	23.19
Percent Craftsmen, Foreman, and Kindred Workers	10.1	12.2	4.5	11.72	11.92
Percent Operatives, Except Transport	6.8	7.8	3.6	4.25	3.24
Percent Transport Equipment Operatives	3.0	4.0	1.0	1.22	2.69
Percent Laborers, Except Farm	4.6	4.7	4.0	5.21	2.20
Percent Farm Workers	3.6	1.3	4.0	.95	1.26
Percent Service Workers	11.4	11.4	12.0	13.54	4.50
Percent Private Household Workers	3.3	3.5	2.0	.52	.22

The differences noted between Census Tract 8 and the other statistical areas were much greater, with Tract 8 evidencing a much higher level of socio-economic status than the city or the county. Median family income within the tract, for example, was \$10,559, compared to approximately \$7700 in the other two areas. Likewise, the median value of owner occupied residences was over \$6000 higher in the tract than in the City of Bryan. The final measure of socio-economic status presented in Table 6--the percent of families below poverty level--also illustrates the generally higher economic condition found in Tract 8 in 1970, with only 4.3% of all families in that area having incomes below the poverty level.

As would be expected, Tract 8 had over 73% of its employed individuals falling into white-collar occupations, in contrast to roughly 56% in both Bryan and Brazos County. (This distribution was also reflected in the income measures discussed previously.)

To summarize, whereas Census Tract 7 closely paralleled both the city and the county in measures of general socio-economic status, those individuals residing in Tract 8 in 1970 were of a significantly higher socio-economic level than the average Bryan or Brazos County resident. However, in both Tracts, the percent of families below poverty level was considerably lower than the percent recorded for the city or county.

IMPACT OF HIGHWAY IMPROVEMENT ON LAND USE IN THE STUDY AREA

An attempt is made to examine the impact of the improvement upon land use. Two types of data are used to indicate the extent of this impact: (1) actual changes in land use in the area, and (2) the opinions of people knowledgeable about the area.

Effects on Abutting and Nonabutting Land Use

Tables 7 and 8 illustrate the amount of abutting and nonabutting acres that changed use and what the previous and new uses were. In this study area, several changes occurred that involved land that had already been improved for another use. In the whole study area, a total of 64.79 acres (26.22 hectares) changed use between 1958 and 1977. Of this acreage, 22.74 acres (9.20 hectares) or 35 percent were previously improved for another use. The remaining acreage changing use was previously in the unimproved category.

To compare changes of abutting and nonabutting land, acres changing use were put on a percentage basis in Table 9. This was done because the nonabutting section is considerably larger than the abutting. The abutting percentages are the percentages of total abutting land and likewise, the nonabutting percentages are the percentages of total nonabutting land. The yearly rate of change was calculated to adjust for the difference in number of years between the periods. The land was further divided into that which was previously improved and that which was previously unimproved.

As shown in Table 9, abutting property changed use at a yearly rate of 1.00 percent in the before period. Nonabutting land use was changing at a 0.42 percent rate for this period. In the abutting category, previously unimproved land that became developed accounted for more than half of the land use changes from 1958 to 1965. However, on nonabutting land, land-

Table 7. Types of Land Use Changes of Abutting Acreage by Time Period^a

Land Use Change	Before Period		Short-Run After Period		Long-Run After Period		Total After Period	
	1958-1965	1965-1977	1965-1970	1970-1977	1970-1977	1965-1977	1965-1977	1965-1977
	Acres Changing Use	Percent of Total Abutting Acres	Acres Changing Use	Percent of Total Abutting Acres	Acres Changing Use	Percent of Total Abutting Acres	Acres Changing Use	Percent of Total Abutting Acres
Residential to Commercial	0	0	.35	0.92	.13	0.34	.48	1.27
Residential to Public	0	0	0	0	.58	1.53	.58	1.53
Residential to Unimproved	1.16	3.06	0	0	.52	1.37	.52	1.37
Commercial to Residential	0	0	.13	0.34	.25	0.66	.38	1.00
Unimproved to Residential	1.49	3.93	1.24	3.27	.26	0.69	1.50	3.96
Unimproved to Commercial	0	0	2.58	6.80	0	0	2.58	6.81
Total Land Changing Use	2.65	6.99	4.30	11.35	1.74	4.59	6.04	15.94
Improved Land	1.16	3.06	.48	1.27	1.48	3.90	1.96	5.17
Unimproved Land	1.49	3.93	3.82	10.08	.26	0.69	4.08	10.77
Total Land Not Changing Use	35.25	93.01	33.60	88.65	36.16	95.41	31.86	84.06
Total Abutting Land	37.90	100.00	37.90	100.00	37.90	100.00	37.90	100.00

^aOne acre equals .4046856 hectares.

