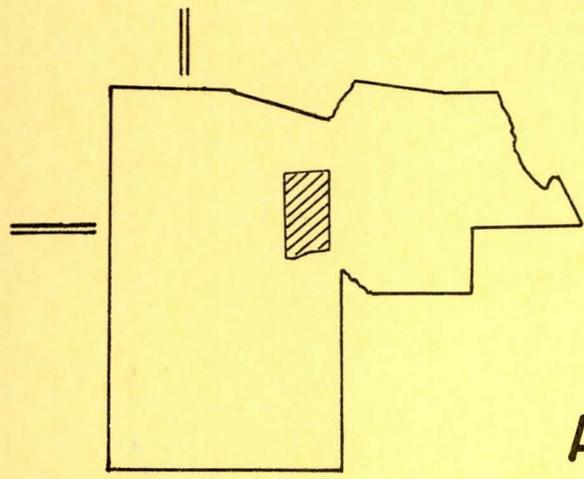


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A REPORT UPON
WEST CENTRAL
MARICOPA COUNTY, ARIZONA

Volume II

A Planning Report: Economics,
Population and Housing, Public Facilities,
Present and Future Land Use

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MARICOPA COUNTY PLANNING AND ZONING DEPARTMENT — MAY 1972

PR-7

A PUBLIC HEARING will be held by the Maricopa County Board of Supervisors at 9:00 A.M., September 19, 1972, in the Board of Supervisors Auditorium, 205 West Jefferson, Phoenix, Arizona, upon a proposed land use plan for an area that extends from 91st Avenue on the east to Jackrabbit Trail on the west, and between the Beardsley Canal on the north and the Gila and Salt Rivers on the south.

The subject plan may be inspected in the Office of the Maricopa County Planning and Zoning Department, 111 South 3rd Avenue, Room 300, Phoenix, Arizona.

BOARD OF SUPERVISORS
PHOENIX, ARIZONA

RHEA WOODALL
CLERK

PUBLISHED: Arizona Republic, August 14, 1972
Westsider, August 16, 1972

**A REPORT UPON
WEST CENTRAL MARICOPA
COUNTY, ARIZONA**

Volume II

A Planning Report: Economics,
Population and Housing, Public Facilities,
Present and Future Land Use

Prepared by

THE MARICOPA COUNTY PLANNING AND ZONING DEPARTMENT
111 South Third Avenue
Phoenix, Arizona 85003

May 1972

Price: Five Dollars

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PREFACE

The planning study for an area designated as West Central Maricopa County has been divided into two parts: Volume I is concerned with water resources and Volume II is concerned with economics, population, land use, utilities, and other conditions that affect present development and that will influence future population growth, development, and land use patterns.

This report has been prepared within the framework of the County's Comprehensive planning program and it is part of a series of studies undertaken for various geographical areas of the County.

Maricopa County has experienced unprecedented population growth and according to all indicators it will continue to grow, although possibly at a slower rate than in recent years. The County cannot control the amount of growth that it will receive but it can guide and direct growth to a certain extent through zoning regulations, subdivision regulations, capital expenditure programming, and other public measures.

West Central Maricopa County is experiencing increasing urbanization through growth of existing communities, new communities, and scattered growth. In the long run scattered growth presents the major planning problem because of the inherent conflict with agricultural activities and the difficulty of providing an adequate and economical level of governmental facilities and services. Thus, one of the primary objectives of this study has been to determine the location and extent of agricultural development, which should be continued to be used for agriculture so long as its owner desire that their lands be devoted to agricultural uses.

If new urban development can be encouraged to located adjacent to existing communities and in self contained or satellite communities, then agricultural lands can be protected against adverse effects of urban development and urban

development can be developed in land use patterns and population densities that will facilitate provision of utilities, streets, schools, parks and the like.

In West Central Maricopa County, more land is suitable and appropriate for urban use than will probably be required according to population projections discussed herein. However, projections are, at best, estimates as to what may be expected. Since major population increases in the past, in Maricopa County, have resulted from in-migration, the extent of future growth depends upon many variables that are imponderable. Notwithstanding these limitations, this report attempts to carefully evaluate existing conditions and trends, physical factors that have determined existing growth and development and that will influence future development, and to suggest a future general land use pattern.

If the suggested land use pattern contained herein is generally adhered to and revised only when warranted by unforeseen future conditions and needs, it will serve as a useful guide for major public improvements and a framework for private development.

During the preparation of this report many agencies and individuals contributed information and data that has been most helpful. However, the County Planning Department is responsible for conclusions and proposals contained herein.

Donald W. Hutton
Director

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SYNOPSIS

This report discusses existing conditions and trends in economics, population, housing, land use, public facilities and utilities within an area that is bounded on the north and west by the Beardsley Canal, on the east by 91st Avenue and on the south by the Gila and Salt Rivers. The area embraced in the study contains about 180,000 acres of land that amounts to 285 square miles.

The primary purpose of this report is to develop guidelines for the orderly growth and development of West Central Maricopa County. Volume I of this study, sub-titled "A Study of Physical Environmental Factors as a Basis of Land Use Planning" provided a basis for the determination of agricultural and urban core areas, and highlighted the fact that the availability of water is the critical problem in the area under review, as it is in the region.

A suggested future land use pattern that has been prepared as part of the report is intended to: 1) encourage more compact and contiguous urban growth and development in order to facilitate provision of streets and highways, water, sewers, schools, parks, and other public facilities; 2) center future urban growth around existing communities in designated core areas, at an average density of seven persons per gross acre, except for Sun City and Youngtown that are developed at five persons; 3) protect agricultural land from encroachment by urban land uses; 4) protect flood prone areas against any further encroachment, urban or rural, which will reduce the flood carrying capacity of any floodway; and 5) protect Luke Air Force Base by preventing new urban development from locating in the immediate vicinity of the Base within Noise Zone 2 thereof. This zone is described by Base officials (in terms of the possible reaction of people who live in the zone), accordingly: "Individuals may complain, perhaps vigorously. Concerted group action is possible."

Barring unforeseen conditions or trends it is estimated that by 1995 the population in the area under study may increase to approximately 135,000 persons

from its 1970 Census count of about 50,000 persons. The 1995 planned holding capacity population for the area is 246,000 (of this total 87% is urban, and 13% is rural), and this total serves as the control figure for the suggested general land use plan. This vast difference in estimates points up the difficulty of forecasting population for a limited geographical area such as the area under study. It is recognized that there is a close statistical relationship between the amount of land used for various urban purposes and population units of one-hundred persons. With certain adjustments for the type and character of the area under study, this empirical relationship is the basis for estimating future land area requirements in the area under study. Overall, it is estimated that 33,352 acres will be required to accommodate an urban population of 214,000 persons. This assumes a ratio of 15.58 acres per 100 persons, as compared with a present average ratio of about 13.01 acres per 100 persons for various urban areas in the County.

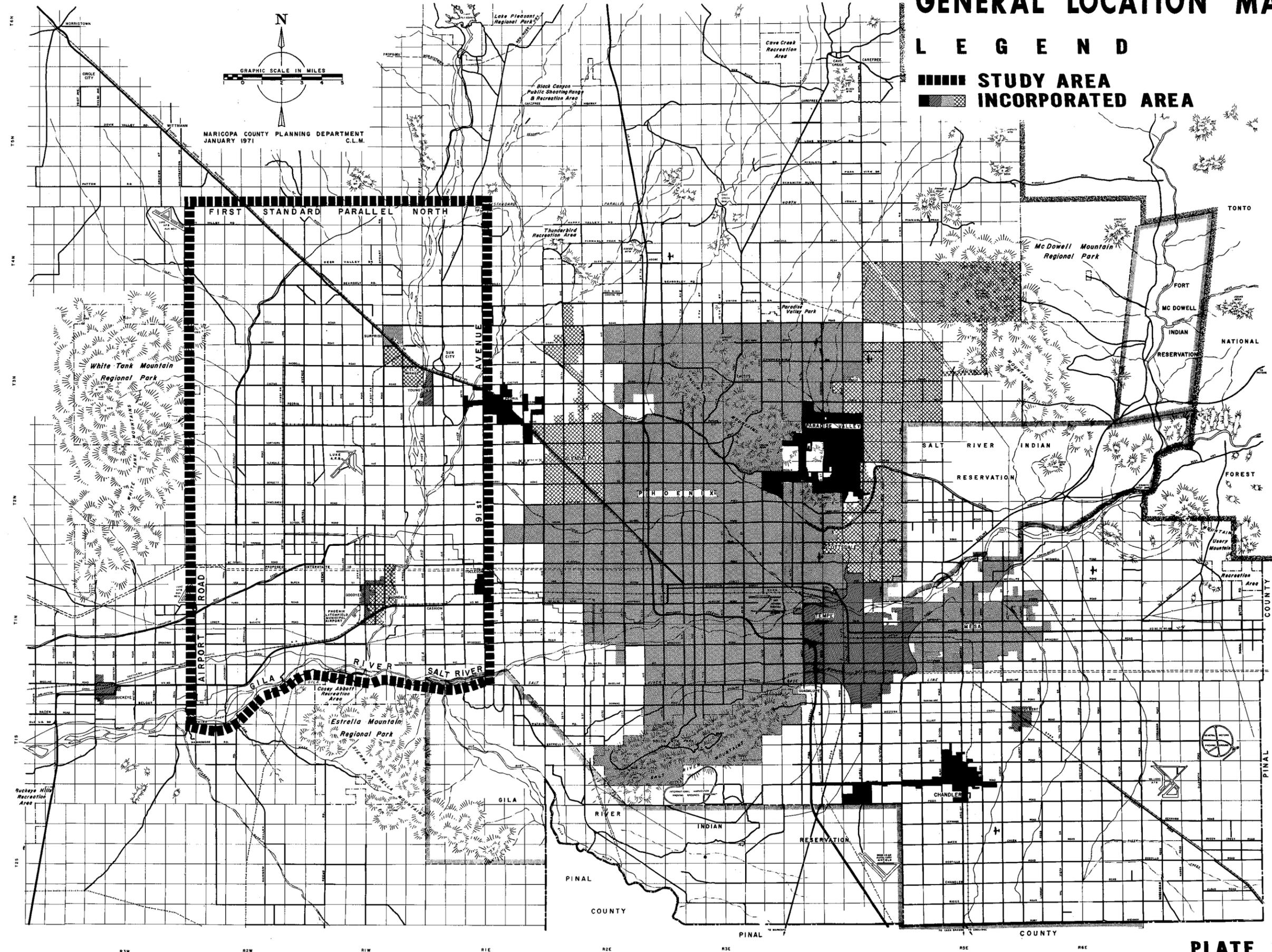
The suggested future land use pattern should serve as a guide for evaluating applications for change of zoning, proposed subdivisions of land, and long range plans for schools and other public improvements. Public understanding of planning problems and needs within the area under study and support of measures available for implementation of planning proposals and objectives are essential if maximum benefits are to be obtained from this study. The information and data contained in this report should be reviewed at periodic intervals and planning proposals should be updated and refined as conditions and circumstances warrant. Also, this report reveals that additional studies are needed on the following major functional subjects (as they affect the area either directly or from a regional viewpoint): 1) water, 2) agriculture, 3) economics, 4) schools, 5) sewers, and 6) public transportation. In this manner, this report will become a viable document.

WEST CENTRAL MARICOPA COUNTY, ARIZONA

GENERAL LOCATION MAP

LEGEND

- STUDY AREA
- INCORPORATED AREA



CHAPTER I

INTRODUCTION

This chapter discusses the scope of the present study, and the history of the area under study.

Scope of the Study

This report discusses existing conditions and trends in economics, population, housing, land use, public facilities and utilities within an area that is bounded on the north and west by the Beardsley Canal, on the east by 91st Avenue, and on the south by the Gila and Salt Rivers. The aforementioned area, which contains approximately 342 square miles (220,000 acres), is hereinafter referred to as the Study Area. Its general location, and its relationship to communities and highways in Central Maricopa County, is shown on Plate 1, "General Location Map".

In general, the primary purpose of this report is to develop guidelines for the orderly growth and development of west central Maricopa County. A suggested future land use pattern that has been prepared as part of the West Central Maricopa County Study is intended to: 1) encourage more compact and contiguous urban growth and development in order to facilitate provision of streets and highways, water, sewers, schools, parks, and other public facilities, 2) protect agricultural land from encroachment by urban land uses, and 3) protect Luke Air Force Base by preventing new urban development from locating in the immediate vicinity of the Base within Noise Zone 2 thereof. The suggested future land use pattern should serve as a guide for evaluating applications for change of zoning, proposed subdivisions of land, and long range plans for schools and other public improvements.

Planning Problems

The planning problems and needs that exist within this area will require maximum understanding and cooperation of citizens and public agencies concerned if satisfactory solutions are to be obtained. Present development is scattered, which precludes providing a satisfactory and economical level of government facilities and services. Standards for construction here as well as elsewhere in the County have suffered because of the lack of a building code. Strip commercial zoning along the two major highways has resulted in scattered commercial development. The intrusions of conventional subdivisions into farming areas have resulted in a negative impact on agricultural activities. Luke Air Force Base noise zones must be given maximum consideration for protection of the Base and for reasons of general health, safety, and welfare of the public.

There is no reason why the Study Area should not develop in accordance with sound planning objectives. Extensive land resources are available. A network of major streets and highways serves the area, and can be improved. There are many recreational opportunities available now, and capable of expansion; for example, the Casey Abbott Recreation Area, the Estrella Mountain Regional Park, and the White Tank Mountain Regional Park.

The suggested future land use pattern, contained in this report, is designed to conserve agricultural lands to the maximum extent possible and to encourage new urban development to locate in or contiguous to identifiable core areas in order to facilitate the provision of needed physical facilities such as streets and highway, utilities, schools, parks, and the like.

Barring unforeseen conditions or trends it is estimated that by 1995 the population within the Study Area may increase to approximately 135,000 persons from its 1970 Census count of about 50,000 persons. Public facilities must be planned wisely to serve this estimated population.

History of the Study Area

A resume of the history of the area under study reveals interesting and significant facts and figures. Coincidentally, time has permitted a transition from "old villages" to "new villages" when viewed in the context of residential patterns.

The Early Years

There are approximately fifteen archeological sites⁽¹⁾ (occupied by the Hohokam Indians during the time period of A.D. 500 - 1450) located within the boundaries of the White Tank Mountain Regional Park and the Casey Abbott Recreational Area. Eleven of these sites are in the first-named park while the remainder are in the latter park. The White Tank Mountain Regional Park is certainly noteworthy for two historical items: 1) the largest "old village" (approximately seventy-five acres in size) is situated there near water-holding tanks, and 2) the discovery of possible agricultural terraces or checkdams in the northeast corner of the park indicates that farming may have been carried on by utilizing seasonal runoff of rainwater. Subsequently, other Indian tribes also found sanctuary in these present-day parks.

During the era of Spanish and Mexican colonization (mid 1500's to mid 1800's), soldiers, explorers, missionaries, and trappers traversed the lands between the Sierra Estrella and Salt River Mountains. This is understandable since it was in this general area that the Gila River flowed to its confluence with the Salt River, thereby providing a major north-south travel route. Plate I contains previously mentioned names.

At the conclusion of the war between the United States and Mexico, the southern boundary of U.S. Territory was established by a joint Mexican-American survey on the Gila River. One of the stone survey markers was placed on the very

same hill, just south of the Gila River and opposite the mouth of the Salt River, where the "Initial Point" for government surveys (Township-Ranges) of Arizona began in 1867. As a result, townships nearest the marker were surveyed initially.

Early Development

Irrigation on a large scale was made possible by the enactment of Federal legislation on homesteading and irrigation canals in the 1860's and 1870's. In 1877 the "Desert Land Act" permitted a settler to gain title to 640 acres of desert land if he agreed to irrigate it within three years and to pay a small sum per acre. Just five years later, under conditions of this act, Captain William A. Hancock acquired a section of land near the present City of Tolleson.⁽²⁾

The principal sources of water for irrigation purposes were the Gila and Salt Rivers. In 1868 a federal surveyor described the Gila River as a fine stream of water about 680 feet wide. In the 1870's many water claims were filed on the Gila River and a canal existed two miles below the mouth of the Agua Fria River. Also, in 1886 the Buckeye Canal claimed about one-hundred acre-feet of water from the Gila River. Completion of the Coolidge Dam in 1930 ended the stream's flow. By the early 1890's over 100,000 acres were under irrigation in the Salt River Valley, and still more settlers were pouring in.⁽³⁾ To transport the water to the freshly-cleared farmland required the construction of about ten canals. The Grand Canal that traverses a portion of the Study Area opened in 1878, a decade after the opening of the Valley's initial canal (popularly known as "Swilling's Ditch").

The impetus for intensive and extensive farming in the Salt River Valley was the harnessing of the Salt River. This was accomplished by the completion of the Roosevelt Dam in 1911. Subsequently, five additional storage dams were constructed on the Salt and Verde Rivers. It should be noted that the pumping of underground water started just after Arizona gained statehood in 1912, once electric power was available. In 1927, with the completion of Carl Pleasant Dam

(now known as Waddell Dam), the Agua Fria River was finally under partial control. Coupled with the Beardsley Canal of the Maricopa County Water Conservation District No. 1, the area east of the White Tank Mountains became a productive agricultural region.

In the northern part of the Study Area, wagon routes were vital for linkage to Wickenburg until completion in 1895 of the railroad between Phoenix and Prescott. Calderwood's Station was known as the "upper crossing" of the Agua Fria River, and it was important because it was located only about twelve miles from a waterhole in the midst of desert terrain. Today, Bell Road crosses the "upper crossing". In 1888, a number of settlers from Peoria, Illinois, located in an area near the Agua Fria River that subsequently was named Peoria. They were urged to settle here by William J. Murphy who was the founder of the unified canal system, and the first person to plant citrus in the Glendale area.⁽⁴⁾

Later Development

During World War I, Goodyear Farms (an extensive, unified landholding) was started in order to grow strong, long-staple Egyptian cotton for tire cords when the available supply route from Egypt was blocked. In the 1920's, the "Farms" were transformed into a total farming operation.

The combination of many of these events resulted in the growth of several communities such as El Mirage, Surprise, Litchfield Park, Goodyear, Avondale, and Tolleson.

At the inception of World War II, Luke Air Force Base was opened to train fighter pilots. Over 12,000 pilots were trained, and in the process Luke Field became the largest fighter training base in the Air Corps. The base was named in memory of Lt. Frank Luke, Jr., the "Balloon Buster", a famous flying hero of World War I. The base is still active, and it has the prime mission of training pilots for the Tactical Air Command.⁽⁵⁾

In the mid-1950's, the retirement community of Youngtown was founded by "Big Ben" Schliefer. In December 1960 it became the nation's first and only incorporated retirement community.⁽⁶⁾ In 1959, construction of Sun City was well underway by the Del E. Webb Development Company. It is "master planned" as an active retirement community for residents fifty years of age and older. Sun City provides a variety of residential, recreational, and cultural facilities for relaxed, enjoyable living. According to the 1970 Census, approximately 14,000 persons resided here, in an area that only a decade earlier was used for cotton crops.

In the mid-1960's, the Goodyear Tire and Rubber Company retained private consultants to prepare a general plan for Litchfield Park. The plan was released in 1966, and it envisaged an ultimate population of 75,000 to 100,000 residents.⁽⁷⁾ According to the 1970 census, its initial "new village" contained about 2,000 residents.

The following is a tabulation of communities located completely or partially within the Study Area.

TABLE 1
COMMUNITIES WITHIN THE STUDY AREA

<u>Name of Community</u>	<u>Year of Incorporation</u>
Avondale	1946
Cashion	(1)
El Mirage	1951
Goodyear	1946
Litchfield Park	(1)
Peoria	1954
Sun City	(1)
Surprise	1960
Tolleson	1929
Youngtown	1960

(1) Unincorporated

CHAPTER II

ECONOMIC SURVEY

The following is a discussion of economic factors of significance. It is not within the scope of this report to make detailed economic analyses and projections. Also, it is important to note that detailed 1970 census data on a variety of economic characteristics were not available at the time this report was prepared. To illustrate: on a census tract basis, there is no data on employment status, occupation of worker, income, place of work (that permits comparability to place of residence), and means of transportation to work. However, by using other sources of information, and correlation, reasonable estimates have been developed to describe existing economic conditions.

The economic base within the Study Area is primarily a combination of the following principal activities: government, manufacturing, and agriculture. In fact, these three activities account for about 75% of total employment. In addition, certain portions of the area are generally self-sufficient economically and provide significant employment opportunities for persons residing outside of the area. Overall, the economy of the Study Area is linked to that of the larger Phoenix Urban Area.

Assessed Valuation of the Study Area

With the cooperation of the Office of the County Assessor, and reference to the "1970 Annual Report -Clerk of the Board of Supervisors",⁽⁸⁾ the Planning Department developed estimates of assessed valuation as shown on the following table:

TABLE 2

STUDY AREA 1970 ASSESSED VALUATION

<u>Category</u>	<u>Assessed Valuation (\$)</u>
Real Estate	20,000,000
Improvements	30,000,000
Secured Personal	5,000,000
Unsecured Personal	5,000,000
Utilities, Rails, Wires	<u>15,000,000</u>
Total	75,000,000

By comparison, the 1970 assessed valuation of Maricopa County was approximately $1\frac{1}{4}$ billion dollars. Percentage-wise, the Study Area represents 6% of the total assessed valuation of Maricopa County. Preliminary estimates indicate that the assessed valuation of the County will increase by 10% in 1971.

Economic Base

The economic base for any geographical area comprises those activities that provide the basic employment and income on which the remainder of the local economy relies. It is beyond the scope of this report to include an economic base study; however, it is helpful to be generally familiar with the methodology for such a study. Initially, an area of study is divided into two economic groups; 1) one to serve markets outside the area, and 2) one to serve markets within the area. ⁽⁷⁾ All goods and services sold to the outside markets are considered exports, and the remainder are considered local. Inherent in this classification of markets is a cause and effect relationship since export (outside) markets are viewed as the prime mover of the local economy. To illustrate: If an export-type establishment

were to re-locate in the area under study, local retail merchants would experience a favorable impact as a result of the new workers spending their earnings. It is for this reason that export employment is usually termed "basic", while employment serving the local market is "non-basic". To phrase it differently: there is a proportionate relationship of basic to non-basic jobs i.e., if "x" number of new basic jobs are created, then "y" number of new non-basic jobs will also be created.

More specifically: in a 1965 study of the economy of Maricopa County,⁽⁹⁾ it was estimated that about one-third of the total jobs were considered to be "basic". In the Study Area, primarily because of Luke Air Force Base, it is estimated that two-thirds of the total jobs may be termed "basic".