Table 8. Types of Land Use Changes on Nonabutting Acreage by Time Period^a

Land Use Changes	Before Period		Short-Run After Period		Long-Run After Period		Total After Period	
	Acres Changing Use	1958-1965 Percent of Total Nonabutting Acres	Acres Changing Use	1965-1970 Percent of Total Nonabutting Acres	Acres Changing Use	1970-1977 Percent of Total Nonabutting Acres	Acres Changing Use	1965-1977 Percent of Total Nonabutting Acres
Residential to Commercial	.48	0.22	3.16	1.45	1.41	0.64	4.57	2.09
Residential to Semi-Public	.39	0.18	0	0	0	0	0	0
Residential to Unimproved	.87	0.40	1.17	0.54	.43	0.20	1.60	0.73
Commercial to Residential	1.66	0.76	.06	0.03	.80	0.36	.86	0.39
Commercial to Public	0	0	0	0	.10	0.05	.10	0.05
Unimproved to Residential	2.98	1.36	9.73	4.45	2.20	1.01	11.93	5.47
Unimproved to Commercial	0	0	.48	0.22	2.01	0.92	2.49	1.14
Unimproved to Public	0	0	.29	0.13	0	0	.29	0.13
Total Acres Changing Use	6.38	2.92	14.89	6.82	6.95	3.18	21.84	10.00
Improved Land	3.40	1.56	4.39	2.01	2.74	1.25	7.13	3.26
Unimproved Land	2.98	1.36	10.50	4.81	4.21	1.93	14.71	6.74
Total Acres Not Changing Use	212.03	97.08	203.52	93.18	211.46	96.82	196.57	90.00
Total Nonabutting Acres	218.41	100.00	218.41	100.00	218.41	100.00	218.41	100.00

^aOne acre equals .4046856 hectares.

land changing from one improved use to another accounted for more change than did unimproved land becoming developed in this before period.

The greatest change in land use occurred in the short-run after period which covered 1965 through 1970. Abutting land use change was occurring at a 2.27 percent rate per year. Nonabutting land use was changing at a 1.36 percent rate. Previously unimproved land that became developed accounted for most of the change in this period. The increased amount of land use change in this period indicates that the street improvement could have had an important effect. This period includes the construction years and two years afterwards. The widening of this street was an indication that more traffic was expected in this area. This very likely influenced decisions about land use, particularly commercial use which increased considerably in that period.

The long-run after period, 1970 through 1977, also experienced change, but the rate was much less than in the short-run after period. Abutting land use was changing at a rate of 0.66 percent per year which is less than the rate of change in the before period. The rate of change for nonabutting property was 0.45 percent per year, which was slightly higher than in the before period. Previously improved land accounted for the majority of changes on abutting property and previously unimproved land accounted for most development in the nonabutting property.

These percentages indicate that the street improvement probably had an important impact in the short-run after period. Rates of change were considerably higher than in the before period. This impact appeared to be curtailed greatly in the long-run after period as rates of land use change fell to lower than the before period rates for abutting property and almost as low for nonabutting property. The rate of change for total abutting

property was higher than the rate for total nonabutting property in each period. This is as expected since it was anticipated that abutting property would receive the greatest impact and experience the most land use change after a street improvement.

Other Factors Influencing Change

When analyzing land use changes many factors have to be considered. Not the least of these factors is the general growth of the community. Bryan-College Station is a dynamic location wherein population has increased by 52 percent between 1950 and 1960, by 22 percent between 1960 and 1970, and by 40 percent between 1970 and 1977.

Although the community's main source of employment and income, Texas A&M University, is within the city limits of College Station and physically removed from the study area by almost four miles, the effects of the university are felt. Many of the commercial establishments in the 29th Street Study Area benefit from sales made to people connected with the university. Part of the rental housing in the area is occupied by students or university employees. Many of the home owners are also part of the university. The growth at Texas A&M must certainly be considered a factor in change in land use of any part of the county. It may also have been a factor in the relative stability in this area that was already predominantly developed by the late 1950's.

Influence of Texas Avenue

The location of Texas Avenue relative to 29th Street is another factor that could be significant in determining what caused change in the Study Area. Texas Avenue is the main street through both Bryan and College Station and

is the locale of much of the commercial sector of the two cities. Although it is impossible to totally disentangle the influence of the two streets upon each other, the acreages abutting Texas Avenue were subtracted out of the Study Area in an effort to estimate the magnitude of the Texas Avenue influence.

Table 10 indicates that change in the before period was heavily influenced by Texas Avenue properties. Most of the previously improved properties that changed use abutted Texas Avenue.

Subtracting out the Texas Avenue properties also reduced the percentage changes in the short-run and long-run after periods. However, the relative difference between time periods was not substantially changed. The short-run after period was still the period of most change for the East 29th Street Study Area. The difference between abutting change in the before period and the short-run after period was actually accentuated by subtracting out Texas Avenue changes. With the Texas Avenue properties left in, the short-run after period was experiencing change at a rate about two and one-fourth times that of the before period. Without the Texas Avenue changes, the short-run after period rate was almost three times greater than the before period rate. These figures further indicate that the street improvement probably had an effect on land use in the short-run.

Opinions of Knowledgeable People

Individuals involved in planning expressed the view that the street was upgraded because of existing heavy traffic volumes and recent land use changes. Also, it was their opinion that the street improvement did not cause land use changes that occurred in the after period. However, interviews with individuals involved in real estate and development who were

Table 10. Percentage Change in Abutting and Nonabutting Acres by Period and Type of Land Use with the Texas Avenue Changes Omitted

Type of Land Use	<u>Before Period</u> <u>1958-1965</u>		<u>Short-Run After Period</u> <u>1965-1970</u>		<u>Long-Run After Period</u> <u>1970-1977</u>		<u>Total After Period</u> <u>1965-1977</u>	
	Abutting	Nonabutting	Abutting	Nonabutting	Abutting	Nonabutting	Abutting	Nonabutting
Previously Improved Land	0	0.63	1.27	1.30	3.90	1.21	5.17	2.51
Yearly Rate of Change	0	0.09	0.25	0.26	0.56	0.17	0.43	0.21
Previously Unimproved Land	3.93	1.40	7.02	4.67	0.69	1.48	7.71	6.15
Yearly Rate of Change	0.56	0.20	1.40	0.93	0.10	0.21	1.50	1.14
Total	3.93	2.03	8.29	5.97	4.59	2.69	12.88	8.66
Yearly Rate of Change	0.56	0.29	1.65	1.19	0.66	0.38	2.31	1.57

familiar with the 29th Street area indicate that the street improvement was considered in some of the land use changes that occurred. Commercial development was most frequently pointed out as having been influenced by the improvement.

The location of a large bank on the corner of Texas Avenue and East 29th Street was said to have been determined in large part by the condition and design of East 29th Street after its improvement. Other commercial developments, not only on 29th Street but also on Texas Avenue, were reported to have been located where they were because of the widening and improving of East 29th. Logically, the wider street was expected to funnel more traffic to those locations, thereby providing desirable places for businesses. Another particular development indicated as having been located on East 29th partly because of the improved condition and design was the Texas Employment Commission Office.

The people interviewed felt that the abutting property along East 29th Street will evolve into more commercial usage. This land has more than doubled in value in the last five years, and the increase in value is attributed to the commercial potential. Most of those interviewed expressed the belief that the improvement of the street was an important consideration in the decisions to locate various developments in the area, particularly commercial developments.

CONCLUSIONS

The East 29th Street Study Area has not been one of the most dynamic areas of Bryan-College Station during the period studied, but changes have taken place that could have implications for future land use. The area was primarily residential in 1958, the first year studied, and has remained primarily residential through 1977, the last year observed. However, changes in the types of residences and increases in other land uses have occurred.

Over 71 percent of abutting land was improved in 1958. This improvement was primarily residential and has remained so through 1977 when almost 82 percent was improved. Multiple-family residential acreage has increased and single-family residential acreage has decreased in this 20-year span. Other changes in abutting land use that may signal the start of an eventual change in the character of this area are increases in commercial and governmental developments. The changes from single-family to multiple-family housing are in accordance with those forecasted in the Comprehensive Bryan Plan published in 1970.

Over 81 percent of nonabutting land was improved in 1958. This percentage had increased to over 88 percent by the end of 1977. Nonabutting land had also been used primarily for residences throughout the period although commercial, public-governmental, and semi-public-nonprofit uses have all increased. Multiple-family residential use has gained an increasingly larger share of the total residential use on nonabutting property also.

The greatest amount of change on both abutting and nonabutting land came in the short-run after period from 1965 to 1970. This suggests that the street improvement did have an influence on land use. This period

encompasses one year before construction began, all of the construction years, and two years after construction. The improvement was obvious in this period and indicated that more traffic was expected to occur on East 29th Street. The improvements provided easier access to downtown Bryan and to points further southeast in Bryan and finally to College Station. This was likely an attraction for those seeking locations for commercial or multiple-family developments. Indeed, it was indicated by informed people that the street improvement was definitely an important consideration in the location of some of the commercial developments. These developments would have been located somewhere in the community but were attracted to their present location partly because of the improvement of East 29th Street.

The rate of change slowed in the long-run after period, 1970 through 1977. The street improvement probably was still being considered in the land use changes that were occurring, but the effect was not as apparent.

Many factors besides the street improvement were instrumental in causing change or lack of change in land use in this area. The growth of Bryan-College Station and Texas A&M University provided opportunities for expansions in the commercial and housing sectors of the area. Perhaps more important than what caused change was what caused the lack of change. The shift from downtown Bryan to south Bryan and College Station as the centers of commercial activities has certainly affected the East 29th Street Area which borders the downtown area. It is logical to deduce that more change, particularly change to commercial usage, would have occurred if downtown Bryan had remained the dominant business district. The new by-pass on the east side of Bryan-College Station has contributed to taking traffic away from the East 29th Street Area and the downtown area of Bryan.

In summary, the East 29th Street improvements have affected land use in the area. The effect was greatest in the period that included years immediately before, during, and immediately after construction when the rate of change was highest. Change occurred not only in the form of new developments on unimproved land but also in the form of land changing from one improved use to another.