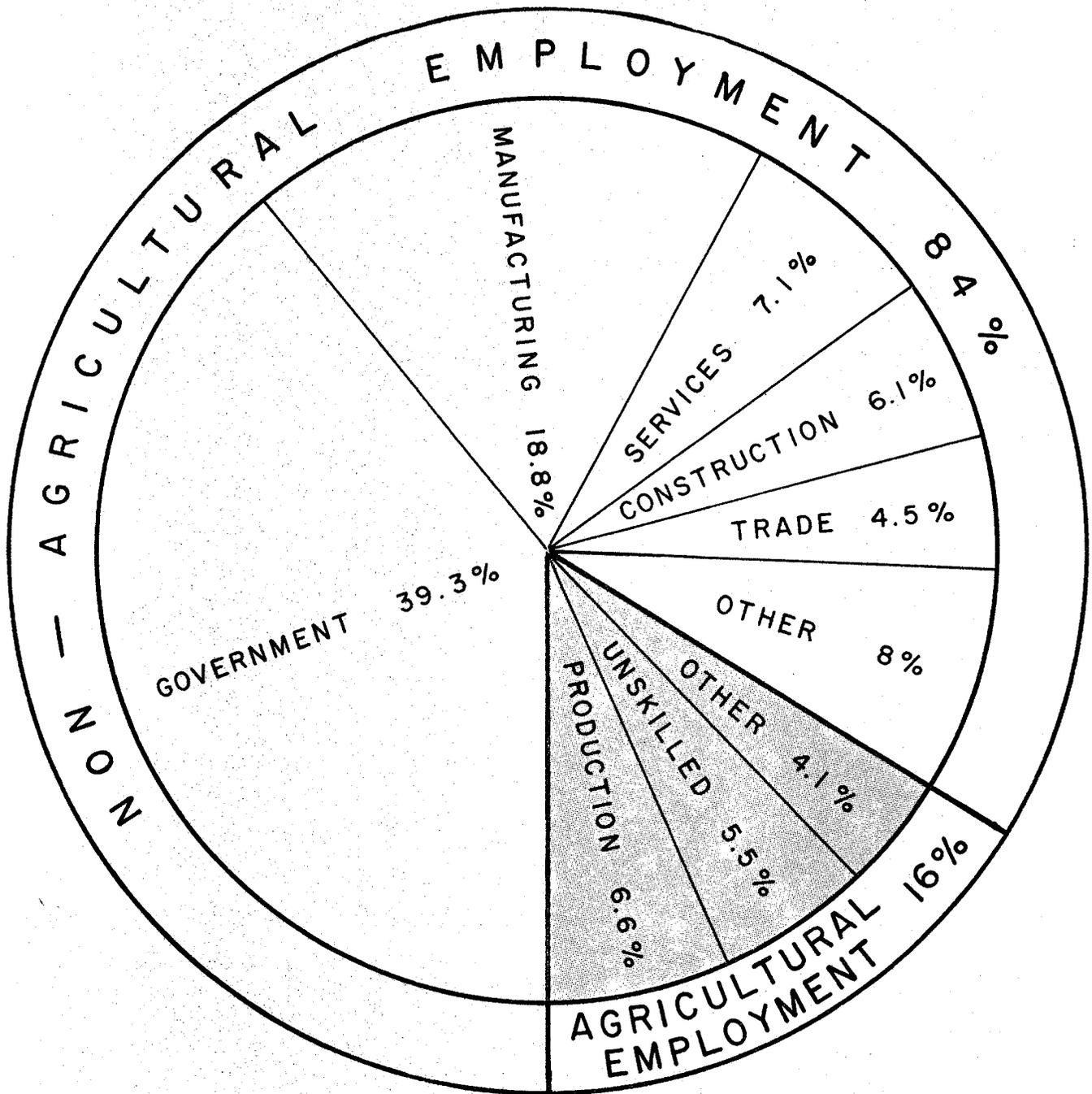
Employment in the Study Area

Plate 2, "Total Employment by Activity", shows the percentage distribution of total employment (civilian and military) in the Study Area. Although the entire area is recognized as being predominantly rural in character, it is surprising to note that non-agricultural employment overwhelmingly exceeds agricultural employment by more than a 5 to 1 ratio. Further, even when compared on an individual activity basis, agriculture only ranks third behind government and manufacturing.

Table 3, "Total Employment by Activity", contains numerical totals, and relevant percentages, for each activity under its major classification. To illustrate: the activity entitled "Government" constitutes slightly less than 40% of total employment, but it represents nearly 50% of non-agricultural employment. The activity entitled "Wholesale and Retail Trade" is virtually constant at approximately 5% of both total and non-agricultural employment.

To avoid any confusion of terms, the following explanatory remarks on Table 3 are presented.

WEST CENTRAL MARICOPA COUNTY, ARIZONA



TOTAL EMPLOYMENT BY ACTIVITY

SOURCE: ADAPTED FROM DATA PROVIDED BY THE UNIVERSITY OF ARIZONA (1971), EMPLOYMENT SECURITY COMMISSION OF ARIZONA (1970), AND LUKE AIR FORCE BASE (1970).

TABLE 3

TOTAL EMPLOYMENT BY ACTIVITY

<u>Activity</u>	<u>Employment</u>	<u>Percentage of Activity</u>	
		<u>Major</u>	<u>Total</u>
<u>Non-Agriculture</u> ⁽¹⁾	16,600	100	83.8
Government	7,788	46.9	39.3
Manufacturing	3,729	22.5	18.8
Services	1,402	8.4	7.1
Construction	1,203	7.3	6.1
Wholesale and Retail Trade	896	5.4	4.5
Finance, Insurance and Real Estate	219	1.3	1.1
Utilities	130	0.8	0.7
Other	1,233	7.4	6.2
<u>Agriculture</u> ⁽²⁾	3,200	100	16.2
Production	1,299	40.6	6.6
Unskilled	1,091	34.1	5.5
Ornamental Horticulture	238	7.4	1.2
Mechanics	216	6.7	1.1
Supplies/Service	147	4.6	0.7
Products	143	4.5	0.7
Professional	50	1.6	0.3
Resources	16	0.5	0.1
TOTAL	19,800	-	100

(1) Non-agriculture estimates derived from 1970 Employment Security Commission of Arizona data, and 1970 Luke Air Force Base statistical information.

(2) Agricultural estimates adapted from 1971 University of Arizona data.

Non-Agricultural Employment

The "Standard Industrial Classification Manual" (SIC) was used in the classification of establishments by type of activity in which engaged to insure coverage of the entire field of economic activities.⁽¹⁰⁾ Representative-type establishments that routinely fall within the previously-listed activities include:

Government: federal, state, and local governmental services (both regular and special). NOTE: Both civilian and military employment are included for purposes of this report since assigned military personnel at Luke Air Force Base account for nearly three of four employees under this category.

Manufacturing: scientific instruments, printing, lumber and wood products, and apparel. For purpose of this report, mining was included under manufacturing. Reason: mining in the Study Area is restricted to a few sand and gravel pit establishments, and employment is meager.

Services: hotels, motels, personal (laundries and cleaners, barber and beauty shops), auto repair shops, motion picture theaters, amusement, educational services, and medical and legal services.

Construction: general building contractors and special trade contractors (plumbers and electricians).

Wholesale and Retail Trade: wholesale distributors of auto equipment, hardware stores, department stores, and groceries.

Finance, Insurance and Real Estate: banks, insurance agents, and real estate brokers.

Utilities: electric, gas, water, and telephone companies.

Other: self-employed, non-paid family workers, and domestics.

Agricultural Employment

The classification scheme used in this report was incorporated from a 1971 University of Arizona study,⁽¹¹⁾ with one major exception. The exception was the inclusion of the activity labeled "Unskilled", which activity includes migratory and seasonal workers who perform field or production line type work not requiring prior formalized training or experience.

Illustrative type job titles for each activity include the following:

Production: general farmhand, irrigator, farm owner-manager, and wheel tractor operator.

Unskilled: migratory and seasonal worker.

Ornamental Horticulture: nursery worker, groundskeeper, and landscape gardner.

Mechanics: farm equipment mechanic, farm supply equipment service man, and welder.

Supplies/Service: farm supply salesman, fertilizer and insecticide salesman, and farm service/supply manager.

Products: ginner, gin manager, agricultural processing foreman, and feed-mill operator.

Professional: veterinarian, vocational agriculture teacher, landscape architect, and crop research technician.

Resources: water master, animal keeper, and soil conservationist.

Labor Force

The Employment Security Commission of Arizona has released statistics on civilian employment and unemployment that are useful for comparative purposes. Table 4 contains selected April 1970 data, as follows:

TABLE 4
EMPLOYMENT - UNEMPLOYMENT TOTALS

<u>Unit</u>	<u>Population</u>	<u>Employed</u>	<u>Unemployed</u>	<u>Total</u>	<u>% of Population</u>
Arizona	1,772,482	660,200	20,400	680,000	38.4
Maricopa County	968,487	388,000	11,200	399,200	41.2

The Bureau of the Census defines the term labor force, accordingly: "All persons 14 years old and over who were employed, unemployed or in the Armed Forces during a specified week. Unemployed comprise those not working but looking for work or on layoff from a job." Within the context of this definition, the Study Area labor force breakdown appears to be:

Population	-	51,356
Employment	-	19,800
Unemployment	-	600
Labor Force Total	-	20,400
Labor Force % of Population	-	39.7

In fact, however, the statistics cited above do not constitute the actual resident labor force. To demonstrate: 1) some people who live inside the Study Area, work outside the area; and 2) conversely, some people who work inside the Study area, live outside the area. As mentioned earlier, detailed census data on economic indicators is required to make meaningful analyses.

In addition, it should be noted that the resident labor force in the area under review is not typical due to the presence of two unusual situations:

1) Luke Air Force Base: The number of assigned military personnel fluctuates in line with the stated mission of the Base.

2) Persons Sixty-Five and Over: The presence of retirement communities such as Sun City and Youngtown inflates this segment of the population.

The following table that is based on 1970 census data illustrates the latter age-range divergence:

TABLE 5
PERSONS SIXTY-FIVE AND OVER

<u>Unit</u>	<u>Persons 65 and Over</u>	<u>Percent</u>
Arizona	161,474	9.1
Maricopa County	90,373	9.3
Study Area	11,773	22.9

Employers

In the Study Area, it is estimated that there are approximately 200 employers for non-agricultural activities. They are sub-divided, accordingly: Wholesale and Retail Trade (60), Services (50), Government (27), Manufacturing (20), Finance (15), Utilities (14), and Construction (12). These statistics include the existence of multiple/branch locations for a given firm, but do not include an activity if the total number of employers was less than ten. For the statistically inclined it is interesting to note that "Wholesale and Retail Trade" employers outnumber "Manufacturing" employers by a 3 to 1 ratio, yet Table 3 shows that "Manufacturing" employment surpasses "Wholesale and Retail" employment by more than a 4 to 1 ratio.

Similar data is not available for employers engaged in agricultural activities; however, data is furnished on the number of farms and farm-related activities later in this chapter.

Economic Importance of Luke Air Force Base

The economic impact of Luke Air Force Base (LAFB) on the Study Area and the Phoenix urban area is evidenced by the following facts and figures which were obtained from a Base survey conducted during April 1970.⁽¹²⁾ As measured in economic terms, LAFB represents an overall investment approaching \$400,000,000. Monthly, there is a flow of several million dollars into the local communities. Further, it was estimated that annual expenditures by LAFB surpassed \$65,000,000, of which almost 90% was for its gross payroll. The LAFB working population comprises these segments:

Military	5,800
Civil Service	1,300
Contractor and Other Civilian	<u>1,200</u>
Total	8,300

Of the above total, approximately 25% (2,100) of the military personnel reside on base.

In the summer of 1971, LAFB began using both single and dual-engine aircraft for training purposes. The conversion resulted in a substantial increase of assigned military personnel.

The future size and function of this military installation can not be predicted. For purposes of this report, it is assumed that LAFB will maintain its summer 1971 size and function. It should be emphasized, however, special attention must be given to future urban land use pattern in the vicinity of LAFB. This is necessary because major alterations of flight patterns can not be made without seriously

jeopardizing safety of flight and endangering life and property. Or, to say it another way: a "good neighbor policy" is needed to ensure total compatibility.

Farms in the Study Area

The definition of a farm varies considerably for different reasons. For purposes of this report, however, we have adhered as closely as possible to the source notes on farms contained in the 1967 "County and City Data Book".⁽¹³⁾ Accordingly, a farm is defined herein to include all places of ten or more acres with estimated annual sales of agricultural products amounting to at least \$50; consequently, farms under ten acres in land area are not counted. Also, farms are considered as essentially operating units, not ownership tracts. If a landlord has croppers or other tenants, the land assigned each cropper or tenant is a separate farm even though the landlord may operate the entire holding as one farm in respect to supervision, equipment, rotation practices, purchase of supplies, or sale of products.

With the cooperation of the Phoenix Soil Conservation Service District Office, it has been possible to estimate the number and general size of farms in the Study Area. There are slightly over 300 farms classified by size as follows:

1) Average Size: 350 acres. This represents the total number of acres of irrigated cropland divided by the number of farms. By comparison, the average size farm in Maricopa County approximates 275 acres.

2) Median Size: 160 acres. This means that one-half of the farms are larger than 160 acres, and one-half of the farms are smaller than 160 acres.

It necessarily follows that comparisons to the County and State will place the subject matter into proper perspective. Table 6 was prepared from a number of sources and it was designed to accomplish this objective.

TABLE 6

NUMBER OF FARMS

	<u>Number</u>	<u>Percentage of</u>	
		<u>State</u>	<u>County</u>
Arizona	5,600	100.0	--
Maricopa County	1,800	32.1	100.0
Study Area	310	5.5	17.2

ACREAGE OF FARMS

	<u>Acreage</u>	<u>Percentage of</u>	
		<u>State</u>	<u>County</u>
Arizona	1,219,030	100.0	--
Maricopa County	462,710	37.9	100.0
Study Area	108,680	8.9	23.5

EMPLOYMENT OF FARMS

	<u>Employment</u>	<u>Percentage of</u>	
		<u>State</u>	<u>County</u>
Arizona	43,870	100.0	--
Maricopa County	16,020	36.5	100.0
Study Area	3,200	7.3	20.0

In summary, the Study Area from a County farm economics viewpoint accounts for the following: almost 1 farm in 5, almost 1 farm-acre in 4, and almost 1 farm-worker in 5.

Principal Crops

The Arizona Crop and Livestock Reporting Service publishes annually a booklet entitled "Arizona Agricultural Statistics".⁽¹⁴⁾ This publication is truly a storehouse of information on crops and livestock at both the State and County levels of government. In particular, there are statistics on acreages, yields, production, and value.

The 1971 publication contains a table on the principal crops grown in each county in Arizona that is of special interest. Ranked in order, on the basis of estimated acreage, are the ten principal crops grown in Maricopa County: cotton, alfalfa, barley, sorghum, wheat, vegetables, citrus, sugar beets, safflower, and "other". All of these crops are grown in the Study Area, but not necessarily at the same acreage ratios. Detailed small area data was unavailable because the confidentiality of the source information had to be safeguarded.

It is important to observe that diversity of production is both evident and essential. To illustrate: there are a number of influencing factors such as climate, water, soil, market, subsidy, and urbanization that enter into the final decision as to what may be grown. Yet, Maricopa County is still the most productive agricultural area in Arizona and it should continue as such through the period covered by this report. In fact, in 1970, Maricopa County outranked the next leading county (Yuma) in acres harvested by almost a 2 to 1 margin (462,710 acres to 246,995 acres). The trend in the Study Area is different as it is being "caught" by the rapidly expanding urban area. For this reason, it is mandatory to suggest a sensible and practical future urban land use pattern that will conserve and protect agricultural pursuits in the area under review.

Related Agricultural Activities

Related agricultural activities in the Study Area are of substantial significance. A discussion is as follows:

Dairies: There are approximately thirty dairies, which represent almost 20% of the total of 160 in the County. County-wide, the standard dairy is a well-designed dry-lot operation averaging around 310 cows. Based on this standard there are almost 10,000 cows in the Study Area.

Cattle Feed Lots: There are seventeen licensed feed lots in the Study Area, which constitute roughly 25% of the total of sixty-five in the County. These feed lots range in size from under 500 head to over 10,000 head, with seven being in the latter category. In 1970-71, according to records maintained by the Arizona Sanitary Livestock Board, both the capacity and maximum head fed at any one time approximated 30% of the County total or 102,000 of 330,000 head.

Hydroponics Establishment: Hydroponics is defined as the cultivation of plants in water containing dissolved inorganic nutrients, rather than in soil. The establishment in the area produces over 1,000,000 pounds of quality vegetables (tomatoes, cucumbers, etc.) annually in its greenhouses with a controlled environment.⁽¹⁵⁾ It is of interest to note several of the characteristics of this growing process as locally practiced:

- 1) Less than 10% of the water conventionally used is required.
- 2) A gravel base is used instead of soil.
- 3) The vegetables grown are protected from soil diseases, weed, drought, frost, hail, wind, and insects.
- 4) No raw organic fertilizers or sprays leaving a harmful residue are used.
- 5) Crop yields are four times higher, at a minimum.

6) Considerably less land is required, e.g. eight greenhouses per acre can produce the same amount of tomatoes that would required 4 to 8 acres of land.

7) It is a use that is permitted in the Rural-43 zoning district.

Hydroponics is a process that offers a partial solution to the encroachment of urbanization.

In addition, there are 9 cotton gins, 2 feed mills, 2 fertilizer plants, and 7 crop duster strips (to house and service 24 fixed-wing aircraft and 2 helicopters).

Cash Receipts for Agriculture

The Arizona Crop and Livestock Reporting Service has released preliminary 1970 data on cash receipts from farming and ranching in Arizona as contained in Table 7. The term "cash receipts" is defined, accordingly: It represents the gross proceeds from marketings of agricultural commodities during a calendar year.⁽¹³⁾

TABLE 7

CASH RECEIPTS FROM AGRICULTURE

<u>Commodity Group</u>	<u>1969</u>	<u>1970</u>
All Crops	292,606	284,745
Livestock and Products	369,398	378,292
Total, All Commodities	662,004	663,037
Governmental Payments	47,850	51,918
Total Cash Receipts	709,854	714,955

It is evident from the preceding table, that agriculture represents a major element of the State's economy. Lacking specific small-area data, we estimate that cash receipts from agriculture in the Study Area amount to roughly \$65,000,000, a sizeable portion of the total economy for the area under study.

In relation to this subject, it is of interest to note that the University of Arizona published in 1969 an informative report⁽¹⁶⁾ containing data on:

1) annual fixed costs for a representative general crop farm in Maricopa County that varies in size (160, 320, and 800 acres); and 2) per acre variable costs and returns for producing various crops such as alfalfa, barley, beets, cotton, sorghum, lettuce, and wheat on a representative general crop farm in Maricopa County.

CHAPTER III

EXISTING CONDITIONS

This chapter discusses briefly the geology, climate, topography, soils, water resources, and water quality within the Study Area. For detailed data on these various elements, reference should be made to Volume I of "A Report Upon West Central Maricopa County, Arizona" subtitled "A Study of Physical Environmental Factors as a Basis for Land Use Planning".

Environmental conditions in the area under review, although not particularly unique insofar as the whole Salt River Valley are concerned, are of such a critical nature that careful consideration must be given to these factors in formulating a future developmental pattern. A proper ecological balance of all of nature's components must be maintained in order that there will be the best conservation of human and natural resources that is possible.

Geology

The geology of the area forms the framework for the physical setting. The area under study is located within the desert region of the Basin and Range Province. Two mountain masses, the White Tank and Sierra Estrella, rise abruptly from the broad plains or dry stream valleys that lie between them.

Most of the two mountainous areas containing hard-rock outcrops are conserved as recreational and open space by virtue of their being a part of the Maricopa County Regional Park System. Some of the gentler topographic slopes on the east side of the White Tank Mountains, although unsuitable for agriculture,

could be adapted to other land uses. However, problems of drainage, water supply and wastewater disposal pose definite limitations.

Climate

Within the Study Area there are two U.S. Weather Bureau observation stations: one in Litchfield Park and the other in Youngtown. Since the Litchfield Park station is close to the geographical center of the area under review, and has complete records from 1918, this station is the source of the data contained in the following two sub-sections.

Precipitation

The climate is typical of the entire region and it is dry. Precipitation approximates slightly over eight inches in most years. Annual amounts have varied from a maximum of 18.12 inches recorded in 1941 to a minimum of 2.57 inches in 1950. The most consistent and reliable rains occur in the midsummer, and July is the only month of the year that has always had measurable rainfall. The largest amount of rainfall in one day totalled 2.71 inches in September, 1925. Unquestionably, the low annual rainfall constitutes a part of the whole water problem.

Temperature

The average yearly temperature is slightly under 70°. The summer climate is hot, and from June through August the average high temperature is over 100° and the average low temperature ranges from 65° to 75°. A record high of 119° was registered on July 11, 1958.

The winter climate is pleasant, and from November through March the average high temperature falls between 65°-75°, and the average low temperature ranges between 35°-40°. A record low of 16° was registered in January,

1950. It should be noted, however, that freezing temperatures normally do not occur after the end of February or before the last week in November. Readings of 20° or less occur on the average in only one winter out of five. It is readily apparent that the factor of temperature is very favorable for agricultural purposes.

Humidity

Relative humidity records are not compiled by the Litchfield Park station. Estimates are available, however, as a result of research work performed by the University of Arizona. Calculations were made for both 6 A.M. and 6 P.M. (MST), as follows:

<u>Time of Day</u>	<u>Monthly Humidity Range</u>	
	<u>Average Low (%)</u>	<u>Average High (%)</u>
Morning	June (36)	December (67)
Evening	May (9)	December (37)

Topography

Aside from the two previously named mountain ranges, the Study Area is predominantly a flat desert valley. At the northern boundary the elevation is about 1,250 feet, and at the confluence of the Agua Fria and Gila Rivers (the southern boundary) the elevation is 920 feet. This is a gradual fall of 330 feet, which is an average slope of 15 feet per mile. Only occasionally is the uniform and general land surface interrupted by the presence of "hills". NOTE: Topography shown on various plates in this report is adapted from U.S. Geological Survey data.

Soils

There are three major kinds of soils within the Study Area. All three kinds are suitable for agriculture, although there is a variation in the management and cultivation practices required for each kind. These are as follows:

A - Deep sandy loams and loamy soils: These soils are found on level to gently sloping valley plains and low terraces. Conventional soil management practices will maintain both fertility and structure.

B - Soils with limy clay loam subsoils: These soils are found on level to gently sloping fans and valley slopes. Careful soil management is required to avoid deterioration or to improve soil-water-air relationships for agricultural purposes.

C - Limy loamy soils and limy gravelly soils: These soils are found on level to gently sloping alluvial fans, valley plains, and stream terraces. Soil management practices are hard to apply and maintain on this type soils.

It should be emphasized that soils affect dramatically the use of septic tanks. Overall, it can be said that A soils are satisfactory for septic tanks; B soils may be troublesome, therefore, a careful study is required prior to the installation of a system; and, C soils generally require special construction.

Water Resources

The subjects discussed briefly herein include: 1) Drainage, 2) Flooding and Flood Control, 3) Water Use and Supplies, and 4) Water Quality.

Overall, the availability of water is the critical problem in the Study Area, as it is in the region. In time, it will be necessary for the residents of the region to demand and determine an all-inclusive water policy to utilize wisely the available water.

Drainage

The Study Area lies mostly within the southern portion of the Agua Fria River Watershed except for the southwest quarter that drains directly south into the Gila River. There are approximately 965 square miles in the drainage area south of Lake Pleasant. From the rolling hills to the north, the terrain slopes gently to the flat plains of the valley floor. The total area is drained by a system of washes that flow into the Gila and Agua Fria River channels.

Flooding and Flood Control

Flooding has occurred in the Study Area despite the completion of the nine-mile long Trilby Wash Detention Basin, two small detention basins, the McMicken Dam, and its outlet channel. Flooding stems from two principal sources: 1) natural phenomena (high intensity storms), and 2) urban development (disruption of the natural drainage system).

The Maricopa County Flood Control District is administratively responsible for flood control recommendations, and it has an adopted "Comprehensive Flood Control Program Report". In addition, in cooperation with the United States Corps of Engineers, channelization studies have been prepared on the Agua Fria, Gila and Salt Rivers. To date, however, the recommendations have not been implemented in the Study Area as a result of a lack of agreement on what to do, or a lack of local funds.

Water Use and Supplies

Table 8, "Summary of Water Uses and Supplies", contains statistics on both present uses and sources of water in the Study Area (this table was extracted from Volume I).

Table 8 indicates that slightly over 555,000 acre-feet of water are used annually while total yearly input is slightly over 325,000 acre-feet, a deficiency of approximately 230,000 acre-feet of water. The "missing water" is

TABLE 8
SUMMARY OF WATER USES AND SUPPLIES

	<u>Ac-Ft. Per Year</u>
PRESENT USES	
Urban (50,000 people at 200 gpcd)*	11,200
Agricultural (109,000 irrigated acres at 5.0 acre-feet	545,000
Total Annual Use	556,200
*gpcd - gallons per capita per day	
PRESENT INPUT SOURCES	
Agua Fria River base supply diversions from Lake Pleasant	20,000
Pumpage equalling White Tank Mountain rainfall recharge	4,000
Pumpage equalling rainfall recharge in drainage area below Lake Pleasant	4,000
Roosevelt Irrigation District import pumpage used in southern portions of Study Area	58,000
Buckeye Water Conservation and Drainage District surface import used in southern portion of Study Area	1,900
Salt River Project surface import used in south- eastern portion of the Study Area	75,000
Pumpage of recharge from farm headgate irrigation water	109,000
Pumpage of recharge equalling conveyance losses less evaporation	55,000
Total Annual Input	326,900

obtained by "mining" groundwater reserves. As based on 1964 data, it is estimated that the upper aquifer in the Study Area contained about 10,000,000 acre-feet of water. Yet, if the present rate of depletion were to remain constant, this invaluable groundwater source would be dry by the year 2010.

More specifically, as a result of economic limitations, most water wells are drilled to a depth of less than 1,000 feet, although on occasion wells have been drilled to a depth of 2,500 feet without encountering bedrock. In the area under study, it is now estimated that the depth to basement rock may be as much as 11,000 feet, but the subject requires additional research.

Depth to groundwater, and the effects of "mining" the aquifer, vary considerably in the Study Area. To illustrate, as based on 1965-1970 U.S. Geological Survey data for twenty-six index wells, the water level dropped almost nine feet per year in the north-central portion while rising almost fourteen per year in the southeast portion. Different theories have been advanced to explain these variances.

Table 8 shows clearly that the overwhelming useage of water is for agricultural purposes. In fact, only slightly more than 2% of the total used is for urban purposes. Calculations indicate that a total population of approximately 775,000 persons would be required in the Study Area to balance urban and agricultural uses of water if overall water usage rate were to remain constant for agricultural purposes.

Water Quality

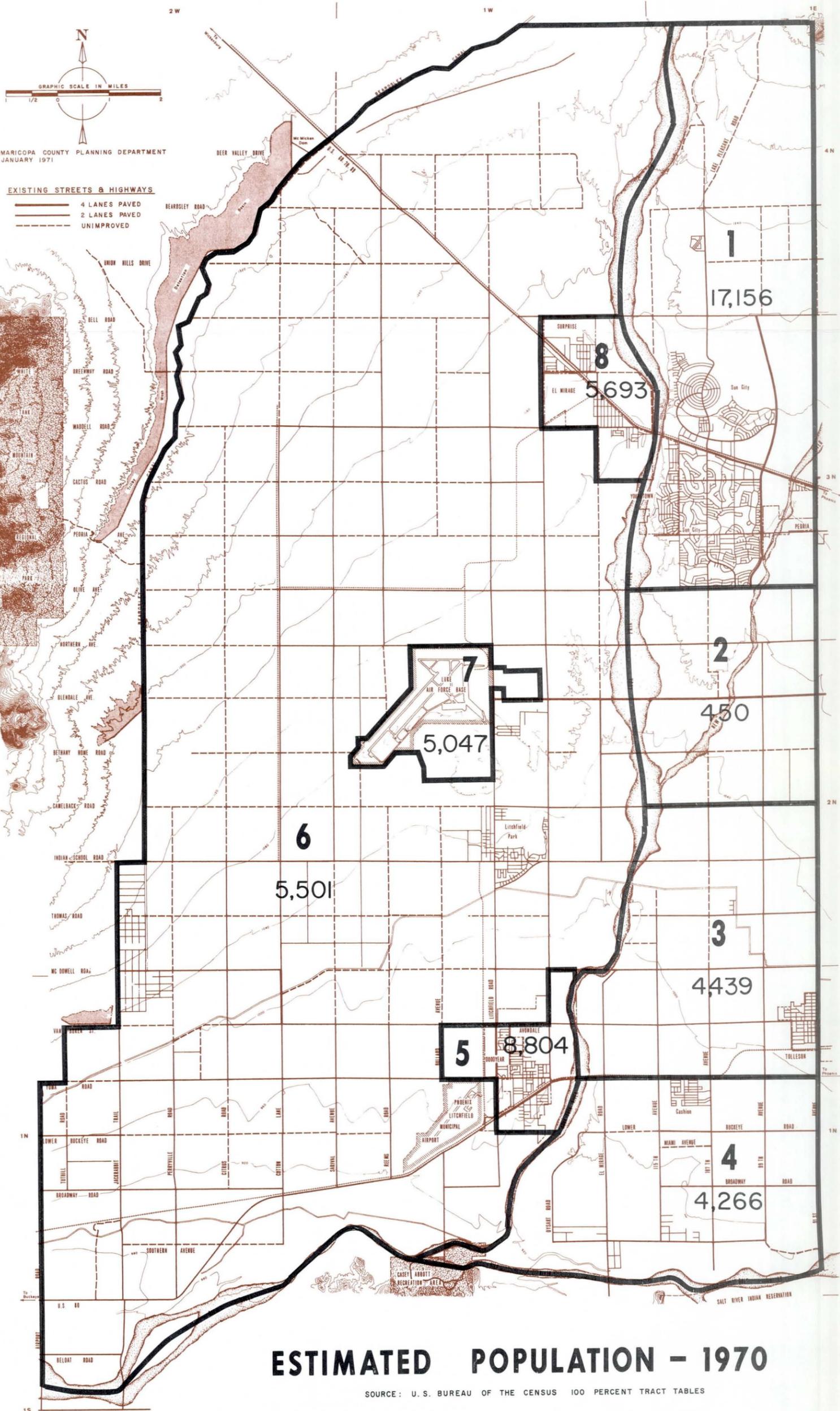
In the Study Area, there has been a deterioration of both surface and sub-surface water quality. For purposes of analyzing water quality, it is necessary to consider the following three basic factors: 1) soluble salt content, 2) hardness, and 3) fluorides.

The Maricopa County Health Department conducts the review process for the approval of proposed water supplies, and sets the upper limits of chemicals in drinking water. Under certain circumstances, water that is not suitable for human consumption (unless treated) may be satisfactory for agricultural purposes.

Overall, in the area only the top northern portion does not have a limiting factor. The remainder of the area generally contains one or more limiting factors. To illustrate: near the White Tank Mountains the water has a high fluoride content while near Luke Air Force Base the water has a high salt content. In particular, water from the Agua Fria River has a high salt content for human use; however, it is satisfactory for irrigation use, and it is used in that manner.

In summary, even though these limiting factors exist water can be treated to satisfactory quality. Of course, the consumer pays more.

WEST CENTRAL MARICOPA COUNTY, ARIZONA



CHAPTER IV

POPULATION AND HOUSING

This chapter discusses the amount, distribution, and density of existing population and housing. This provides a base for determining the kind, general location, character, and extent of public facilities and services that will be needed to meet future as well as present needs. While Arizona had the third highest percentage growth rate of the fifty states, between 1960 and 1970, Maricopa County was fifth highest among the nation's forty most populated metropolitan areas. ⁽¹⁷⁾

Existing Population

The Study Area includes ten complete and nine partial 1970 census tracts. The following data is considered valid, although the boundaries of these census tracts and the Study Area are not coterminous. The 1970 census information for the complete tracts was used as presented, while the land use survey was used to estimate the population and housing count within the partial tracts. For comparative purposes, the Study Area is divided into eight "Unit Areas." These Unit Areas are either a single or a combination of 1970 census tracts.

The estimated 1970 population of 51,356 persons is shown on Plate 3 by Unit Area. This represents 5.3% of the county population of 968,487.

Table 9 shows the growth of the communities within the area from 1960 to 1970. ⁽¹⁸⁾ The communities of Cashion, Litchfield Park, and Sun City account for 35% of the 1970 population.

TABLE 9
POPULATION TRENDS BY COMMUNITY
1960-1970

<u>Community</u>	<u>1960</u>	<u>1970</u>	<u>% Change</u>
Avondale	6,151	6,626	7.72
El Mirage	1,723	3,258	89.09
Goodyear	1,654	2,140	29.38
Peoria ⁽¹⁾	--	500	--
Surprise	1,574	2,427	54.19
Tolleson	3,886	3,800 ⁽²⁾	-0.13
Youngtown	1,559	1,886	20.97
TOTAL INCORPORATED	16,547	20,637	24.72
Cashion		2,705	
Litchfield Park		1,664	
Luke A.F. B. ⁽³⁾		5,047	
Sun City		13,670	
Remainder of Area		7,633	
TOTAL UNINCORPORATED		30,719	
TOTAL STUDY AREA		51,356	

(1) Includes only those persons within the Study Area.

(2) Excludes eighty-one persons outside the Study Area.

(3) No 1960 population total was available for Luke Air Force Base.

In Maricopa County only 9.33% of the population is sixty-five years of age or older, while it is 22.92% within the Study Area. Unit Area 1 has 60.02% of its population in this category because of the retirement communities of Sun City and Youngtown. Table 10 shows the percentages of age groups by Unit Area.

Population Density

Population density determines the extent of physical facilities needed such as utilities, streets and highways, schools and parks, and other public facilities. The majority of the area, as shown on Plate 4, has a density of less than one-half person per acre. This is due to the character of the area which is agricultural. The communities of Surprise, El Mirage, Tolleson, Avondale, Goodyear, and Cashion are heavily populated areas with ten or more persons per acre. The remainder of the area has a density of one-half person to ten persons per acre. With the exception of Sun City and Youngtown, these people are in widely scattered clusters. Obviously, there is no established pattern of development.

Generally, it is difficult to provide a satisfactory level of public facilities and governmental services where densities average less than ten persons per acre. An exception to this standard would be planned communities in which the developer would provide the necessities until such time as the community incorporates.

Family Distribution

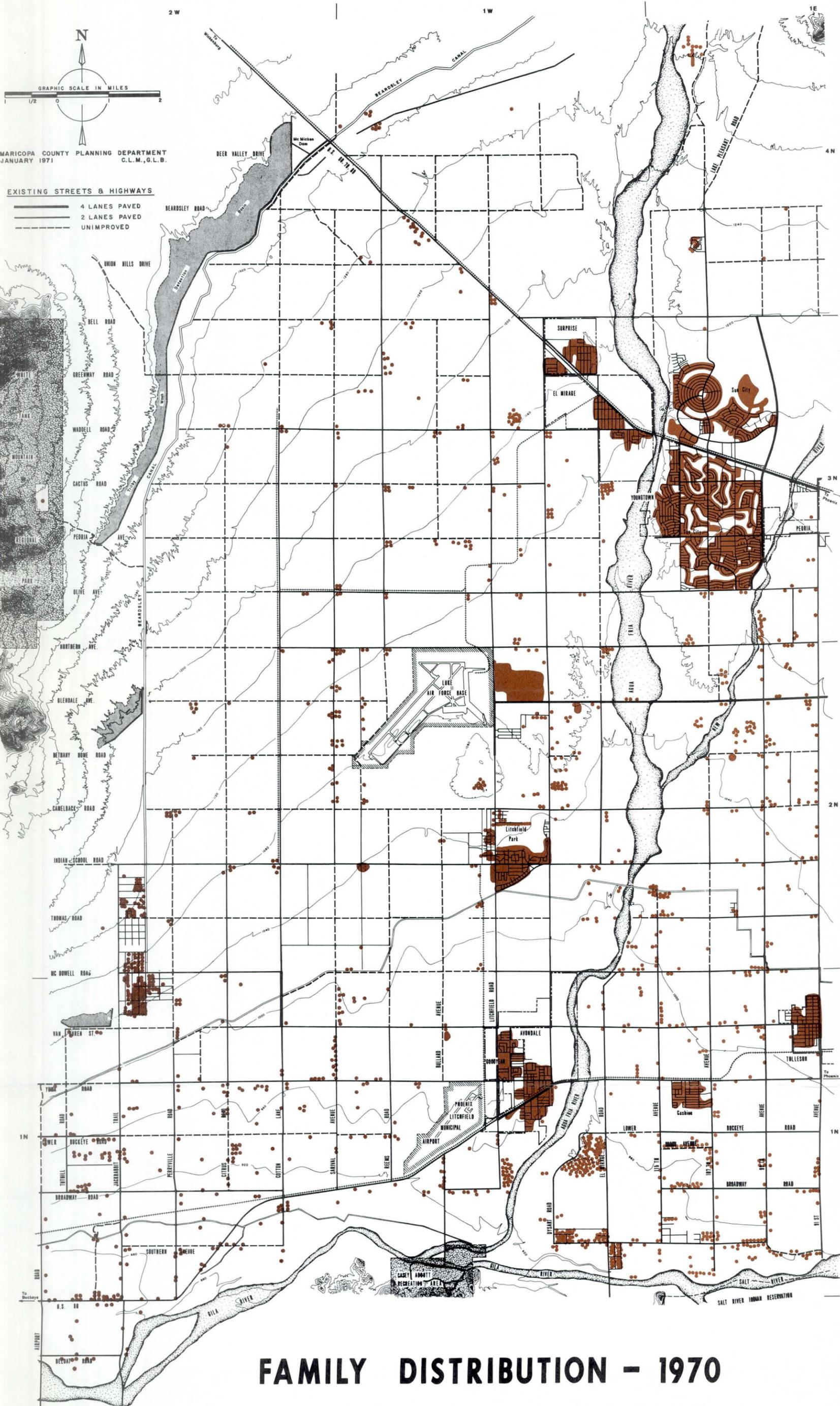
The distribution of the 14,000 families in the area is shown on Plate 5. The highest concentrations appear as a solid mass, while a dot for each family is shown in the less dense areas. Seventy-five percent of the people live within the solid areas. The solid areas include the previously-mentioned six incorporated cities and towns and three unincorporated communities listed on Table 9. In addition, major concentrations are found near Luke Air Force Base, in the vicinity of Jackrabbit Trail between Indian School Road and Van Buren Street, and close to the intersections of El Mirage Road with both Lower Buckeye Road and Southern Avenue.

TABLE 10

POPULATION BY AGE GROUPS

<u>Unit Area</u>	<u>Total Population</u>	<u>0-19 Years</u>	<u>%</u>	<u>20-64 Years</u>	<u>%</u>	<u>65- Years and Over</u>	<u>%</u>
1	17,156	688	4.01	6,171	35.97	10,297	60.02
2	450	183	40.67	248	55.11	19	4.22
3	4,439	2,174	48.97	2,020	45.51	245	5.52
4	4,266	2,220	52.04	1,876	43.98	170	3.98
5	8,804	4,096	46.52	4,255	48.33	453	5.15
6	5,501	2,417	43.94	2,784	50.61	300	5.45
7	5,047	2,041	40.44	2,973	58.91	33	0.65
8	5,693	3,147	55.28	2,290	40.22	256	4.50
Study Area	51,356	16,966	33.04	22,617	44.04	11,773	22.92
Maricopa County	968,487	378,562	39.09	499,552	51.58	90,373	9.33

WEST CENTRAL MARICOPA COUNTY, ARIZONA



MARICOPA COUNTY PLANNING DEPARTMENT
JANUARY 1971
C.L.M., G.L.B.

EXISTING STREETS & HIGHWAYS

- 4 LANES PAVED
- - - - 2 LANES PAVED
- UNIMPROVED

FAMILY DISTRIBUTION - 1970

EACH DOT REPRESENTS ONE FAMILY

TABLE 11

OCCUPANCY OF HOUSING UNITS

<u>Unit Area</u>	<u>All Housing Units</u>	<u>Vacant Seasonal</u>	<u>All Year-Round Housing Units</u>	<u>Owner Occupied</u>	<u>Renter Occupied</u>	<u>Vacant Year-Round</u>
1	9,909	511	9,398	8,455	560	383
2	145	2	143	59	78	6
3	1,146	1	1,145	606	483	56
4	1,073	4	1,069	783	235	51
5	2,579	17	2,562	1,167	1,277	118
6	1,713	97	1,616	854	621	141
7	805	---	805	19	781	5
8	1,350	3	1,347	711	579	57
TOTAL	18,720	635	18,085	12,654	4,614	817

Existing Housing

Based on the 1970 census there are an estimated 18,720 housing units within the Study Area.⁽¹⁹⁾ A housing unit is a house, an apartment, a group of rooms, or a single room occupied or intended for occupancy as separate living quarters. Separate living quarters are those in which the occupants do not live and eat with any other person in the structure, and which quarters have either: 1) direct access from the outside of the building or through a common hall or 2) complete kitchen facilities for the exclusive use of the occupants.

Occupancy and Type

Table 11 shows that 67.6% of all housing units are owner occupied, 24.6% renter occupied, 4.4% vacant year-round, and 3.4% vacant on a seasonal or migratory basis.

The largest percentage, of 12,688 units reported for communities over 2,500 persons, is single-family detached dwellings, which amounts to 83.90%. Next are buildings with two or more housing units, or 14.25% of the housing units. Mobile homes account for only 1.85% of the total.

Selected Housing Characteristics

Table 12 depicts certain characteristics of the housing units within the area.⁽²⁰⁾ A description of some of the characteristics is as follows:

1) Plumbing Facilities: Having hot and cold piped water, a flush toilet, and a bathtub or shower inside the structure for the exclusive use of the occupants of the unit.

2) Kitchen Facilities: Having an installed sink with piped water, a range or cookstove, and a mechanical refrigerator inside the structure for the exclusive use of the occupants of the unit.

TABLE 12

SELECTED HOUSING CHARACTERISTICS

Unit Area	All Year-Round Housing Units	Persons Per Housing Units	% Lacking Plumbing	% Lacking Kitchen Facilities	% More than One Person Per Room	% Valued Less Than \$15,000	% Rented For Less Than \$100
1	9,398	1.83	1.44	1.10	1.09	17.34	18.00
2	143	3.15	2.80	0.70	17.05	39.28	43.08
3	1,145	3.88	8.12	2.97	32.17	87.09	77.50
4	1,069	3.99	12.54	6.00	32.45	82.39	71.43
5	2,562	3.44	8.98	4.06	22.64	73.84	60.35
6	1,616	3.40	8.79	2.97	18.40	18.98	46.48
7	805	6.27	0.75	1.24	20.13	100.00	6.91
8	1,347	4.23	24.42	8.98	41.40	92.11	91.17
Average of Study Area	--	2.74	5.80	2.60	13.59	35.41	49.56
Maricopa County Average	--	3.05	2.55	1.38	10.92	36.35	43.81

3) Value: The homeowner's estimate of how much the property (house and lot) would sell for if it were for sale. Data limited to owner-occupied one-family houses on less than ten acres, without a commercial establishment or medical office on the property. Owner-occupied cooperatives, condominiums, mobile homes, and trailers are excluded.

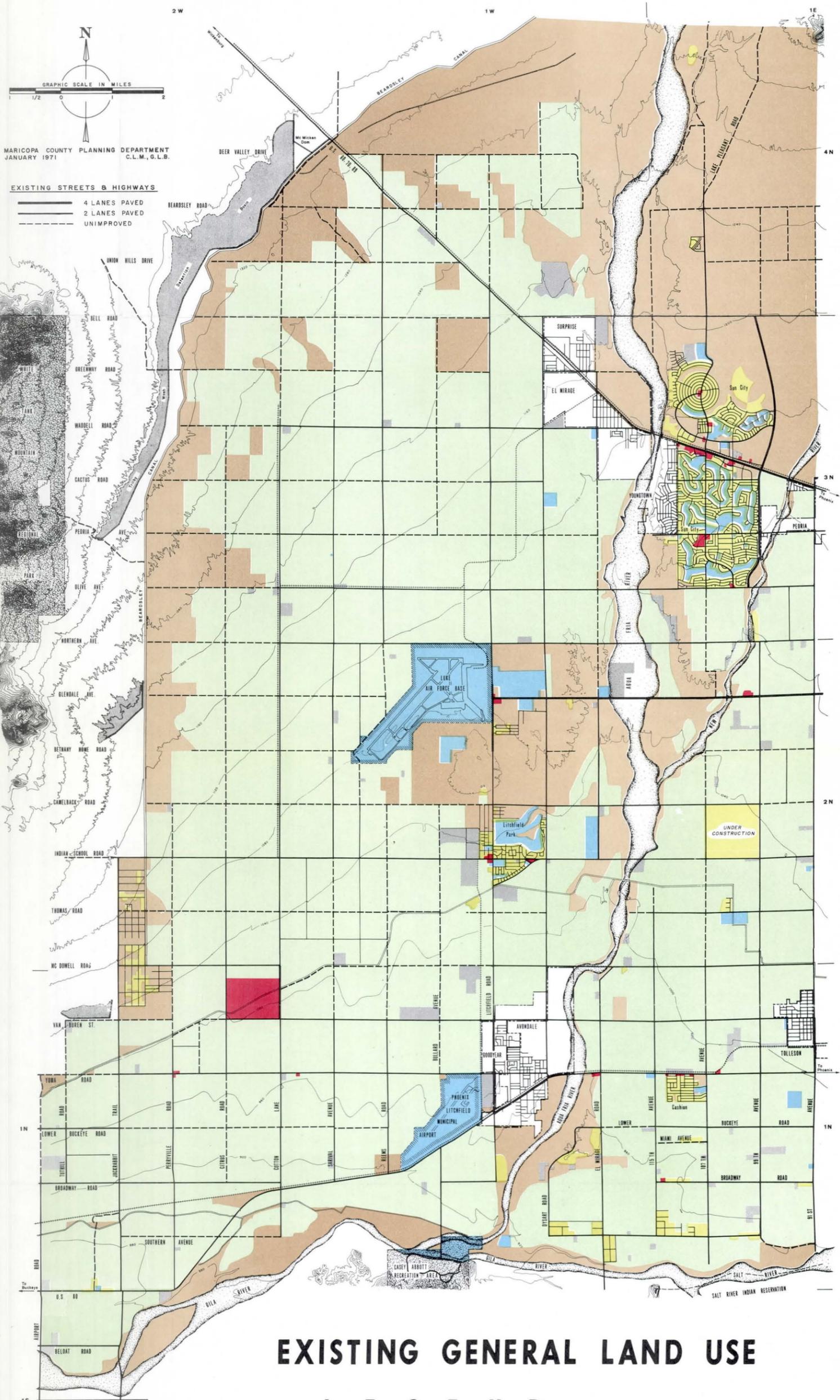
4) Rent: Amount agreed to or contracted for even if the furnishings, utilities, or services are included. Does not include one-family houses on ten acres or more.

It is significant that over 50% of the housing units are within Unit Area 1. The percentages in this area are lower than the County average while the adjacent Unit Area 8 generally has the highest percentages. Unit Area 7, which encompasses Luke Air Force Base, has the highest number of persons per housing unit because group quarters were not counted as housing units.

Lot Area Per Family

Lot sizes, within subdivisions or communities, of single-family homes range in size from 6,000 square feet to more than one acre in size. The larger lots occur within the agricultural area. Lots smaller than 6,000 square feet per family are found predominantly in Sun City where yards are held in common ownership in many instances.

WEST CENTRAL MARICOPA COUNTY, ARIZONA



EXISTING GENERAL LAND USE

LEGEND

- RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL
- AGRICULTURAL
- PUBLIC & SEMI-PUBLIC
- VACANT OR DESERT
- CITY OR TOWN

CHAPTER V
LAND USE AND ZONING

This chapter discusses present land use patterns, the amount of land used for various urban purposes and the relationship of zoning districts to present land use, the amount of irrigated lands, and the amount of publicly owned lands.

Existing Land Use Patterns and Characteristics

Plate 6, "Existing General Land Use Pattern", illustrates the general arrangement of land use, as of early 1971, within the Study Area. The topography, the major street system, the location of the irrigation canals, and the location of the airports have had major effects on the present land use patterns. The major locations and characteristics of present land use patterns are as follows:

- 1) Urban development is concentrated primarily along the two state highways within the Study Area. U. S. Highway 60-70-89 (Grand Avenue) passes diagonally through the northern portion of the area including a part of the City of Peoria, the unincorporated community of Sun City, and the Towns of Youngtown, El Mirage, and Surprise. This corridor is approximately 6.5 miles long, and varies from roadside development to 4 miles wide through Sun City. U. S. Highway 80, crossing the southern portion of the area, passes through the City of Avondale and the Town of Goodyear.
- 2) Other residential development is scattered except in the Litchfield Park and Tolleson-Cashion areas.

TABLE 13
EXISTING LAND USE

<u>Existing Land Use</u>	<u>Acres</u>	<u>Percent of Study Area</u>	<u>Acres Per 100 Persons⁽⁴⁾ Ratio</u>	<u>Various Cities Acres Per 100 Persons⁽⁵⁾ Ratio</u>
Residential	4,300	2.5	14.00	6.70
Commercial	180	.1	0.59	0.60
Industrial	2,400	1.4	7.81	0.77
Agricultural	108,680	61.6		
Public and Semi-Public ⁽¹⁾	4,650	2.6	15.14	4.95
Vacant or Desert ⁽²⁾	56,110	31.8		
TOTAL ⁽³⁾	176,320	100.0	37.54	13.02

(1) Public rights-of-way and canals are included in areas in which they are located.

(2) Includes flood plains.

(3) Does not include 5,440 acres within the incorporated cities and towns.

(4) Based on population of 30,719 persons excluding population in cities and towns.

(5) Based on a 1966 study of nine cities and towns within the County.

3) Agriculture is the largest single land use and contains approximately 108,680 acres or 60% of the Study Area. Residences are scattered throughout this area (See Plate 5 for family distribution data).

4) Presently 56,110 acres are undeveloped (vacant or desert). This includes land within the flood plains.

Table 13 illustrates the acreage and percentage of each land use shown on Plate 6. For comparative purposes, data is included on acres per one hundred persons ratio in the Study Area, and for various communities in the County, it is interesting to note that several of the land use ratios such as residential, industrial, and public and semi-public are unusually high. This can be accounted for, accordingly: 1) see footnote (1) to Table 13, 2) presence of farm-related industries that require large tracts of land, and 3) the two existing airports.

A discussion of the land use patterns shown on Plate 6 is as follows:

Residential uses are primarily single-family. In Sun City there are approximately 3,300 multi-family units, evenly divided between duplexes and multi-family apartment units. Also, there are some multi-family units in Litchfield Park.

Commercial uses include retail trade establishments such as restaurants, grocery stores, and gas stations; and, in addition, service-oriented establishments such as repair shops, barber and beauty shops, and business and professional offices.

Industry is, for the most part, farm related. This category includes 30 dairies, 17 cattle feed pens, 9 cotton gins, 2 feed mills, and 2 fertilizer plants. Other uses are farm equipment storage, gravel pits, and some light industry.

Public uses include schools, public parks, sewage treatment plants, the airport, and the air force base. Semi-public uses include golf courses, cemeteries, a game club, a gun club, and a race track.

Agriculture, which is 60% of the Study Area, is predominantly crop land with some citrus orchards and vineyards. Extensive agricultural areas continue on to the southeast and southwest.

The remaining 30% of the area is neither presently developed nor suitable for development. Together vacant land and agricultural land account for over 90% of the Study Area.

Building Trends

Although the oldest community in the Study Area, Tolleson, was incorporated in 1929, most of the development has taken place within the last fifteen years. Of the 4,000 building permits issued for residential purposes in the unincorporated areas, between calendar years 1965 and 1969, approximately 3,500 were within Sun City. Sixty-eight of the 110 residential subdivision plats recorded, between calendar years 1959 and 1969, were also within Sun City. Most of the commercial development has occurred within the cities and towns, and the communities of Sun City and Litchfield Park.

Zoning

The unincorporated portion of the Study Area is subject to the regulations of the County Zoning Ordinance. This ordinance, how it applies to the area under review and how it compares to actual uses of land, is discussed in this section. Zoning in relation to the suggested future land use pattern is discussed separately in Chapter X.

This planning report does not propose specific changes in existing zoning districting. However, zoning districting should be gradually adjusted to conform with the proposed land use pattern as a means of implementing same.

The present amended county zoning ordinance has been in effect since May 29, 1969. Under the ordinance there are nineteen zoning districts, of which fifteen occur within the Study Area.

The ordinance contains: 9 residential zoning districts, 4 commercial zoning districts, 3 industrial zoning districts, and 3 rural zoning districts. It is not within the scope of this report to describe all the uses permitted within each district; therefore, the reader is referred to the zoning ordinance for such uses.⁽²¹⁾

Table 14 compares the area of existing zoning districts with the amount of land presently used for urban purposes. This table reveals that the amount of land zoned for various purposes is far greater than the amount of land actually used for various purposes. This is a quantitative comparison only as residential uses are permitted in commercial zoning districts. Table 14 is discussed further as follows:

Rural

Of the 181,760 acres within the Study Area, 95% or 172,070 acres are zoned Rural-43 or one home per acre. Prior to May 29, 1969, Rural Zoning permitted 7,000 square feet minimum lot sizes or about five homes per acre. The amended zoning ordinance changed the density requirements necessary to preserve the agricultural land from residential encroachment. The majority of this district is either farmland or vacant. There are 1,330 acres of this land on which a "Special Use" for a variety of uses, other than single-family or farming, is permitted.

Residential

The single-family residential zoning districts encompass 4,814 acres of land. The amount of the land used for residential purposes, within these districts, accounts for 2,031 acres. There are 864 acres used for other than single-family residences.

TABLE 14

EXISTING URBAN ZONING DISTRICTS AND LAND USED⁽¹⁾

Urban Zoning District	Acres Zoned	Acres Developed		Total Acres	
		Primary Permitted Use	Other Uses ⁽²⁾	Developed	Undeveloped
R1-18	592	30	356	386	206
R1-10	114	90	--	90	24
R1-8	79	60	--	60	19
R1-6	4,029	1,851	508	2,359	1,670
Total Single-Family	4,814	2,031	864	2,895	1,919
R-3	1,231	463	10	473	758
R-4	536	170	125	295	241
R-5	863	95	2	97	766
Total Multi-Family	2,630	728	137	865	1,765
CS	21	--	--	--	21
C-1	29	--	2	2	27
C-2	665	55	86	141	524
C-3	843	20	95	115	728
Total Commercial	1,558	75	183	258	1,300
I-1	18	--	--	--	18
I-2	428	2	--	2	426
I-3	242	86	2	88	154
Total Industrial	688	88	2	90	598
GRANDTOTAL	9,690	2,922	1,186	4,108	5,582

(1) Includes public rights-of-way and canals which are located within Zoning Districts.

(2) Does not include land used for farming.

Zoning districts permitting multi-family uses amount to 2,630 acres of which 728 acres are used for this purpose. An additional 137 acres are used for other purposes.

Commercial

Commercial zoning districts comprise 1,558 acres as compared with seventy-five acres used for commerce. Generally, the large difference is accounted for by the C-3 strip zoning along U. S. Highway 60-70-89, U.S. Highway 80, and Van Buren Street. Strip zoning was imposed under the first county zoning ordinance. Subsequently it has been generally recognized that strip zoning is undesirable since the demand for commercial zoning is far less than the supply under such circumstances. Also, strip commercial development retards movement of through traffic. There are 183 acres used for other than commerce.

Industrial

Industrial zoning districts include some 688 acres as compared with eighty-eight acres used for industry. These districts are located primarily along major roads or railroad lines.

Conclusions

There should be a close relationship between the amount of land zoned for various purposes and the amount of land needed to meet future as well as present population needs. Present county zoning districts were established without benefit of land use studies such as contained herein. Aside from quantitative disparities, there are problems of distribution of districts. The present study recognizes these problems but the solution will depend upon the extent to which the suggested future land use pattern is adhered to and the extent to which zoning districts can be gradually adjusted to conform with this pattern.

Luke Air Force Base Zoning

Luke Air Force Base was established in 1941 to train combat pilots. The base is located almost in the exact center of the Study Area; therefore, it has important effects on both areawide land and air use.

Base Operations

The prime mission of Luke Air Force Base is to train combat pilots, and several hundred are trained each year. For 1971, it is estimated that movements totalled about 63,000. Additionally, low approaches are made at Luke Auxiliary Field No. 1, just outside the northwest corner of the area under review.

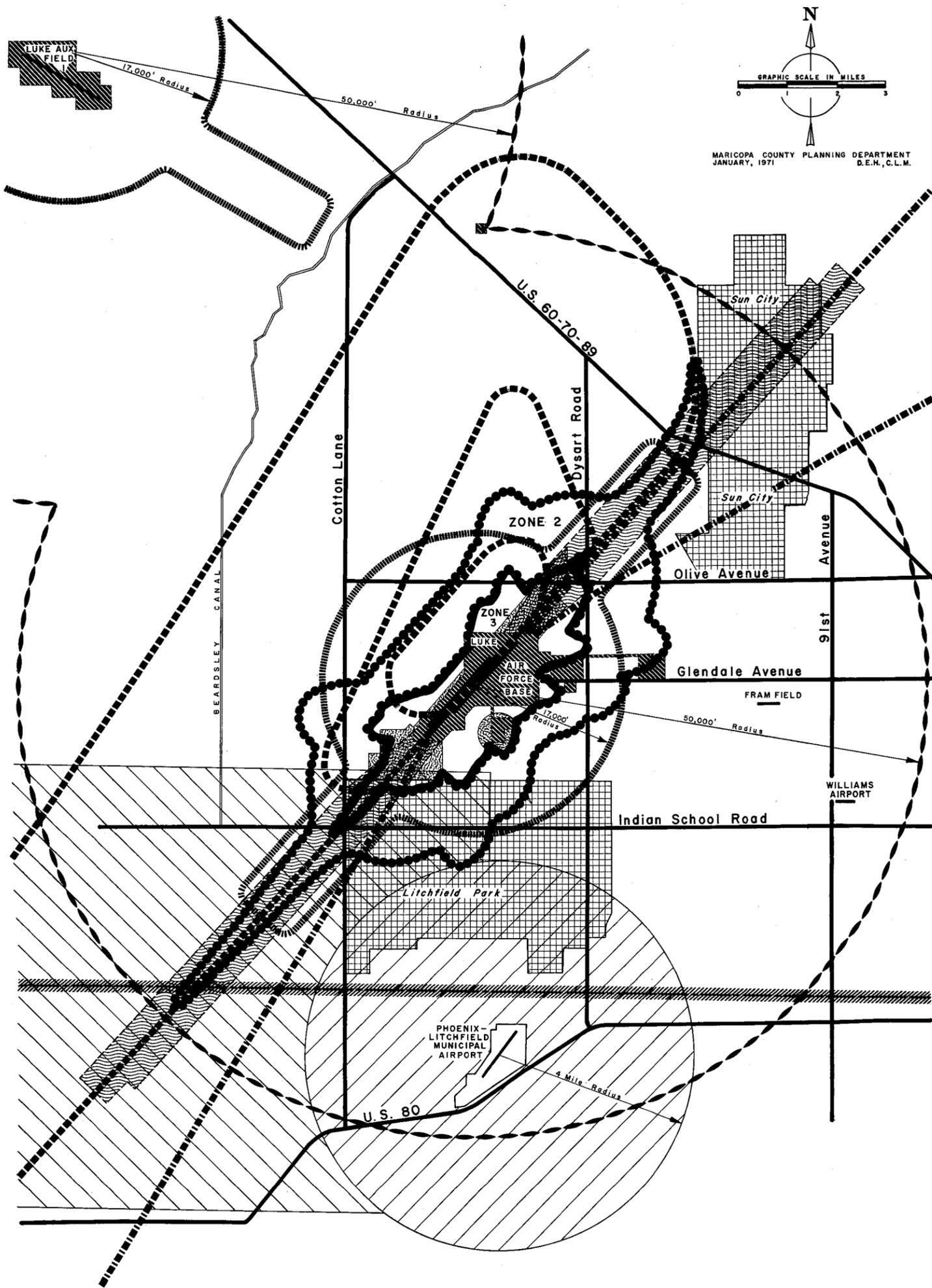
According to Luke officials, flight patterns in the Study Area have been progressively restricted because of noise complains from Sun City, Litchfield Park, and other areas to the point where they can be restricted no further without impairing the safety of the training operations, as well as the safety of the persons residing in the area. Yet, military aircraft continue to utilize the bulk of the airspace within the area under study. Current training operations are conducted by both single and dual-engine aircraft. See Plate No. 7 for locations of the most common flight patterns, and locations of the noise and airport regulation zones.

Noise Zones

Plate 7 shows the "noise zones" around Luke Air Force Base as of January 1, 1970, which data is still current.

The boundaries of the noise zones are based upon the characteristics of the engines of the aircraft which fly from the base (type, number, and size), the number of operations (landings, takeoffs, and runups), and the time (day or night). The zones are described in terms of the possible reactions of people who live in the zones, according to Air Force information. (22)

WEST CENTRAL MARICOPA COUNTY, ARIZONA



LUKE AIR FORCE BASE - LAND & AIRSPACE USES

SOURCE: RESPECTIVE PUBLIC & PRIVATE ORGANIZATIONS

L E G E N D

- | | |
|---|--|
| <ul style="list-style-type: none"> LAND OWNED U.S. AIR FORCE AIR SPACE EASEMENT OWNED PLANNED COMMUNITY PHOENIX - LITCHFIELD AIRPORT TRAFFIC AREA AIRCRAFT OPERATION RESTRICTION FROM 2,000' TO 5,500' MEAN SEA LEVEL F.A.A. VICTOR AIRWAY 16 CENTER LINE | <p>TRAFFIC PATTERN</p> <ul style="list-style-type: none"> VISUAL INSTRUMENT RUNWAY CLEAR ZONE <p>AIR NOISE INTENSITY ZONES (JAN. 1970)</p> <ul style="list-style-type: none"> ZONE 2 ZONE 3 <p>COUNTY AIRPORT ZONES</p> <ul style="list-style-type: none"> HEIGHT RESTRICTION RADIO SIGNAL & ILLUMINATION RESTRICTION |
|---|--|

Zone 3 is the zone closest to the runways, and accounts for 6,157 acres of land. In it, "Individual reactions would likely include repeated, vigorous complaints. Concerted group action might be expected."

Zone 2 is next, outside of Zone 3, and accounts for 22,752 acres of land. In it, "Individuals may complain, perhaps vigorously. Concerted group action is possible."

Zone 1 is outside of Zone 2, and has no outer limit. In it, "Essentially no complaints would be expected. The noise may, however, interfere occasionally with certain activities of the residents."

Government Regulations

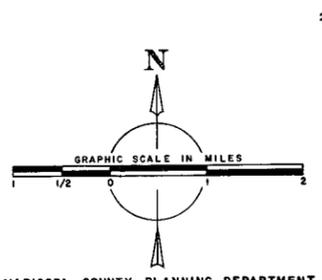
The Federal Aviation Administration restricts the use of air space between 2,000 and 5,500 feet (above mean sea level) in a large zone southwest of Luke Air Force Base because of heavy military jet traffic between the base and the bombing range. The zone is nine miles wide, centered on Victor Airway 16 (west from Sky Harbor Airport) between the Phoenix-Litchfield Airport traffic area and a north-south line six miles west of the Town of Buckeye (see Plate 7). Also, there are FAA regulations prohibiting tall structures from extending into runway clear zones at both ends of the base runway.

In 1957, the Maricopa County Board of Supervisors acted to protect all active military bases in the County by limiting the heights of structures and dangerous lights and radio signals in the vicinities of the bases.

Public Lands

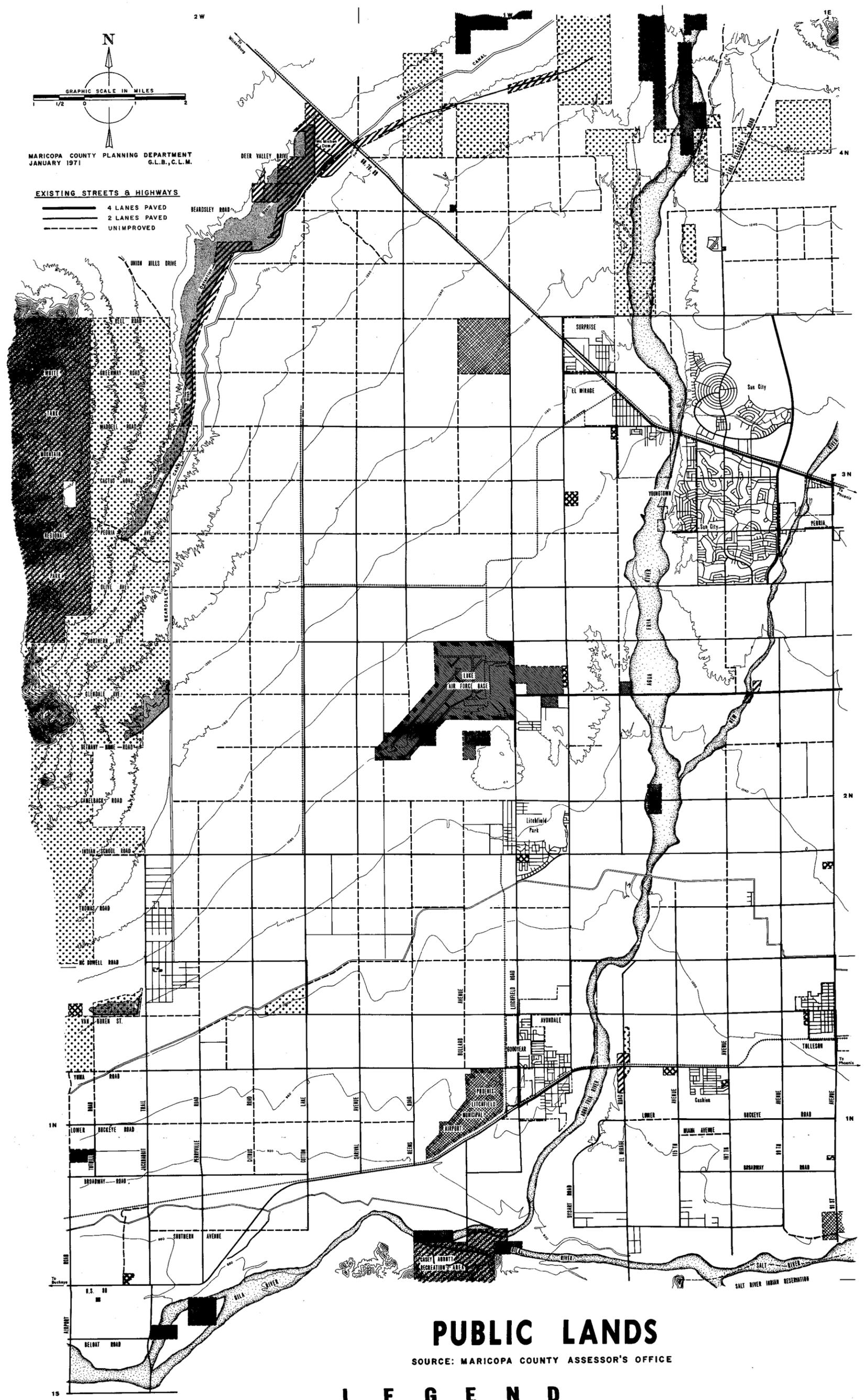
Public lands within the Study Area amount to 11,975 acres. These lands are shown on Plate 8, and the acreage by public agency is listed in Table 15.

WEST CENTRAL MARICOPA COUNTY, ARIZONA



EXISTING STREETS & HIGHWAYS

- 4 LANES PAVED
- 2 LANES PAVED
- UNIMPROVED



PUBLIC LANDS

SOURCE: MARICOPA COUNTY ASSESSOR'S OFFICE

LEGEND

- | | |
|------------------|------------------|
| UNITED STATES | SCHOOL DISTRICTS |
| STATE OF ARIZONA | CITY OF PHOENIX |
| MARICOPA COUNTY | |

TABLE 15

AMOUNT OF LAND UNDER PUBLIC OWNERSHIP

<u>Agency</u>	<u>Acreage</u>	<u>Percent</u>
United States	4,180	34.9
State of Arizona	5,500	46.0
Maricopa County	580	4.8
School Districts	190	1.6
City of Phoenix	<u>1,525</u>	<u>12.7</u>
Total Public Lands	11,975	100.0

United States Lands: Luke Air Force Base accounts for 2,510 acres of the federal lands.

State of Arizona: The majority of these lands lie north of Grand Avenue. There are an additional 12,570 acres of State land shown on Plate 8 laying west of the Study Area and adjacent to the White Tank Mountain Regional Park.

Maricopa County Lands: These lands occupy 580 acres. Plate 8 also shows 6,530 acres of County land which are adjacent to the Study Area. These include White Tank Mountain Regional Park, Casey Abbott Recreation Area, and the land within the Trilby Wash Detention Basin.

School Districts: These 190 acres are distributed over eight elementary school districts.

City of Phoenix: The Phoenix-Litchfield Municipal Airport contains 804 acres. Phoenix owns eighty acres of land west of their sewage treatment plant at 91st Avenue plus a vacant 640 acre tract southwest of the Bell Road and Litchfield Road intersection. This tract was formerly an auxiliary field for Luke Air Force Base.

Irrigated Lands

This subject is discussed in detail in Volume I of the "West Central Maricopa County Study". It is of interest to include herein, however, generalized data on irrigated lands because of the large acreage involved (60% of the Study Area or about 109,000 acres), and because of the economic importance of protecting agricultural lands against encroachment by adverse uses.

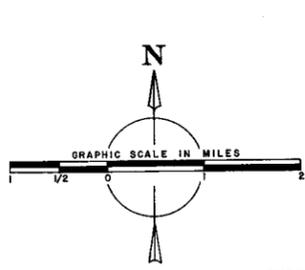
Irrigated lands within the Study Area are shown on Plate 6. The two sources of irrigation water are surface water and groundwater. Surface water is obtained from the Agua Fria and Salt Rivers. Lands are either irrigated solely with groundwater or a combination of surface and groundwater.

Six major service canals traverse the Study Area, and for administrative purposes there are six irrigation districts. Chapter II contains economic data on irrigated lands.

Major Private Land Ownership

Plate 9 shows the major parcels or tracts of 640 acres or more that are under single or unified ownership. There are fourteen separate holdings encompassing 30,050 acres of land. These large parcels, separately or when contiguous, could be ultimately developed into new communities or used for new public facilities. Small isolated subdivisions of less than 640 acres suffer from a lack of adequate physical facilities, and they should be discouraged. It is important to note that lands held in trust by title companies are not shown on Plate 9.

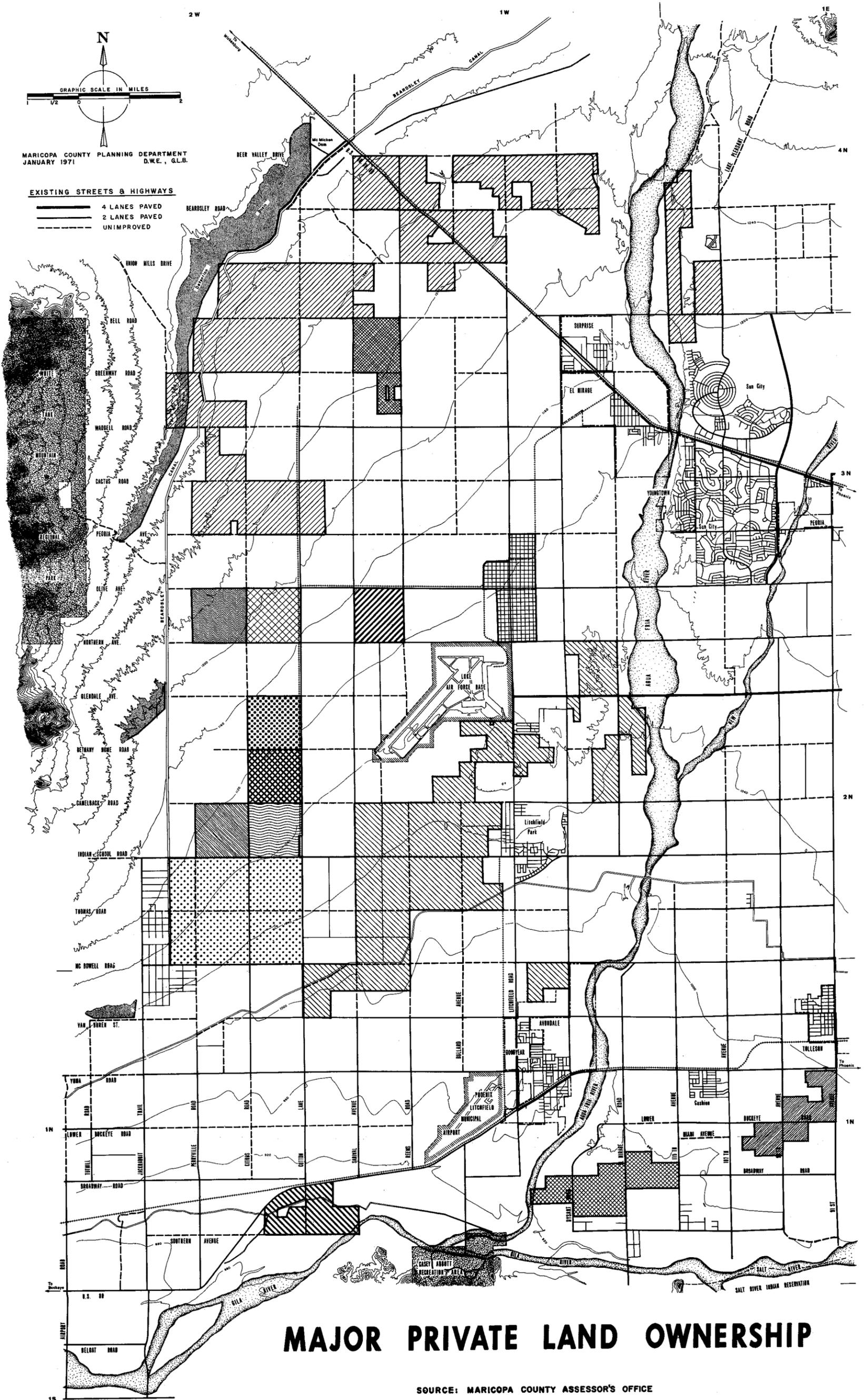
WEST CENTRAL MARICOPA COUNTY, ARIZONA



MARICOPA COUNTY PLANNING DEPARTMENT
JANUARY 1971
D.W.E., G.L.B.

EXISTING STREETS & HIGHWAYS

- 4 LANES PAVED
- - - 2 LANES PAVED
- - - UNIMPROVED



MAJOR PRIVATE LAND OWNERSHIP

SOURCE: MARICOPA COUNTY ASSESSOR'S OFFICE

PATTERNS SHOWN REPRESENT MAJOR PARCELS AND TRACTS UNDER SINGLE OR UNIFIED PRIVATE OWNERSHIP

CHAPTER VI
MAJOR STREETS AND HIGHWAYS

This chapter discusses principles and standards, the general location and extent of the present major street and highway system within the Study Area, estimated average daily traffic, construction trends, and the major deficiencies and needs of the street system.

Principles and Standards

A major street system is intended to provide for a free flow of traffic to and from all major areas of a community. It provides for fast and safe traffic movement from one residential area to another, from residential areas to major areas of employment and recreation, and it also provides for a planned network of the major local streets needed to accommodate through traffic.

There are a number of advantages that result from such a major street system:

- 1) Traffic can be more easily controlled.
- 2) Larger volumes of traffic can be moved over a few wide streets rather than dispersed over a number of narrow streets.
- 3) Major streets are primarily of general, rather than local benefit, and they can often be financed with the assistance of state and federal aid.

4) Residential areas can be better protected. Heavy traffic on residential streets creates hazardous conditions and noise levels that adversely affect residential amenities and values. Major traffic routes should not be located where they will divide a neighborhood into segments.

5) Greater economies in street construction can be provided in accordance with traffic needs. For instance, a lighter and narrower type of pavement can be used for minor residential streets than that which is needed for through streets.

Modern complexities of urban development have made the traffic problem a difficult one to solve. If sound planning principles and standards are adhered to in the design of a system of major streets, and if the various proposals are implemented systematically over a period of years, then many of the problems of traffic movement can be reduced, if not eliminated entirely.

Types of Streets and Highways

In general a wide variety of street types serving specific purposes are needed in the development of a system of major streets and highways. It is not within the scope of this report to discuss in detail all of the street classifications. However, some general comments are provided for the classification of streets needed to serve the Study Area.

Local residential streets are primarily designed to provide access to abutting property. These streets should accommodate one moving lane and two parking lanes. Normally this is sufficient to accommodate traffic movement in both directions, since curb parking spaces are normally only partially occupied at any given time in residential neighborhoods. Adopted County standards require 50 feet of right-of-way with 32 feet

to 36 feet of pavement width. Traffic volumes on these streets should be minor with speeds not to exceed 25 miles per hour. All through traffic movement should be discouraged, and buses and trucks be restricted from these streets.

Collector streets are primarily designed to pick up traffic from local streets and feed it into the major street system. A collector street should have two moving lanes and two parking lanes. Adopted County standards for collector streets are as follows: 1) residential collector streets require 60 feet of right-of-way and 40 foot pavement widths, 2) major collector or mid-section line roads require 80 feet of right-of-way and 48 foot pavement widths. Speeds should not be permitted to exceed 30 or 35 miles per hour. Collector streets should not be continuous from one neighborhood to another in order to discourage through traffic movement.

Major streets usually require at least four moving lanes and two parking or distress lanes. They should be designed with heavier pavement than collector or local streets in order to accommodate heavy traffic volumes at moderate to high speeds. To insure a smooth flow of traffic, conflicts along major streets (e.g. curb parking) should be eliminated or kept to a minimum. Adopted County standards require 110 feet of right-of-way for four moving and two parking lanes and 150 feet of right-of-way for a four lane arterial with service roads.

Freeways are designed to carry high volumes of through traffic at relatively high speeds. Access is controlled and permitted at specified points such as an interchange with another freeway or major street. A freeway at grade with service roads requires a minimum of 220 feet of right-of-way.

The manual "Subdivision Procedures and Requirements" prepared by the County Planning and Zoning Department contains illustrations of street cross sections and standards adopted by the County.⁽²³⁾

At the regional level, the Maricopa Association of Governments Transportation Planning Program (formerly VATTs) has a continuing study underway that includes the highway and transportation system within the County. Traffic movements are under constant study and evaluation and partly for this reason this report does not deal with specific possible future cross sections or geometric design considerations for specific routes within the Study Area. Minimum rights-of-way and cross sections should be determined from detailed engineering studies.

Street and Highway System

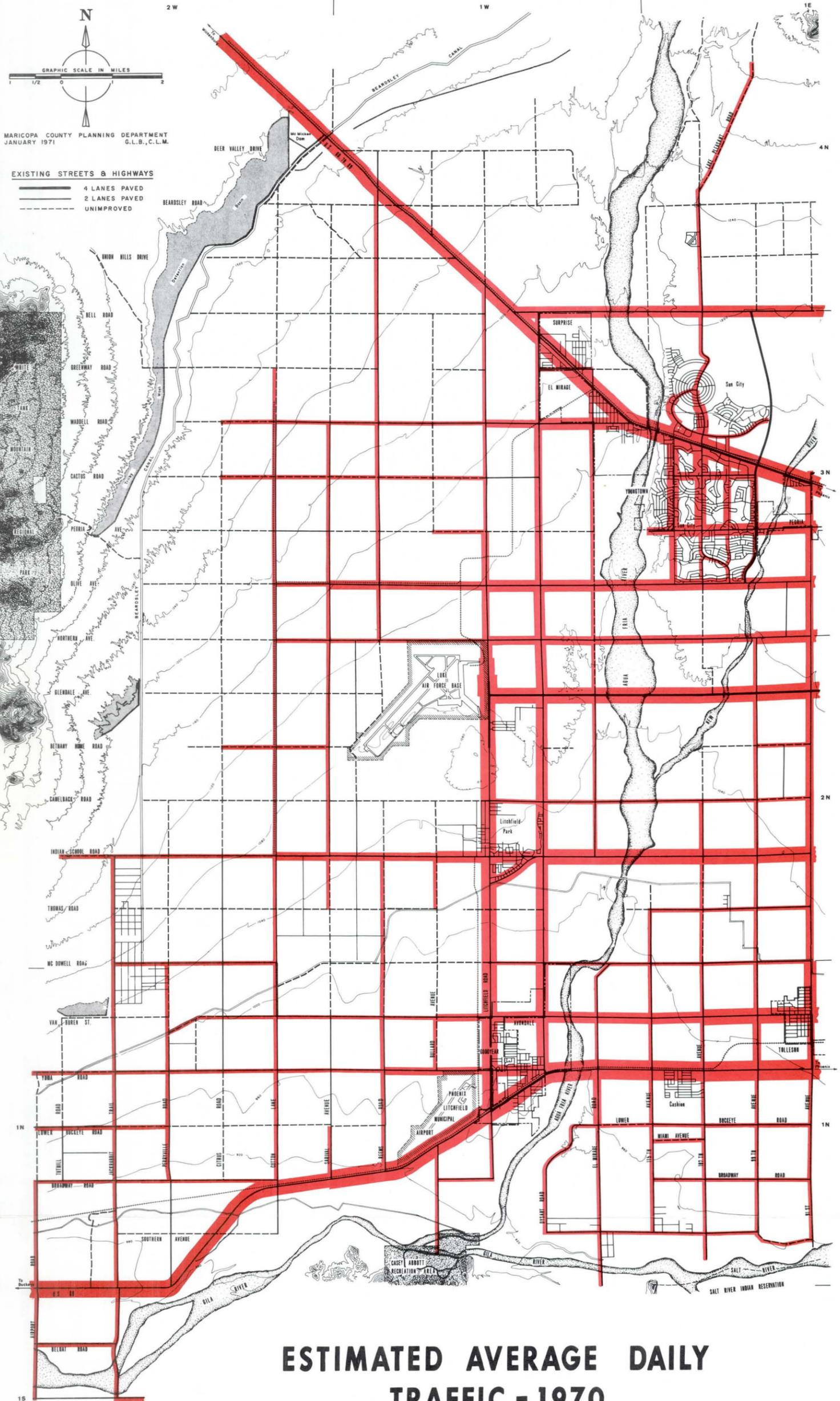
Two State highways and numerous County roads serve the Study Area. Plate 10 shows the locations, names, and surface treatments of the area's street and highway system. In general, the system forms a gridiron pattern and is an extension of the grid system used on the entire valley floor within the Phoenix metropolitan area.

State Highways

The two State highways which pass through the area are essentially east-west routes, and provide direct access to the City of Phoenix.

One is Grand Avenue. From Phoenix it enters the area under study just east of the New River crossing, and leaves the area approximately eleven miles to the northwest, at the Beardsley Canal crossing. Within this area, Grand Avenue serves as three U. S. Highway routes: 60, 70, and 89, and it passes through the communities of Peoria, Sun City, Youngtown, El Mirage, and Surprise. Mostly, it is a wide, paved, two lane highway except in Sun City where it is four lanes. The right-of-way width varies from 100 to 193 feet, with a width of 150 feet being most common.

WEST CENTRAL MARICOPA COUNTY, ARIZONA



SOURCE: 1969 AND 1970 TRAFFIC COUNTS BY THE MARICOPA COUNTY AND ARIZONA STATE HIGHWAY DEPARTMENTS

The other State highway is the route for U.S. 80. From Phoenix, it enters the area via Buckeye Road, just south of the City of Tolleson and leaves the area approximately sixteen miles to the southwest via Baseline Road, four miles east of the Town of Buckeye. In the area under review it passes through or next to the communities of Cashion, Avondale and Goodyear. Mostly it is a wide paved two lane highway except in Avondale where it is four lanes. The right-of-way width varies from 75 to 200 feet with 75 feet being most common.

County Roads

County maintained roads provide most of the direct access to land within the Study Area. The exceptions, in addition to the State highways, are as follows: 1) roads within municipalities that are maintained by their respective governments, 2) roads that have been dedicated for public use but are unacceptable because they do not meet County road construction standards, and 3) private roads, such as irrigation canal maintenance roads.

Most of the principal County roads are on the section lines established by the U. S. Geological Survey when the land was originally surveyed. The public rights-of-way are commonly sixty-six feet wide, except where additional rights-of-way have been dedicated by land owners.

There are approximately 443 miles of maintained "section line" roads in the Study Area. Sixty per cent are paved, accordingly: 1) fifteen miles of four lane roads, and 2) 250 miles of two lane roads. In addition, there are 178 miles of graded, dirt or gravel roads. Since most of these roads follow the section lines, they are usually one mile apart, both north-south and east-west.

It is interesting to note that the role of the section line road within the Study Area changes from a collector road to an arterial or major road depending on the nature and extent of development in the surrounding area.

To illustrate: in the rural areas, the mile roads serve as collector routes for farm properties, but within the urbanized areas they function as arterial or major roads.

Average Daily Traffic

The estimated 1970 average daily traffic, as shown on Plate 10, was derived from available County and State source material⁽²⁴⁾, and from existing land use data. As might be expected, the heaviest traffic is on the two State highways, and in the eastern half of the Study Area. In addition to the State highways, four County roads carried more than 4,000 vehicles per day: Van Buren Street east of 107th Avenue, Indian School Road and Glendale Avenue east of Litchfield Road, and Litchfield Road from U.S. 80 to the Luke Air Force Base main gate.

The ranges for average daily traffic on the highways and section line roads, in the Study Area for 1970, are as follows:

TABLE 16

Estimated 1970 Average Daily Traffic

<u>Range (vehicles per day)</u>	<u>State Highways (miles)</u>	<u>Section Line Roads (miles)</u>	<u>Total (miles)</u>	<u>Ratio (per cent)</u>
Less than 100	-	156	156	33.2
100 to 1,000	-	195	195	41.5
1,000 to 2,000	-	35	35	7.5
2,000 to 4,000	-	34	34	7.2
4,000 to 8,000	11	23	34	7.2
8,000 or more	<u>16</u>	<u>-</u>	<u>16</u>	3.4
	27	443	470	100.0

Construction Trends

Improvements to both previously mentioned systems have been programmed by the respective governments.

State of Arizona

One of the freeways that is programmed for construction in the immediate future by the Arizona State Highway Department will cross the southern half of the Study Area. It will be part of U.S. Interstate 10, is named the Papago West Freeway, and will provide direct access between the area under review and Phoenix. Chapter X contains detailed data on the freeway. Also, major improvements are scheduled for portions of the two State highways that pass through the area.

Maricopa County

Each year, the County Highway Department recommends, and the County Board of Supervisors approves, a "Five-Year Road Program." A recent program approved by the Board of Supervisors provides for the expenditure of \$15,653,500 on road improvements during fiscal years 1970-71 through 1975-76⁽²⁵⁾. Of this amount, approximately \$3,556,500 are scheduled for expenditure on road improvement projects within the Study Area. The improvements scheduled are listed in Table 17. Overall, they include four new bridges and twenty-five miles of paving.

Major Deficiencies and Needs

A few of the problems with the existing street and highway system shown on Plate 10 are discussed below:

1) Lack of Right-of-Way: In general, a minimum right-of-way of 110 feet is suggested for major streets providing four moving lanes with a median, and 150 feet if service roads are added. This is the standard applicable to

TABLE 17.

PLANNED ROAD IMPROVEMENT PROJECTS

Fiscal Years 1970-71 through 1975-761970-71 Fiscal Year

Glendale Avenue	Bridge at Agua Fria River	500,000
91st Avenue	Paving, Indian School Road to Glendale Avenue	210,000

1971-72 Fiscal Year

Yuma Road	Bridge at R.I.D. Canal	35,000
Glendale Avenue	Paving, Litchfield Road to El Mirage Road	60,000
Glendale Avenue	Paving, El Mirage Road to 99th Avenue	90,000

1972-73 Fiscal Year

91st Avenue	Bridge at R.I.D. Canal	60,000
Peoria Avenue	Paving, Dysart Road to Reams Road	109,500

1973-74 Fiscal Year

Van Buren Street	Paving, 99th Avenue to 91st Avenue	310,000
Litchfield Road	Paving, U.S. 80 to San Xavier Boulevard	700,000

1974-75 Fiscal Year

Olive Avenue	Bridge at New River	345,000
McDowell Road	Paving, 99th Avenue to 91st Avenue*	86,250
Litchfield Road	Paving, San Xavier Boulevard to McDowell Road	425,000

1975-76 Fiscal Year

Indian School Road	Paving, Dysart Road to 91st Avenue*	460,715
McDowell Road	Paving, Litchfield Road to Cotton Lane	165,000

SIX-YEAR TOTAL

\$3,556,465

*Part of Larger Project. Cost prorated.

section line roads. In fact, however, the majority of section line roads are sixty-six feet in width throughout their length. Widening is gradually accomplished when land is subdivided or when a zoning change is made. Right-of-way is also acquired by negotiation or condemnation under various highway projects.

2) Need for Improvements: It is recognized that as finances and other conditions permit, improvements such as paving, widening, and adding bridges will occur. The proposed system of major streets and highways is discussed in Chapter X.

CHAPTER VII

TRANSPORTATION AND MASS TRANSIT

The purpose of this chapter is to discuss briefly the transportation and mass transit services that are available to the Study Area.

Air Service

There is no scheduled air service originating within the area. The only scheduled air service for the entire Phoenix metropolitan area is at Phoenix Sky Harbor International Airport.

There are two airports that serve general aviation: Phoenix-Litchfield Municipal Airport and Fram Field (see Plate 7). Phoenix-Litchfield Municipal Airport is located just west of the Town of Goodyear and north of U.S. Highway 80, approximately six miles south of Luke Air Force Base. The airport was originally a military facility, and it is now owned and operated by the City of Phoenix. It has a 8,500 foot paved runway, and a variety of service and industrial facilities. In addition, the number of aircraft movements (landings plus takeoffs) at Phoenix-Litchfield was 56,000 during its first year of city operation (July 1, 1968 to June 30, 1969). For the second year, the number of movements increased to 108,000. During the 1970-71 fiscal year, it was estimated that movements totalled 164,000. In comparison, Sky Harbor Airport totalled 357,000 movements for the same time-period. The airport operates from 6:00 a.m. to 10:00 p.m., seven days a week, and it is estimated that about 85% of the movements occur during daylight hours.

Fram Field is west of 91st Avenue, between Glendale Avenue and Bethany Home Road, approximately six miles east of Luke Air Force Base. This small privately owned and operated public airport has a 2,200 foot unpaved runway, and some facilities. Within ten miles of the Study Area there are eight additional publicly or privately operated airports open to general aviation.

Bus Service

Local passenger and freight service by bus is provided along the two State highways which traverse the Study Area. Communities in the northern part, along Grand Avenue, are served by three firms (Continental Trailways, Greyhound Bus Lines, and Sun Valley Bus Lines) with a total of sixteen westbound and fifteen eastbound schedules every day. Communities in the southern part, along U.S. 80, are served by three firms (Arizona Bus Lines, Continental Trailways, and Greyhound Bus Lines) with a total of eight westbound and seven eastbound schedules per day.

Also, it is significant to note that the community of Sun City has a well-established, internal bus system to serve its residents and visitors. At this time the system is operated as a community service not as a profit making venture although a nominal fare is charged. Service is on a regularly scheduled basis, and equipment consists of two small buses.

Rail Service

Two railroads provide freight service to the Study Area: The Santa Fe Railway in the northern part and the Southern Pacific Transportation Company in the southern part. The main lines parallel, generally, the two State highway routes. Each railroad provides service from its Phoenix yard to its own lines and sidings in the area under review, either on a daily or demand basis. The main lines and service lines are shown on Plate 1. Freight rates between points in the Study Area and distant points are the same as for Phoenix.

Only the Southern Pacific provides passenger connecting service from Phoenix westerly to Los Angeles and easterly to New Orleans, as part of the AMTRAK system (National Railroad Passenger Corporation). This service makes no stops in the area under review.

Motor Freight Service

No major motor freight service companies are headquartered in the Study Area. It should be noted, however, that Phoenix and its environs are serviced by: 10 transcontinental truck lines, 30 interstate truck lines, 39 intrastate truck lines, and a variety of specialized delivery services. (26)

CHAPTER VIII

PUBLIC SCHOOLS, PARKS, AND RECREATION FACILITIES

This chapter discusses principles and standards for schools and parks, an analysis of existing conditions, and the estimated magnitude of future needs. Although schools and parks are covered separately, the concept of combining schools and parks for year-round use by all local citizens is gaining in acceptance. The advantages of multi-use of these facilities, if only as a matter of efficient and economical use of land, are obvious.

Principles and Standards for Public Schools

A widely accepted authority on standards for schools is the Council of Educational Facility Planners (CEFP) that was formerly the National Council on School House Construction. The 1969 edition is entitled "Guide for Planning Educational Facilities" and will be used as a basis for the establishment of principles and standards in the Study Area.⁽²⁷⁾

In the 1953 edition of the NSC's "Guide", the Council proposed minimum elementary school sites of five acres plus an additional acre for each one-hundred pupils of predicted ultimate maximum enrollment. For secondary schools, a similar formula using ten acres as the basic figure was established. Many local studies up through the early 1960's accepted these proposals for basic planning purposes.

In the 1964 edition,⁽²⁸⁾ and reemphasized in the 1969 edition, the Council stated the following:

"Experience has clearly indicated that present school sites of such area are inadequate. Many school districts are exceeding these minimum site guidelines. They are discovering that larger sites result in substantial improvements in educational programs, community services and efficiency of operation."

Principles and standards for each type of school are discussed in the following paragraphs, with the reminder that these guidelines should be considered as minimum aims and should be exceeded wherever possible.

All of the school districts within the Study Area are organized on the 8-4 plan. Kindergarten and grades one through eight are contained in the elementary schools, with grades nine through twelve contained in the high schools. Plans and suggestions contained herein assume that the present system will continue in the future.

Elementary Schools

In 1970, this Department prepared a report entitled "A Park, Recreation and Open Space Study, Maricopa County, Arizona" for the Maricopa County Association of Governments (MAG).⁽²⁹⁾ As a part of this study, an analysis was made of the specific recommendations for standards for schools as proposed by the various planning agencies within the Phoenix Metropolitan area and a summary of this information was prepared. Within the Study Area, the only municipality having a plan including standards for schools and parks is the City of Avondale.⁽³⁰⁻³¹⁾

For an elementary school, it was determined that the optimum enrollment size would range from 400 to 900 pupils, with the desirable median being approximately 700 pupils. The 1969 "Guide" (CEFP) previously referred to suggests that for an elementary school there should be provided a minimum site size of ten acres, plus an additional one acre for each one-hundred pupils of projected ultimate maximum enrollment. On this basis, an ideal elementary school site providing space to accommodate buildings, playgrounds, parking space, and landscaping would consist of not less than seventeen acres. It is

generally accepted that elementary school classrooms should not average more than thirty pupils; therefore, at least twenty-four classrooms should be included in the building design.

An elementary school should serve as the nucleus for neighborhood activities. It should be centrally located within the area it serves and not more than one-half to three-fourths of a mile walking distance for the majority of the residents. The possibility of developing the elementary school in conjunction with a neighborhood park will be discussed in future paragraphs.

In the Avondale plan, previously referred to, it was recommended that elementary school enrollment should range from 200 to 600 pupils and site size should be five acres plus one acre per each one-hundred pupils. These standards are below those stated above and are not believed to be desirable. A study made in 1968 by the College of Education, Arizona State University for the Litchfield Park area made some recommendations for minimal acreage requirements⁽³²⁾. A three to five acre site was deemed necessary for a "Parent-Child Educational Center", and thirty to forty acres for a "Modified Education Park". This is a somewhat different educational program concept from that discussed above and may not be acceptable for the entire Study Area.

High Schools

In the previously referenced "Open Space Study", local planning agencies recommended a range of 1,000 to 2,500 pupils for the optimum size for a senior high school. Because of the complexity of modern high school plants, it is recommended that the standard be 2,000 students. The 1969 "Guide" suggests that a high school contain a basic site of thirty acres plus one additional acre per one-hundred students of ultimate enrollment. A 2,000 capacity school would therefore require an area of fifty acres. Since this site should include certain park facilities, some additional acreage may be needed as will be discussed in following paragraphs.

In senior high schools, increasing numbers of learning activities take place in more specialized learning spaces such as laboratories and music and art rooms. Traditional school programs, however, still require a number of general learning spaces of the typical classroom type. The 1969 "Guide" recommends that these spaces should be required to accommodate from twenty-five to thirty pupils. For an ultimate high school enrollment of 2,000, a minimum of sixty-seven such classrooms would be needed.

A high school should be located on or near a major street and have access from collector streets. Normally, high school students walk to school or are transported by bus or automobile. One and one-half to two miles are considered to be a reasonable maximum distance for walking.

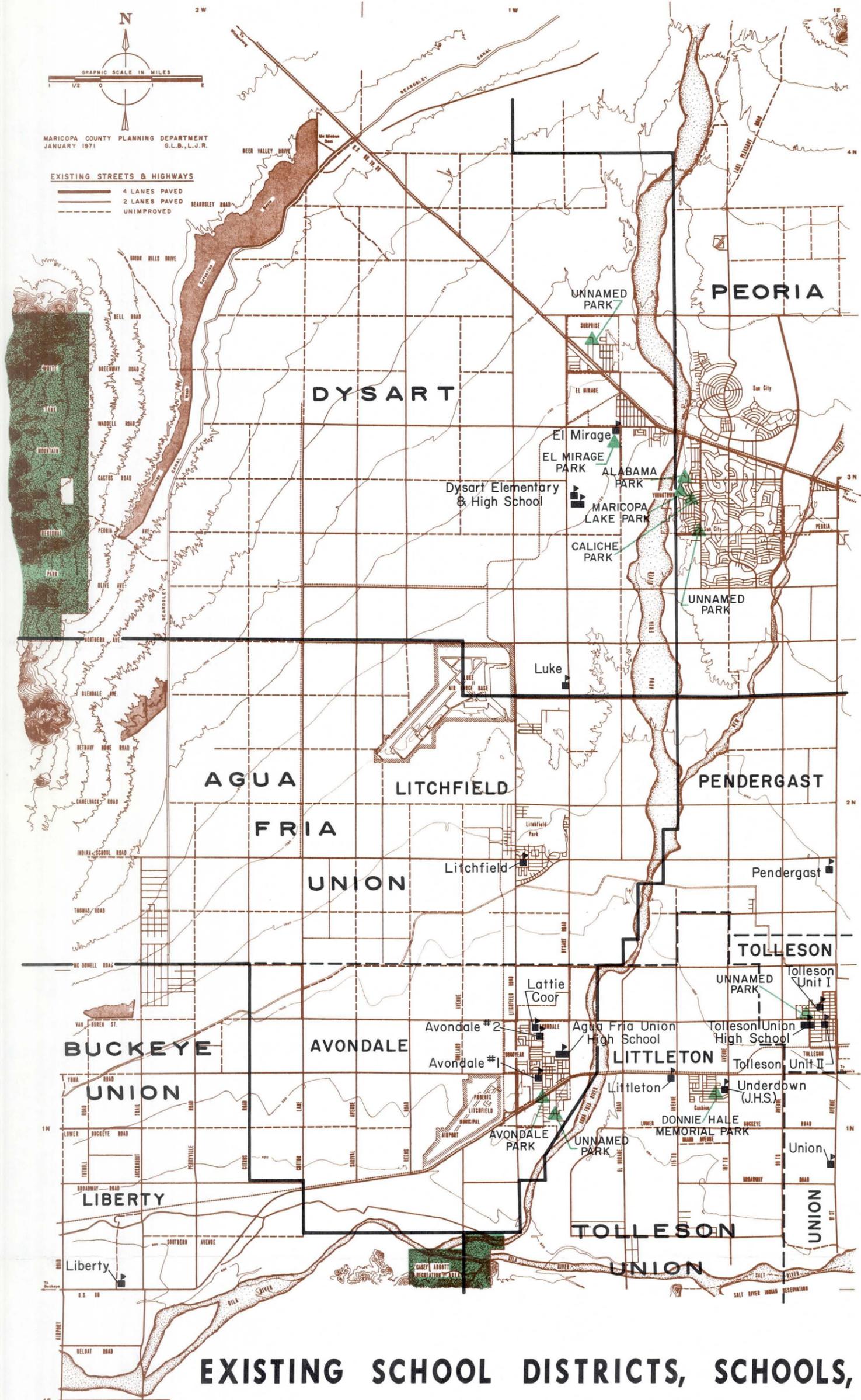
For high schools, the Avondale plan calls for an enrollment of 600 to 2,000 students with a basic site size of thirty acres plus one acre per one-hundred pupil enrollment which is in line with the standards cited above. Likewise, the Litchfield Park Study calls for a minimal site size of fifty to sixty acres for secondary (high) schools.

Existing School Conditions and Needs

There are five high school districts and nine elementary school districts, containing three high schools and fifteen elementary schools respectively, which fall within the Study Area. Plate 11 shows the location of the various schools and the boundaries of the several districts. Only the Dysart and Agua Fria Union High Schools have all their facilities within the area of interest.

All of the high schools include grades nine through twelve. Although Underdown School in the Littleton School District is listed as a junior high school, it serves grades five through eight, and therefore, should not be classified as a junior high school in accordance with the previous discussion on principles and standards.

WEST CENTRAL MARICOPA COUNTY, ARIZONA



EXISTING SCHOOL DISTRICTS, SCHOOLS, PARKS, AND RECREATIONAL FACILITIES

LEGEND

- HIGH SCHOOL DISTRICT BOUNDARY
- ▬ HIGH SCHOOL
- ▬ ELEMENTARY SCHOOL DISTRICT
- ▬ ELEMENTARY OR JUNIOR HIGH SCHOOL
- ▬ REGIONAL PARK
- ▲ NEIGHBORHOOD OR COMMUNITY FACILITY

TABLE 18

DATA ON EXISTING PUBLIC SCHOOLS

<u>Districts</u>	<u>Grades</u>	<u>Total Site Acres</u>	<u>Design Capacity</u>	<u>ADA 1969-70</u>	<u>Estimated ADA 1971-72</u>	<u>Acres Deficient by Design</u>	<u>Number Classrooms</u>	<u>Pupils/ Classroom (Est. ADA)</u>
<u>High School</u>								
Dysart	9-12	20.0	700	602	688	- 17	35	20
Agua Fria Union	9-12	55.0	1200	850	1107	+ 13	58	19
Tolleson Union	9-12	24.0	900	679	778	- 15	34	23
Peoria	9-12	22.0	490	463	615	- 13	31	20
Buckeye	9-12	60.0	700	611	610	+ 23	37	16
<u>Elementary</u>								
Dysart								
Elementary	1-8	20.0	1200			- 2	52	
El Mirage	1-6	10.0	800			- 8	34	
Luke	1-6	18.0	600			+ 2	29	
Total District		48.0	2600	2608	2910*	- 8	115	25
Litchfield	K-8	20.0	850	781	1015*	+ 1	42	24
Avondale								
Number 1	K-4	17.0	1400			- 7	46	
Number 2	6-8	11.5	600			- 4	21	
Lattie Coor	5-6	20.0	650			+ 3	20	
Total District		48.5	2650	2032	2053*	- 8	87	24
Tolleson								
Unit #1	1-4	5.0	500			- 10	24	
Unit #2	5-8	7.0	600			- 9	18	
Total District		12.0	1100	875	945*	- 19	42	23
Union	1-8	8.0	150	137	144	- 4	7	21
Littleton								
Littleton	1-4	15.0	600			- 1	31	
Underdown	5-8	9.6	500			- 5	21	
Total District		24.6	1100	1036	1170	- 6	52	23
Pendergast	1-8	10.0	450	158	225	- 5	21	11
Peoria	1-8	18.0	1500	1320	1630	- 7	65	25
Liberty	1-8	23.0	750	451	502*	+ 5	23	22

*Kindergarten added

In subsequent paragraphs on existing conditions and needs for public schools, the following site standards will be used:

<u>School Type</u>	<u>Size of Site</u>
Elementary (Grades K through 8)	10 acres plus 1 acre per 100 pupils
High School (Grades 9 through 12)	30 acres plus 1 acre per 100 pupils

Table 18 contains certain data on schools and/or school districts which affect the Study Area. The information on site acreage, design capacity, and number of classrooms was obtained from a survey of the individual schools. The information on Average Daily Attendance (ADA) was furnished by the office of the Maricopa County Superintendent of Schools. It should be noted that records of ADA are maintained by district and not by separate schools.

On the basis of design capacity, only two high schools and four elementary schools exceed standards for site acreage. As can be noted from Table 18, most school sites are seriously deficient in area both from the standpoint of design as well as average daily attendance.

Estimated attendance figures for the present school year indicate that most of the schools in the area under study are approaching or already exceed the capacity for which they were originally intended. It is interesting to note, however, that the number of pupils per classroom is either equal to or below nationally recognized standards.

Estimates of Future School Requirements

The prediction of future school enrollment and consequent school plant needs is necessarily a complicated procedure. Usually, a district is considered as a whole with estimates made of the number of pupils entering kindergarten or the first grade and the number who will progress through all twelve grades. For short-term planning, such as for a five-year period, this procedure has proven quite reliable.

It is not within the scope of this study to make a detailed projection of future pupil demand by grade and by school district. However, based upon the following population - pupil ratio trends in Maricopa County as applied to future population projections, rough estimates have been made for pupil demands for the year 1995.

	1960	1965	1970
Total County Population	663,510	876,078	968,487
<u>Elementary</u> (Grades 1-8)			
Average Daily Attendance	102,930	134,983	157,722
% of Population	15.51	15.41	16.28
<u>High School</u> (Grades 9-12)			
Average Daily Attendance	28,753	48,718	57,733
% of Population	4.33	5.56	5.96
<u>Total Pupils</u>			
% of Total Population	19.84	20.97	22.24

The following estimates of future school needs are based upon the assumption that ratios of students to total population would follow the above trends. Since the ratios have gradually increased during the ten-year period, it will be assumed that 17% of the population will be in elementary schools and 6% will be in senior high schools.

As discussed in Chapter X, it is estimated that by 1995, some 246,000 persons could be living in the Study Area. This is an increase of 196,000 over the 50,000 persons estimated to be in the area in 1970. From this total, it is necessary to subtract those additional persons who would be residing in the retirement communities of Sun City and Youngtown (approximately 32,500 persons) in order to avoid distortion of the estimates. As a result, there would be an additional 28,000 elementary pupils and 10,000 additional high school pupils in the area by 1995.

Assuming new elementary schools would be designed to accommodate 700 pupils, forty new schools will be required. On the basis of standards as previously presented, this would require 680 acres of school sites and 934 classrooms. Five additional 2,000-capacity high schools would also be needed and these would require 250 acres and 400 more classrooms.

The above estimates are based upon the premise that the school districts would continue under present 8-4 systems. However, estimates have also been prepared herein for future pupil demands should the school districts convert to the 6-3-3 system. Since the Mesa School District is the only district within the County organized under this plan, estimates for the Study Area are based upon this district's population - pupil ratios. In Maricopa County's 1968 study entitled "A Report Upon a General Land Use Plan for Eastern Maricopa County, Arizona", it was determined that 53% of the total enrollment was in grades 1 to 6 inclusive, 25% in junior high grades 7 to 9 inclusive, and 22% in senior high grades 10 to 12 inclusive. (33)

Under this system, future school requirements in the Study Area would be as follows:

<u>Type of School</u>	<u>Number Pupils</u>	<u>Number Schools</u>	<u>Total Acres</u>	<u>Total Classrooms</u>
Elementary (1-6)	24,135	34	578	805
Junior High (7-9)	11,385	11	330	455
Senior High (10-12)	<u>10,020</u>	<u>5</u>	<u>250</u>	<u>400</u>
TOTALS	45,540	50	1,158	1,660

Principles and Standards for Parks

Parks, recreational areas, and open space are an integral part of land use planning, not only from the standpoint of utility, but also as a concern for community appearance and aesthetic value. As previously mentioned, the economy and usefulness resulting from the joint development of parks and schools is obvious.

In their 1958 study, the National Recreational Association (NRA) proposed that there should be ten acres of land per 1,000 persons as an urban-wide total for active and passive recreation space.⁽³⁴⁾ This standard suggests that one-quarter of the total (2.5 acres per 1,000 persons) be allocated to local playgrounds and playfields and that the remainder (7.5 acres per 1,000 persons) be allocated to community and larger city-wide parks. This basic standard has generally been accepted by jurisdictions in the Phoenix-Maricopa area and has also been recommended by the American Public Health Association.⁽³⁵⁾

The above total does not include large reserves or regional parks such as the Casey Abbott Recreation Area or the White Tank Mountain Regional Park. The size, location, service area, and type of facilities for each park are discussed in the following paragraphs.

Neighborhood Facilities

For purposes of planning in urban areas, a neighborhood is commonly considered to be the geographical area tributary to an elementary school and within walking distance thereof.

In terms of population to be served, it is generally agreed that a neighborhood should average from 4,000 to 5,000 persons; however, extremes vary from as low as 2,000 to as high as 10,000. In terms of general area, there is agreement that an urban neighborhood should normally not be more than one square mile and should not be crossed by a major barrier such as a highway or large drainage area. The square mile grid system of roads and streets resulting from original land surveys establishes a natural starting point for neighborhoods in terms of "service radius", usually one-quarter to one-half mile, which is considered to be an easy and reasonable walking distance.

In addition to the elementary school, two basic types of neighborhood facilities are usually recognized: the neighborhood playground and the neighborhood park, which will be discussed in the following paragraphs.

Neighborhood Playgrounds: Playgrounds are areas for active recreation primarily serving the needs of five to fourteen year old children but also affording some limited opportunities for youths and adults. Features include play apparatus, athletic courts and fields, and possibly a swimming pool and recreation building. The recommended size of the site varies from three to seven acres. The site size should provide a minimum of one acre, and preferably 1.25 acres, per 1,000 people in the neighborhood. Where possible, these facilities should adjoin elementary school grounds.

Neighborhood Parks: The neighborhood park is an area primarily intended to provide an attractive open area and a place for quiet, passive recreation for people of all ages. Desirable features include open grass areas with trees and shrubs, benches and picnic tables, ornamental pools or a lagoon, and a shelter building with restroom facilities. To expand the uses, play apparatus for children and a paved court area may also be included, although these facilities would not be needed if the park were adjacent to a playground or school developed under the standards described above.

A neighborhood park should consist of a minimum of five acres, or should provide 1.25 acres per 1,000 persons proposing to use the facility.

Where possible, the neighborhood park should be located adjacent to the neighborhood playground and, in the unincorporated areas, it may be necessary for schools to acquire school sites of sufficient size to accommodate both playground and neighborhood park needs. Since it is the County's policy to develop and maintain large recreational areas and regional parks, it is unlikely that the County would want to maintain and operate a neighborhood park.

Community Facilities

Communities, as well as neighborhoods, should be the basis for planning for recreational, park, and open space requirements. The local community is normally a "cluster" of four or more neighborhoods and the facilities provided are often associated with a junior or senior high school. It is generally agreed that community facilities should serve a population of approximately 20,000 persons. The area should be centrally located and be within a mile of every home.

Where all facilities are located in one common area, the site may be called a community center. Ordinarily, however, because of the different types of activity and the corresponding difference in acreage requirements, facilities are more often described as playfields and community parks.

Community Playfields: A playfield is the type of area that furnishes a variety of facilities primarily for the use of active young people and adults. It provides for popular forms of recreation that require more space that would be available in the neighborhood playground. In addition to athletic courts such as tennis and basketball, separate marked sports fields for softball, baseball, football, and soccer are generally included. In addition, it would be considered ideal to have a field house and large swimming pool. An important feature for playfields in the area should be adequate lighting for night use.

As described above, it is obvious that a playfield would provide for the type of organized activities ordinarily found at a junior or senior high school. It is highly desirable and generally advantageous to have the locations adjoining. However, where this is accomplished, there may still be administrative problems of multiple use. There is some general agreement that twenty to twenty-five acres would be most desirable. A playfield of this size would provide a minimum of one acre per 1,000 people.

Community Parks: The community park is designed to provide active and passive recreational facilities for all age groups. Its area of service may be an entire town or a large geographical segment of a city. Depending upon its relationship to the playfield and other factors such as topography and environmental interest, site size standards vary from twenty to fifty acres and the population served may range from 20,000 to 50,000 persons. Site size is based on a standard of one acre per 1,000 population in the community.

Large Parks

In the preceding sections of this report, it has been established that a minimum total of 4.5 acres per 1,000 persons should be provided for neighborhood and community-type park facilities. In order to attain the "10 acres per 1,000 persons" standard, additional areas must be provided. Like the small spaces such as miniparks, large areas have also been given a number of different "titles" locally. Among these names are "large", "city wide", "major", "district", "regional", and "reservation", usually combined with the word "park".

Along with a variance in names, standards are generally considered to be much more flexible but in some cases, this flexibility amounts almost to vagueness. On two factors, however, there has been general agreement that the site should be a minimum size of one-hundred acres, and the area should be located within one hour's travel distance from the majority of the population centers.

Land area standards for large parks that serve an entire city or town are standards applicable to the community park (i.e., play courts and fields, swimming and boating facilities, and shelter and restroom buildings). In addition, such facilities as golf courses, hiking and riding trails, zoos, and botanical gardens may be provided. The emphasis, however, should be on having as much natural or landscaped open area as possible to meet active and passive recreational needs of the entire city or town.

Authorities have recommended that there should be a large recreational park in each major section of a city and each park should be designed to serve a population of from 50,000 to 150,000 persons. On the basis of a minimum site size of one-hundred acres, this would provide from 2.00 to a low of 0.67 acres per 1,000 people. In order to meet overall standards, it is obvious that areas of well over one-hundred acres would be needed if large populations are to be served.

Regional Parks

A noted authority, George D. Butler, in his comprehensive study entitled "Standards for Municipal Recreation Areas"⁽³⁶⁾ concluded that there was considerable agreement that, in addition to urban requirements, ten acres in outlying regional parks should be provided for each 1,000 people living in the region. In some parts of the country, as high as twenty-five acres per 1,000 people have been recommended as a long-range goal.

The provision of regional facilities is beyond the scope of authorities in the Study Area and, in fact, such facilities are provided for by the Maricopa County Park System. It should be pointed out, however, that design standards call for taking advantage, wherever possible, of unusual natural or scenic features where people can truly enjoy the environment and where the regional "ecosystem" can possibly remain in balance, and undisturbed.

Precise standards for size, location, and facilities are difficult to establish since there are many potential uses for such areas. However, one principle should be observed: the facilities should be based on natural resource conservation as opposed to the user-orientation of smaller recreational areas. Although such activities as hiking, riding, picnicking, and camping may be permitted and provided for, open spaces must predominate and vegetation and terrain must be protected. The location of a regional park is normally dictated by the availability and suitability of land for this purpose.

Summary of Standards for Parks

The analysis of existing park conditions in the Study Area and the projections for future needs will be based upon the foregoing discussions. Table 19 is a "Summary of Recommended Standards for Public Park and Recreational Open Space." Projections of future needs will be based on these recommended standards, but it should be remembered that these are minimums and should be exceeded wherever possible.

Existing Public Park System

Municipal Parks

Table 20 is a "Summary of Existing Municipal Parks and Recreational Facilities", the location of which are shown on Plate 11 (previously referred to in this Chapter). There are twelve separate areas with a total of 171.23 acres. Most of the facilities are limited to athletic fields and courts for active recreation, and ramadas and picnic tables for passive activities.

Eleven of the parks fall within the neighborhood category and consist of a total of 51.23 acres. This is an average park size of 4.66 acres which is somewhat below the desired minimum size of five acres. Based upon a present population of approximately 50,000 persons and a standard of 2.50 acres per 1,000 population for neighborhood facilities, there should be a total of 125 developed acres. Existing park acreage is only 41% of the desired total and this must be considered to be quite inadequate.

The only area that can be classified as a community facility is the 120 acre tract of the Goodyear Shooting Range. This is a desirable activity center, but its use at the present stage of development is limited.

TABLE 19

SUMMARY OF RECOMMENDED STANDARDS FOR PUBLIC PARK AND RECREATIONAL OPEN SPACE

	<u>Age Group</u>	<u>Service Radius</u>	<u>Area Needed (in acres)</u>	<u>Population Served</u>	<u>Acre/1,000 Persons</u>
URBAN FACILITIES					
<u>Neighborhood</u>					
Playgrounds	5-14 yrs.	$\frac{1}{4}$ to $\frac{1}{2}$ mile	5	4,000	1.25
Parks	All ages	$\frac{1}{4}$ to $\frac{1}{2}$ mile	5	4,000	1.25
<u>Community</u>					
Playfields	Young people and Adults	1 to 2 miles	20	20,000	1.00
Parks	All ages	1 to 4 miles	20	20,000	1.00
<u>Large Parks</u>	All ages	30-60 minutes travel time	100	50,000	2.0-5.5
EXTRA-URBAN AREA					
<u>Regional Parks</u>	All ages	1-2 hours travel time	100	All	10-25

TABLE 20

SUMMARY OF EXISTING MUNICIPAL PARKS AND RECREATIONAL FACILITIES

<u>Municipality and Name of Park</u>	<u>Type of Facility</u>	<u>Site Size (in acres)</u>	<u>General Facilities</u>
<u>AVONDALE</u>			
City of Avondale	Roadside Park	9.00	Ramadas and picnic tables
Mountain View	Neighborhood Playground	4.50	Baseball-football fields, tennis and basketball courts, ramadas and picnic tables
<u>EL MIRAGE</u>			
Town of El Mirage	Neighborhood Playground	8.00	Baseball field and basketball court
<u>GOODYEAR</u>			
Town of Goodyear	Community Range	120.00	Firing range, skeet and archery
<u>TOLLESON</u>			
Unnamed	Small Park	1.00	Picnic tables and community building
Unnamed	Neighborhood	6.00	Undeveloped
<u>YOUNGTOWN</u>			
Unnamed	Minipark	0.15	Picnic tables
Alabama	Neighborhood Park	1.80	Picnic tables
Caliche	Neighborhood Park	1.14	Ramadas and Picnic tables
Maricopa Lake	Neighborhood Park	10.44	Fishing and picnic tables
Ramada-Clubhouse	Neighborhood Park	3.20	Ramada, picnic tables and clubhouse
<u>CASHION (COUNTY)</u>			
Donnie Hale Memorial	Neighborhood Park	6.00	Baseball-softball field, picnic tables and shelter house
	TOTAL ACRES	171.23	

Large and Regional Parks

In accordance with previously discussed standards, there are no municipally owned large parks in the Study Area. However, Maricopa County's Casey Abbott Recreational Area on the southern limits of the area serves as a substitute for this type of park (see Plate 11). Casey Abbott contains a total of 2,124 acres of which 600 acres are developed.⁽³⁷⁾ Facilities include an 18-hole golf course with a club house, an outdoor amphitheater, ramadas, picnic tables, open field camping spaces, and marked hiking and riding trails. This is a model example of a larger type park, and future development by the County Parks and Recreation Department will further enhance its value.

To the south and southeast of Casey Abbott Recreation Area and adjacent to it is the Estrella Mountain Regional Park. There are 16,468 acres in this park and although presently undeveloped, future plans call for a limited improvement emphasizing a historical theme.

The White Tank Regional Park, a portion of which is included on the west side of the Study Area, contains 26,338 acres and is the largest park in the County System.⁽³⁸⁾ Although it is planned that this area should remain essentially a wilderness, archeological remains are more extensive than in any other regional park. An interpretive program involving archeologists and students is contemplated. At the present time, picnic tables, ramadas, outdoor grills, and open field camping sites are provided in a limited portion of the Park.

In addition to the above, two other County recreation areas (Thunderbird Regional Park⁽³⁹⁾ and Lake Pleasant Regional Park)⁽⁴⁰⁾ are within easy access to residents of the Study Area. It is apparent that there is more than adequate regional park and open wilderness area for the present population of approximately 50,000 persons and there will probably be a sufficient amount for any reasonable amount of future growth within the area.

Special Facilities

Golf Courses: The only public golf course within the Study Area is the one located in Casey Abbott Recreation Area as previously mentioned. This is an 18-hole course which encompasses 170 acres of the park land. It is the general consensus that an 18-hole course should have a minimum site-size of 160 acres and there should be one course for every 55,000 persons within a given area. This would provide approximately three acres for each 1,000 population.

On the basis of the above, this public course adequately serves the needs of the present residents in the area. In addition, there are two 18-hole private golf courses in the Litchfield Park area consisting of a total of 220 acres. There are presently five completed 18-hole courses in the Sun City area and the sixth course will be completed in the immediate future. The six courses contain a total of 839 acres and are classified as "semi-private", in that some limited use by the general public is permitted. The Villa De Paz Golf and Country Club, located at Indian School Road and 99th Avenue (four miles east of Litchfield Park), is in the process of completing the first 9-holes of a proposed 18-hole facility. When completely developed, the course will contain 140 acres and will be operated as a private club.

There are a total of 1,199 acres in non-public golf courses within the Study Area. Under the standard proposed above, this amounts to twenty-four acres per 1,000 present population. In terms of open space, this is a most desirable situation. However, the limited availability and use of these facilities points out the fact that this acreage should not be considered as a substitute for other park and recreational space shortages that now exist.

Hiking and Riding Trails: At the present time there are no marked or developed hiking and riding trails in the Study Area although a portion of the Sun Circle primary trail has been approved in the area by the Maricopa County Hiking and Riding Trails Committee. This trail originates along the Gila River to Casey Abbott Recreational Area, turns northward along the Agua Fria River channel to its confluence with New River, and then northeastward along this channel. This portion of the Sun Circle Trail is approximately seventeen miles in length. A secondary trail, beginning at New River and Grand Avenue (U.S. 60, 70, 89), and going northwestward along the highway to the Agua Fria River, thence north along the channel to Lake Pleasant, has also been proposed. Approximately ten miles of this trail would be within the area under study.

The development of these trails is dependent upon the future acquisition of rights-of-way and easements. Since practically all of this twenty-seven mile hiking and riding trail system falls within flood plains, development will be influenced by future flood control measures.

A systematic program for the development of trails is a relatively new planning endeavor and standards are rather imprecise. In the previously referenced 1970 "Open Space Study", proposed standards were evolved from several sources. In summary, it was suggested that there should be twenty-five miles of multi-use trails per 50,000 population, and the system should include rest stops; an overnight camp site; and parking, loading, and unloading areas. Such an ideal trail network would consist of approximately forty total acres or 0.80 acres per 1,000 people.⁽⁴¹⁾

Estimates of Future Park Needs

In the Study Area, not only for the future but also to make up present deficiencies, the greatest need for public park and recreational facilities is the provision of space within or near centers of urban concentration. The emphasis, of course, should be on neighborhood and community facilities.

Total requirements are based on the following estimates: the 1995 holding capacity population may be 246,000 persons, but since Sun City and Youngtown provide their own facilities it is necessary to subtract 48,000 persons; therefore, facilities will be needed for 198,000 persons (as based upon the standards as recommended in Table 19), accordingly:

<u>Type of Facility</u>	<u>Total No.</u>	<u>Total Acres</u>
<u>Neighborhood</u>		
Playgrounds	50	250
Parks	50	250
<u>Community</u>		
Playfields	10	200
Parks	<u>10</u>	<u>200</u>
TOTALS	120	900

Subtracting the amounts of present neighborhood facilities, 89 additional areas consisting of 445 acres will be required. Likewise, for community use, 19 additional parks or playgrounds containing 380 acres will be needed.

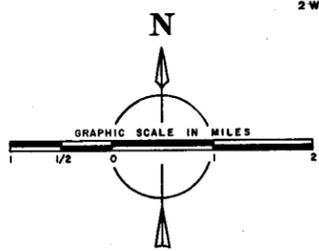
Under present areas of incorporation, there is no municipality that is large enough to provide large parks. However, with a potential ultimate population of 246,000 persons, at least 492 acres will need to be provided for in the future. This is assuming only two acres of large park area for each 1,000 persons; consequently, in order to meet the "10 acres per 1,000 persons" standard, the deficit would be made up by golf courses, trails, and perhaps regional parks. It is believed to be desirable, however, to have the total of 5.5 acres per 1,000 persons (4.5 acres for neighborhood and community) in large parks which would provide a broader use for all citizens. This would call for a total of 1,350 acres for large parks.

As previously pointed out, the size and accessibility of regional parks is such that no present or even future deficit exists in the Study Area. Likewise, there is a surplus of golf course acreage but most of the courses are not generally available to the public. In addition to the Casey Abbott course, provisions should be made for four more 18-hole and one 9-hole public golf courses that would require a total of 720 acres.

For an ultimate population of 246,000 persons, there should be a total of about 125 miles of hiking and riding trails. Since no trails are presently dedicated, nor developed, about 200 acres in a lineal system will be needed.

Again, it should be emphasized that the present and immediate future needs are for facilities "closer to the people". Also, the joint use of school and park sites on a year-round basis is the most efficient and desirable form of operation. It is known that some joint programs, especially involving the use of playground equipment and athletic fields and courts, are being carried out in the Study Area. In order to attain maximum mutual benefits, there will have to be continued and increased cooperation among a number of diverse jurisdictions.

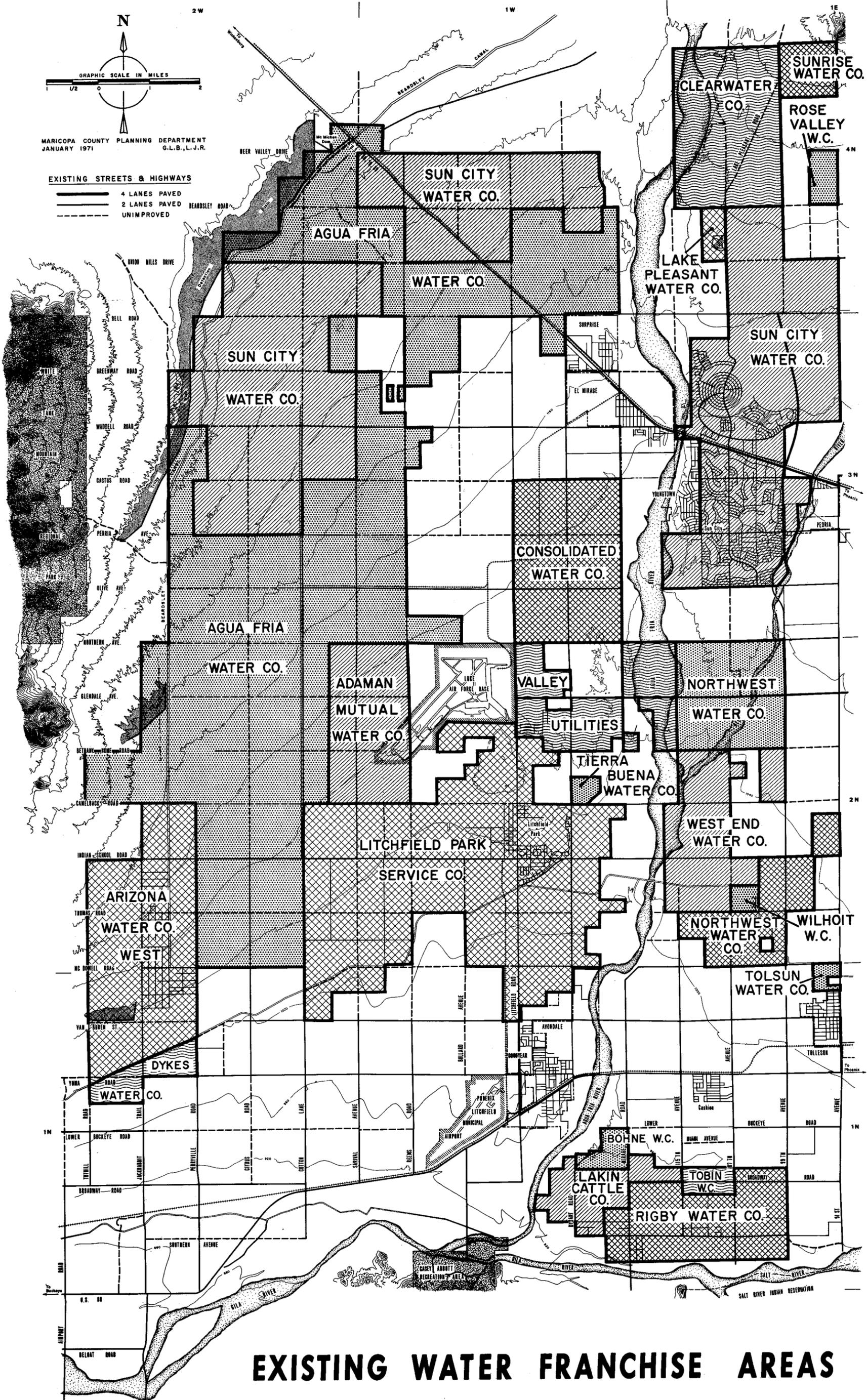
WEST CENTRAL MARICOPA COUNTY, ARIZONA



MARICOPA COUNTY PLANNING DEPARTMENT
JANUARY 1971 G.L.B., L.J.R.

EXISTING STREETS & HIGHWAYS

- 4 LANES PAVED
- 2 LANES PAVED
- UNIMPROVED



EXISTING WATER FRANCHISE AREAS

SOURCE: ARIZONA CORPORATION COMMISSION (JAN. 21, 1971)

CHAPTER IX

PUBLIC UTILITIES AND RELATED FACILITIES

This chapter is divided into four major sections, as follows: 1) Water Utilities, 2) Sewer Facilities, 3) Solid Waste Facilities, and 4) High Capacity Utility Lines.

It is axiomatic that public utilities and related facilities are provided in response to existing and future patterns of urban development. The more intense the development, the more complex is the required system. Unquestionably, the provision of or lack of public utilities and related facilities is a prime determinant of land developmental policy. ⁽⁴²⁾

Water Utilities

The distribution of water for purposes other than irrigation is through franchises authorized by the Arizona Corporation Commission. There are nine governmental water utilities (Avondale, El Mirage, Glendale, Goodyear, Luke Air Force Base, Peoria, Phoenix, Tolleson, and Youngtown), which either are within the Study Area or extend into it. In addition, there are twenty-one private water companies, and the area under franchise by each private corporation is shown on Plate 12. Some of the private water companies are inactive or dormant, waiting for a demand to develop within the franchise area.

In the interests of general water conservation and control, and in order to solve problems of treatment and storage, it is obvious that the utmost cooperation between both governmental and private units will be needed in order to accomplish mutual objectives.

Sewer Facilities

The eleven larger incorporated and unincorporated communities in the Study Area dispose of their sewage by different methods.

Peoria - Sun City - Youngtown

The City of Peoria, the Town of Youngtown, and the unincorporated community of Sun City, make use of the City of Glendale's trunk sewer and the 91st Avenue sewage treatment plant, operated by the City of Phoenix. This treatment plant is located by the Salt River just outside the eastern boundary of the Study Area. Youngtown and Glendale own part of the 91st Avenue Plant and have rights of 400,000 and 5,000,000 gallons per day treatment, respectively. In addition, Glendale has an option for an additional 3,000,000 gallons per day treatment. The agreements with Peoria are for no set amount, but are binding only to 1979. Sun City's agreements with Peoria and Glendale, for use of their sewer trunk lines, are for a maximum of 2,000,000 gallons of wastewater per day. Sun City will reach that amount in two to six years according to estimates made by different interested parties. There have been discussions among representatives of the concerned communities regarding the addition of joint facilities to meet their respective wastewater needs. Chapter X contains additional data on this matter.

El Mirage - Surprise

The Towns of El Mirage and Surprise both utilize individual septic tanks, and no community systems are programmed or planned.

Tolleson

The City of Tolleson owns and operates its own wastewater treatment plant, which is located approximately one mile south of the City between Yuma and Lower Buckeye Roads. In addition to the City, it also serves a meat packing plant with sizeable employment.

The capacity of the treatment plant is 2,500,000 gallons per day. The percentage of the capacity used varies widely, from 30 to 80% depending mainly upon the number of animals processed per day in the meat packing plant. The City contributes only 180,000 to 500,000 gallons of wastewater per day, and it is seeking additional customers for its treatment plants.

Cashion

The unincorporated community of Cashion utilizes septic tanks.

Avondale - Goodyear

The City of Avondale and the Town of Goodyear, jointly, own and use a wastewater treatment plant with a capacity of 750,000 gallons per day. The plant is located by Lower Buckeye Road, just south of Avondale. The plant was built in 1958 and is currently operating at 50% of capacity.

Litchfield Park

The developer of this community is providing wastewater treatment at its own plant, which is located between Indian School and Thomas Roads. Currently, the plant operates at about 50% of capacity. It can serve a total population of 3,500 persons, and can be expanded. The developer has considered joining with the municipalities of Avondale and Goodyear, and others, in the establishment of a common treatment facility, as recommended in a 1968 consultant's study entitled, "Wastewater Report for the Valley Metropolitan Area of Phoenix, Arizona". (43)

Luke Air Force Base

The wastewater that is generated at Luke Air Force Base is treated at a plant that is owned and operated by the Base, which plant is located east of Luke Air Force Base on the Agua Fria River. An average of approximately 1,100,000

gallons per day were treated at the plant in 1970, although it has a capacity of 5,000,000 gallons per day.

Solid Waste Facilities

An ever-growing problem is the disposal of large volumes of solid wastes that are produced daily. It is for this reason that the County Health Department was instrumental in having a comprehensive study prepared in 1968 on this subject. The consultant's study is entitled, "Solid Wastes Disposal Report".⁽⁴⁴⁾ Explanatory data contained herein was extracted primarily from said report, as it related directly to the Study Area.

Generally, the kinds of solid wastes may be classified according to the activity that generates the wastes; to illustrate: 1) residential and institutional, 2) commercial and industrial, 3) construction and demolition, 4) traffic and recreational, and 5) agricultural.

Specifically, however, urban solid wastes are considered to include garbage, rubbish, garden refuse, and the like. A 1965 Federal environmental report estimated that the annual output is 1,600 pounds per person.⁽⁴⁵⁾

Solid waste disposal operations in the Study Area vary. The three methods used are listed and defined, accordingly:

- 1) Sanitary Landfills: Are places on land filled with solid wastes and covered with earth by controlled methods in accordance with an engineering plan that precludes the creation of health hazards, obnoxious odors, or conditions offensive to sight.
- 2) Landfills: Are places on land filled with solid wastes and covered with earth.
- 3) Dumps: Are places where solid wastes are dumped and left uncovered, and may be burned on occasion.

It should be emphasized, however, that sanitary landfilling is the only method available on land as a sanitary disposal method for all solid wastes. It is more efficient where average haul distance is a minimum and daily tonnage is large enough to support investment in large items of equipment.

Location of Sites

The only sanitary landfill in the Study Area is operated by the City of Glendale, and it is located at 103rd and Northern Avenues. The municipalities of El Mirage, Peoria, Surprise, and Youngtown have made arrangements to use this facility, as also have the County, Sun City, and Luke Air Force Base. The management program conducted by Glendale has proven to be very commendable and efficient.

The City of Avondale operates a landfill that is located at El Mirage and Broadway Roads. Also using this facility are Cashion, Goodyear, Litchfield Park, and the County.

The City of Tolleson operates a landfill to meet its own local governmental requirements. It is located at 91st Avenue near the Salt River, just outside of the area under study.

Finally, there are a number of unauthorized dumps scattered throughout the sparsely populated parts of the Study Area. These dumps are unsightly, and constitute a public health hazard.

High Capacity Public Utility Lines

Four public utilities plus the U.S. Bureau of Reclamation currently operate a total of approximately 254 miles of high capacity utility lines within the Study Area. Over half, 132 miles, are electric power lines; and, sixty-one additional miles of electric power lines are programmed for construction in the immediate future. No new routes are programmed for either high capacity natural gas or

high capacity telephone lines. Most of the utility routes are in the southern and eastern thirds of the area under review. See Plate 13 for the types, capacities, and general locations of the existing and programmed facilities. Also, see Table 21 for data on right-of-way widths that was acquired from respective utility organizations.

Electric

Two public utilities provide electric power service to the Study Area. The Salt River Project serves that part of the area which is east of the New and Agua Fria Rivers. The Arizona Public Service Company (APS) serves that part which is west of the previously-mentioned rivers. Both firms use 69,000 volt overhead lines for their primary distribution networks. The other (higher voltage) lines now within the area are used exclusively for transmitting power between outside terminal points.

The two primary distribution systems within the Study Area currently obtain power from substations located outside of the area. However, APS will soon provide for direct service with construction of a new 345,000 volt line and expansion of its facilities at two existing substations. These new facilities, plus all of the other programmed facilities in the Study Area, will be constructed in conjunction with the new Navajo power plant located in northeastern Arizona. One of the new lines will be constructed by Tucson Gas and Electric Company. It is to run south, essentially along the Agua Fria River, from a new substation to be built by APS in the northeast corner of the Study Area. It will be the southern terminal for the 500,000 volt lines coming from the Navajo plant. Immediate service from the substation will also be provided to the Salt River Project system, and future very high voltage lines are planned to go west and northwest from the substation.

TABLE 21

RIGHTS OF WAY

High Capacity Public Utility Lines

	<u>Capacity</u>	<u>Owner</u>	<u>Average Width (Ft.)</u>
Electric	69,000 volts	Arizona Public Service Co.	In Public R/W
	69,000 volts	Salt River Project	In Public R/W
	161,000 volts	U.S. Bureau of Reclamation	40 - 100
	230,000 volts	Arizona Public Service Co.	--
	230,000 volts	Salt River Project	130 - 330
	230,000 volts	U. S. Bureau of Reclamation	125
	345,000 volts	Arizona Public Service Co.	--
	345,000 volts	U.S. Bureau of Reclamation	125
	345,000 volts	Tucson Gas & Electric Co.	300
	500,000 volts	Arizona Public Service Co.	--
Natural Gas	4 to 6" Diam.	Arizona Public Service Co.	In Public R/W
	8 to 12" Diam.	El Paso Natural Gas Co.	30 - 60
Telephone	Coaxial Cable	American Telephone & Telegraph	16 - 20

Natural Gas

Natural gas service within the Study Area is provided mainly by the Arizona Public Service Company. APS purchases the gas from the El Paso Natural Gas Company, which also has lines in the area under review. The El Paso lines primarily serve other areas; however, El Paso does occasionally sell gas directly to consumers who are located along its routes.

Telephone

The entire Study Area is served only by the Mountain States Telephone and Telegraph Company. In addition to the Mountain States lines, the American Telephone and Telegraph Company maintains a buried, high capacity coaxial cable which passes through the area, in the vicinity of Van Buren Street.

CHAPTER X
GENERAL LAND USE PLAN

The following is a discussion of the future population and the land area requirements for urban development, general planning objectives and policies, a suggested general land use plan, and various methods for implementing the suggested general land use plan.

Future Population

It is difficult to estimate the future population within the Study Area, since there is insufficient data available to establish a trend. At this time, about 90% of the County's population resides within the Phoenix Metropolitan Area. As Maricopa County grows, it is expected that the Metropolitan Area will eventually encompass a considerable portion of the area under review. For this reason a major objective of this study is to determine the amount and distribution of future population so that public facilities such as school sites can be planned accordingly and acquired in advance of need whenever possible.

The estimated population of the area was 51,356 persons in 1970, which represents 5.3% of the total County population. It has been estimated that the total County population may increase to 2,550,000 persons by 1995, which is more than two and one-half times the present population. If 5.3% of the aforementioned population resides in the Study Area, this would amount to a population of 135,150 persons by 1995 or more than two and one-half times the present population.

As explained later in this chapter, the 1995 planned holding capacity population for the entire Study Area is 246,000 persons. This total will serve as the control figure for the suggested general land use plan.

It is apparent that there is a vast difference between the two previously mentioned estimates, which range from 135,150 persons to 246,000 persons. This vast difference in estimates points up the difficulty of forecasting population for a limited geographical area such as the area under study.

Future Land Area Requirements for Urban Development

Studies made over a period of many years by Harland Bartholomew and Associates, who pioneered in the field of urban planning, revealed that there is a close statistical relationship between the amount of land used for various urban purposes and population units of one-hundred persons. Studies made by the County Planning Department since 1958 for various cities and towns also confirm the aforementioned relationship of population to land use. With certain adjustments for the type and character of the area being studied, this empirical relationship is the basis for estimating future land area requirements in the Study Area.⁽⁴⁶⁾ Table 22 shows the estimated urban land area required to accommodate 214,000 persons, which represents 87% of the total population of 246,000 persons. The remaining 32,000 persons or 13% are estimated to be rural population.

The estimated 1995 urban land area requirements are based on the assumption that future residential development will occur in the designated urban core areas at an average density of seven persons per gross acre except for Sun City and Youngtown, which have been developed at densities of about five persons per gross acre.

Estimates for future land area needs were developed by geographical sub-units, as follows: The southern urban area contains 20,384 acres of land, and at a gross density of seven persons per acre, this urban area would contain

TABLE 22

EXISTING AND ESTIMATED FUTURE RATIOS OF LAND USE TO POPULATION
AND ESTIMATED URBAN LAND USE REQUIREMENTS BY 1995

Land Use Category	Present Study Area		Various Cities	Future Land Area Needs		
	Acres Used	Acres Per 100 Persons Ratio(3)	Acres Per 100 Persons Ratio(4)	Acres Per 100 Persons Ratio(5)	Acres Required By 1995	Acres in Plan
Residential	4,300	14.00	6.70	7.85	9,230	16,798
Commercial	180	.59	.60	.77	905	1,645
Industrial	2,400	7.81	.77	.82	964	1,760
Parks and Playgrounds ⁽¹⁾	--	--	.14	1.13	1,329	2,420
Public and Semi-Public Streets ⁽²⁾	4,650	15.14	1.38	1.11	1,305	2,393
	--	--	3.42	3.90	4,586	8,336
TOTAL DEVELOPED AREA	11,530	37.54	13.01	15.58	18,319	33,352 ⁽⁶⁾
Agriculture	108,680					
Vacant or Desert	56,110					
TOTAL UNINCORPORATED AREA	176,320					
INCORPORATED AREA	5,440					
TOTAL STUDY AREA	181,760					

(1) Existing parks and playgrounds are included under Public and Semi-Public.

(2) Streets are included in areas in which they are located.

(3) Based on 30,719 persons within the unincorporated area.

(4) Based on a 1966 study of nine cities and towns within the County.

(5) Based on estimated 1995 population within urbanized area of 117,580 persons.

(6) Does not include 3,508 acres of scattered urban uses within rural area. The 33,352 urban acres shown can accommodate 214,000 persons.

approximately 142,500 persons. This means that 14.30 acres would be needed for every one-hundred persons. In the northern urban area, five persons per gross acre were used for Sun City and Youngtown, while seven persons were used for the remainder of the area. This area has 12,968 acres of urbanization, for a total of approximately 71,500 persons, or 18.12 acres per one-hundred persons.

Proposed Land Use Policies

Phoenix and the surrounding areas, including the Study Area, are mutually dependent for their social, economic, and physical well-being. To realize the preceding objectives, some public policies must be pursued by the entire Phoenix region. As a result, the following general land use policies are suggested for consideration:

- 1) Prohibit excessive use of water in the Phoenix region, to allow for stabilization and, if possible, recharge of the underground water reservoirs.
- 2) Permit new urban and rural non-farm residential development on lands that are well-suited for those purposes.
- 3) Preserve the best agricultural lands for agricultural uses.
- 4) Promote outdoor recreation and other open space land uses within and around urban areas.

General Land Use Plan

Plate 14, "Suggested Future Land Use Pattern", shows the general location and extent of residential, commercial, industrial, agricultural, and flood prone areas. Also shown are the general locations and types of schools, airports, other public and semi-public facilities, major streets and highways, hiking and riding trails, and parks and recreation areas. It is important to note the following three influencing factors:

- 1) Volume 1 of "A Report Upon West Central Maricopa County, Arizona", sub-titled "A Study of Physical Environmental Factors as a Basis for Land Use Planning"⁽⁴⁷⁾ provided a basis for the determination of agricultural and urban core areas.
- 2) The following future general land use plans were taken into consideration: Sun City, Youngtown, Surprise, Peoria, Glendale, Phoenix, Avondale, Litchfield Park, and reports upon a Comprehensive Plan for Maricopa County.⁽⁴⁸⁾
- 3) Luke Air Force Base noise zones were considered. Luke Air Force Base Noise Zone 2 is critical in planning for future development as: "Individuals (residing within this land area) may complain, perhaps vigorously. Concerted group action is possible." For this reason, any intensive use of the land area within Zone 2 is not recommended. The section entitled "Luke Air Force Base Zoning" located in Chapter V contains detailed information.

Residential Land

Proposed urban residential land area comprises 16,798 acres.

Urban Residential

Overall, an average density of seven persons per gross acre is envisaged for this residential category, although individual subdivision could have densities of twenty persons or more per acre. This density would be necessary in the designated urban core areas in order to provide the necessary public utilities and facilities. By securing compact and contiguous residential development, the Plan will serve residents more effectively, as follows:

- 1) Urban sprawl will be curtailed by providing for agricultural and rural residential buffer areas thus relieving the monotony of suburban development.
- 2) Community identification will be retained since the urban core areas are centered around existing communities, including: Tolleson-Cashion, Avondale-Goodyear, Litchfield Park, Sun City-Youngtown, El Mirage-Surprise, and Peoria. Further, in some cases the flood prone areas of the Agua Fria River aid in retaining community identification.
- 3) Scattered pockets of development will be discouraged.
- 4) Subdivision design can be more flexible, and result in additional benefits such as an improved internal street system.
- 5) Residential uses will be insulated from the interstate freeway.
- 6) Needed recreational areas will be conveniently located to users.
- 7) Employment centers will be very convenient.
- 8) Overloading of community facilities such as sewer trunk lines will be avoided.
- 9) Full consideration can be given to the containment of high capacity public utility lines within existing corridors.
- 10) Water usage will be reduced appreciably as generally urban uses only require half the water used for agricultural purposes.

The category "Urban Residential" applies to various types of residential uses and lot sizes. It is anticipated that the majority of single-family residential development would be located on 8,000 to 18,000 square foot lots with exception of town houses that may be satisfactorily built on lots as small as 5,000 square feet in size. Also, multi-family residential areas should be encouraged as long

as the overall density of seven persons per gross acre is not exceeded for the tract of land under development. Within this grouping there could be town-houses, duplexes, apartments, mobile home parks, and the like; in fact, both Sun City and Litchfield Park already have this type of residential development. It is reasonable to expect that multi-family type development would logically occur near planned shopping centers and designated highway commercial-industrial areas; however, it is recommended that no residential development be permitted in commercial or industrial areas. By adhering to these guidelines, multi-family uses in many cases will serve as a buffer between single-family residences and employment centers, and make the home-to-work trip more convenient.

Desert Areas

Desert areas comprise some 26,000 acres and are defined as those unreserved portions of the area which have not been developed or used for urban purposes. The major portions of desert land are located south and east of Luke Air Force Base, a narrow strip west of Perryville Road, and in the most northern portion of the Study Area.

Most of the desert areas have some soil covering capable of supporting at least limited plant growth. The soils vary from very thin, rocky and gravelly soils on the steeper slopes close to the mountain fronts, to thick sandy and clayey loams toward the major drainage channels. Generally, the desert areas have no severe limitations for urban development, and the soils on slopes of less than one percent are mostly suitable for agriculture. In local areas, however, limitations may be present and the detailed soil capabilities studies of the U.S. Soil Conservation Service should be consulted.

Commercial Land

The General Plan provides for two broad categories of commercial land use: planned shopping centers and general commercial areas, for a total of 1,655 acres. A positive attempt has been made to eliminate many deficiencies associated with conventional business districts such as: areas of slow vehicular traffic, time-consuming and hazardous intersection delays, conflicts of pedestrian and vehicular traffic, and inadequate parking. As a result, the economic base will be strengthened.

Planned Shopping Centers

As defined in 1968 by the Urban Land Institute, a shopping center is "A group of commercial establishments, planned, developed, owned and managed as a unit related in location, size, and type of shops to the trade area that the unit serves; it provides on-site parking in definite relationship to the types and sizes of stores."⁽⁴⁹⁾

There are three recognized types of planned shopping centers: neighborhood, community, and regional. Each type of center varies in the following key characteristics: average gross floor area, average minimum site area, minimum population support, and the leading tenant. The recommended Plan provides for a total of 685 acres of commerce distributed as follows: 270 acres for neighborhood shopping centers, 160 acres for community shopping centers, and 255 acres for regional shopping centers.

It is beyond the scope of this report to analyze shopping center characteristics and trends; however, the following table will be useful in understanding the basis for recommendations in the Plan:

TABLE 23

Types of Shopping Centers

<u>Type of Center</u>	<u>Recommended Site Size (acres)</u>	<u>Leading Tenant</u>	<u>Nature of Sales</u>
Neighborhood	5 to 10	Supermarket	Convenience goods (food, drugs, etc.). Personal services (laundry, barber, etc.).
Community	20 to 40	Variety store and super-market	Above, plus more soft lines (clothing), and hard lines (appliances). More variety.
Regional	70 to 100	Department stores, plus office buildings	General merchandise, apparel, furniture, etc. Full variety. Professional offices and clinics.

In particular, neighborhood and community shopping centers are represented schematically on Plate 14. Many of the centers are shown as a circle embracing all four quadrants of principal roads because it is impossible to predict exactly where future development may occur. Yet, it is anticipated that when development does occur, the shopping center will be sited in one quadrant of an intersection of principal roads (not split with commercial uses at each corner). In this manner, the interrelated highway and business functions will be safeguarded.⁽⁵⁰⁾ It should be noted that the location of shopping centers in Litchfield Park differs as a result of the conceptual plan developed by this community. Further, there are two proposed regional shopping centers for the southern portion of the area under study. Even though they are only four miles apart, each one has its own natural trade area and will be able to take full advantage of freeway amenities. Also, it should be emphasized that these regional centers will serve periphery areas.

In summary, all planned shopping center sites are provided with access via principal roads, and are sufficiently spacious to provide for a safe internal circulation system, ample parking, and future expansion. Finally adequate screening should be used to buffer non-commercial activity.

General Commercial Areas

For purposes of the report, this term is described accordingly:

- 1) Central Business District: These areas have been provided for by the various communities for a total of 560 acres. Within this type of commercial activity, uses will range from retail shopping to service and repair-type facilities.
- 2) Highway Commercial: These areas are specifically designated on the Plan and they parallel the interstate freeway for a total of 410 acres. By grouping this type of activity it is possible to meet the needs of both freeway users and local residents. In these areas, it would be advantageous to have such uses as motels, travel trailer parks, restaurants, gas stations, garages, and the like.

Industrial Land

Industrial areas total 1,760 acres. It is anticipated that new industry, in the urban core areas, will be light as heavy industry is neither desirable nor needed. Agriculturally-oriented industrial uses that are generally considered as obnoxious (feed lots, cotton gins, and the like) should be restricted to the designated agricultural areas, away from population concentrations. In this manner, required supportive -agricultural -industrial uses will not be eliminated to the overall detriment of the Study Area.

It is anticipated that a sizable segment of the population will be employed locally. When combined with future commercial activity, the area will have a sound economic base. To illustrate:

- 1) Industrial areas are conveniently located in respect to population concentrations, whether it be Tolleson in the south or Surprise in the north.
- 2) Extensive industrial areas are provided along the interstate freeway to take full advantage of safe, high-speed market connections.
- 3) The designated industrial area on Litchfield Road is conveniently located to both the Phoenix-Litchfield Municipal Airport and the freeway.

In summary, potential future industrial growth is enhanced by a number of key factors such as: an expanding population, an interstate freeway with significant market impact, and the need for large-sized industrial sites with necessary utilities.⁽⁵¹⁾ This potential growth most likely will be in the following activities: manufacturing, wholesaling and warehousing, and research and development establishments.

Agricultural Land

Agriculture should continue to be the predominant land use in the Study Area. For it to remain an important segment of the economy, however, agriculture should be protected against urban encroachments. In turn, by safeguarding the proposed agricultural areas, the urban core areas will be buffered by green fields. The recommended agricultural pattern, which totals 96,700 acres, is shown on Plate 14. Factors considered in making this determination, included:

- 1) The retention of agricultural lands with the best soils, as based on data contained in Volume I of this report.
- 2) The formulation of urban core areas to avoid haphazard intrusions into areas that are presently irrigated and under cultivation.

3) The high consumptive use of water for agricultural purposes.

As has been stated earlier, the stimulus to initial growth was the advent of irrigation farming in the early 1900's. Given a dependable water supply to complement the favorable climate, it is not surprising that the agricultural lands in the Valley of the Sun have been among the most productive in the world. In the Study Area, it is of note to remember that approximately 109,000 acres are presently cultivated.

Nationally, we lose about 1,250,000 acres of arable land each year. How much of this land is actually required or actually developed for urban uses and how much lies in idleness, due to the impracticality of farming land in very close proximity to urban areas is unknown. In Maricopa County, this process occurs at an approximate rate of 3,500 to 4,000 acres a year. A study made several years ago of Salt River Project records indicated that conversion of agricultural land to other uses occurred at a rate of 3,600 acres a year.

The reason for the large shifts of agricultural lands to urban and associated uses in Maricopa County is clear. Agriculture, the base on which the Valley of the Sun grew, was the predominant land use when the Salt River Irrigation Project was built. The tremendous growth experienced since World War II required tremendous acreages of land on which to build. In most cases, the nearest, most easily developable lands with existing water resources, were the agricultural lands surrounding Phoenix.

Both the process and the rate of absorption are known, and evident too is the irreversibility of the change. What remains to be answered is whether or not using this valuable resource for urban purposes as compared to using other available-non irrigated lands is in the best interest of the community and the property owners concerned. This question should be the subject of a separate study, a study that is long overdue.

More specifically, approximately 12,000 acres of presently used agricultural lands are recommended for conversion to urban-type uses. Most of this acreage is situated in the southern part of the Study Area. A glance at Plate 14 reveals that about one-half of the land area will still be useable for agriculture and related farm activities (cotton gins, dairies, feed lots, and hydroponic establishments). It must be emphasized that it will be in order to use those lands for that specified purpose, and not to permit creeping urbanization in the form of scattered subdivisions.

At this time, it has been calculated on an annual basis that in the Study Area water usage amounts to roughly 555,000 acre-feet while water input sources total about 325,000 acre-feet, a deficiency of 230,000 acre-feet (40% of the total used). The "missing water" is obtained by "mining" groundwater reserves that could dry-up within forty years IF the present rate of depletion remains constant. Obviously, water stabilization (input = output) is a policy that must be stressed. It is estimated that roughly 16,000 acre-feet of groundwater reserves will be saved from "mining" if the suggested General Plan is followed. Obviously, this would be a major step in the right direction. Other helpful measures to conserve water include: 1) increased efficiency in irrigation practice, 2) cultivation of crops that do not use vast amounts of irrigation water, and 3) promoting hydroponic establishments.

Flood Prone Land

Flood prone land areas shown total 22,200 acres or about 12% of the Study Area. Also shown are proposed channels for the following rivers: Agua Fria, Gila, New, and Salt. The data presented herein is based on information adapted from these sources: Maricopa County Flood Control District,⁽⁵²⁾ U.S. Army Corps of Engineers,⁽⁵³⁾ the U.S. Geological Survey,⁽⁵⁴⁾ and the Maricopa Association of Governments' Storm Drainage Report.⁽⁵⁵⁾

Admittedly, the Study Area has a flood problem, and encroachment has already occurred in flood prone areas. With increased urbanization, the pressures will rise to permit more intensive development in the flood prone areas.

It is strongly recommended that at this time the flood prone areas be protected against any further encroachment, urban or rural, which will reduce the flood-carrying capacity of any floodway. At some point in the future, when corrective and preventive measures have been implemented to reduce significantly the problem of flooding, this Plan should be amended accordingly where warranted.

More specifically, corrective measures include primarily the construction of dams and channel improvements. Preventive measures are primarily flood-plain management methods including regulations that will designate floodways. The subsection entitled "Flood Control District", which appears later in this chapter, contains additional information on preventive measures.

To summarize: at some future point it will not be necessary, as it is now, to halt all development in flood prone areas. Instead, it will be possible to have a designated floodway with adjacent zones designed to permit varying intensities of use. To illustrate, a large linear type of park providing for a variety of recreational activities could be established in the south portion of the Agua Fria River.

Public Schools

The General Plan proposes a system of schools based on the standards and pupil enrollments previously discussed in Chapter VIII. The total number of students projected for 1995 would require forty-eight elementary schools and seven high schools, for a total of 1,166 acres. By comparison, there are now fifteen elementary school and three high schools that utilize a total of 311 acres of land. These totals provide only for resident students. No provision has been made for students residing

outside the Study Area who may attend schools within the area under review. School sites should be acquired in advance of need whenever feasible. Also an in-depth school plant study should be prepared for the County.

In addition, a 275 acre site is shown on the General Plan for a Junior College. The proposed site is centrally located in the southern half of the Study Area and is readily accessible by freeway. Such a facility will be required within the next decade.

The site could accommodate both a liberal arts school and a trade school with sufficient open space to provide for a well-planned campus. Being close to a large agricultural area, the trade school could offer courses in farm related activities such as an experimental farm, or in farm equipment maintenance, etc. Aircraft repair, in conjunction with the municipal airport and the crop-dusting strips within the area, is another possibility. These trades would require a considerable amount of space. Of significance, the school could also provide some of the manpower that would be needed by the industries that move into the area.

Phoenix-Litchfield Municipal Airport

The City of Phoenix has submitted a request for federal financial assistance under the Airport Development Air Program authorized by the Airport and Airway Development Act of 1970 for a project to construct a new parallel taxiway (8,000' x 40') and install taxiway edge lighting. Approval of this request is expected in 1972.

Also, the City is encouraging the initiation of air freight service at this location. This service would benefit both the agricultural and industrial interests that are or will locate in the vicinity.

Other Public Facilities

In June 1971, Associate Architects Varney, Sexton, and Sydnor submitted a study entitled "County Facility Proposal Report"⁽⁵⁶⁾ to the Board of Supervisors. This report recommended that the County property on the northeast corner of Dysart Road and Van Buren Street be used as a "Southwest County Service Center". The uses recommended include low cost housing, a park, sheriff's detention facility, juvenile probation office, site maintenance shop, and a service center for minor repairs and storage of vehicles and equipment. Also, when required, other facilities might be added such as court functions. Presently, the site is partially used for low cost housing and a neighborhood clinic.

The County leases, from the City of Tolleson, a portion of the City-County Complex at 95th Avenue and Van Buren Street. This site is only three acres in size and contains a City Hall, jail, and library in conjunction with the County's Health Clinic and Justice of the Peace court.

In 1968, John Carollo Engineers prepared a "Solid Wastes Disposal Report" and a "Wastewater Report" for Maricopa County, but they did not have the benefit of this suggested "General Land Use Plan". Recently, the County Health Department estimated that approximately 640 acres will be needed for sanitary landfills to meet the needs of the projected population within the Study Area. It is premature at this time to designate these sites, but it is recommended that one large site be in the northern portion and another one in the southern portion. Also, a new study should be undertaken to design a sewer system that would conform to the recommendations contained in this report.

In July 1971, agreement was reached by five Valley cities to build a \$6,000,000 addition to the 91st Avenue sewage treatment plant. The addition will be constructed by 1974. It will add 30,000,000 gallons a day capacity to the plant, thereby increasing total capacity to 135,000,000 gallons per day. The agreements provide for the addition of 5,000,000 gallons per day to the City of Glendale's capacity.

Major Streets and Highways

The proposed major street and highway system totals approximately 146 miles. The suggested future land use pattern, the "1990 Assigned Traffic Volumes" prepared by the Maricopa Association of Governments Transportation Planning Program, and the State and County Highway Departments' plans were considered in formulating this system.

Freeways

The proposed I-10 (Papago West Freeway) will cross the southern portion of the Study Area, between Van Buren Street and McDowell Road, for a distance of about thirteen miles. This freeway is part of the Interstate System that connects Phoenix to Los Angeles, and it is expected to be completed in the mid-1970's. There will be a right-of-way of 308 feet with flaring at the seven interchanges. The roadway will be five feet above grade, with six moving lanes from 67th Avenue to Dysart Road and four moving lanes from Dysart Road to beyond Jackrabbit Trail. Controlled access will be maintained throughout the length of the freeway. Access control on all crossroads will be maintained for a distance of 300 feet beyond the freeway right-of-way line. Generally, frontage roads will not be necessary. Also, an additional ninety feet or right-of-way will be required along the north side of the highway, from approximately Bullard Road to 67th Avenue, for construction of a lined drainage channel.

There are two freeways proposed by other groups within the area, that have not been shown on the plan: The Paradise Freeway, with an alignment along Bethany Home Road to Litchfield Road, then southwest to I-10 at Reams Road, was proposed by the developers of Litchfield Park. This freeway is not part of the State Highway System nor would it appear to be warranted. The Buckeye (Maricopa) Freeway, in the vicinity of Broadway Road, is intended to link I-17 with U.S. 80 near Reams Road. This freeway is now included on the State Highway System and

and would pass through an agricultural area; therefore, it would not serve the majority of the residents in the urban area. Further, being within four miles of the Papago West Freeway, it is very doubtful if it ever will have sufficient traffic to justify construction.

Other Major Streets and Highways

The Plan shows approximately 133 miles of major streets and highways. Most of these roads will require additional rights-of-way for extension or widening, and should be provided in advance of need. These facilities should be divided four-lane routes when the average daily traffic count approaches 5,000 vehicles. In addition, to safeguard their design capacity, intersections should be protected against needless curb cuts to avoid congestion.

Highway Beautification

The Arizona Highway Commission recently declared a moratorium on advertising sign construction at rural interstate highway interchanges. This was done to conform to Arizona House Bill 195 (approved May 18, 1970) and the 1965 National Highway Beautification Act. Such compliance is commendable since highway aesthetics should not be overlooked.

Public Transportation

There will be a considerable number of persons dependent upon public transportation. It is reasonable to expect that service should be provided to: link the designated urban core areas, 2) serve major employment centers (especially those by the interstate freeway) and 3) connect with Central Phoenix.

In July 1971 a consulting firm submitted to the Maricopa Association of Governments a report entitled, "Phoenix Urban Area Public Transportation Study".⁽⁵⁷⁾ This report contains a number of recommendations on possible solutions

to this urban problem. At this time, the report is undergoing study by concerned public officials prior to taking official action.

It is recommended that an efficient bus transit system be developed. This subject is complex and beyond the scope of this report; therefore, it is further recommended that the matter be studied in more detail. Yet, one observation is in order: historically, in other parts of the nation, where densities are low such as in the Phoenix urban area automobiles are used to assemble sufficient passengers at a loading point near a public transit stop. These loading points are known as "fringe parking lots" or "park-and-ride" areas. Fortunately, the area under review contains several sites where this approach could be used (on County property in Avondale; and at employment centers along the freeway).

To illustrate: in the morning rush hour a bus could be loaded at one of these areas, and then continue on into Phoenix as an express bus. Basic to this suggestion is the assumption that bus transit must be considered a public service and not a profit-making operation.

Hiking and Riding Trails

The two hiking and riding trails discussed previously in Chapter VIII are shown on Plate 14. New trails are under study by County officials, and others, but no definite locations have been established yet.

Parks and Recreation Areas

To meet the projected holding capacity population of the Study Area, exclusive of Sun City and Youngtown, it is estimated that fifty neighborhood park-playgrounds and ten community park-playfields will be needed. These estimates are based on the principles and standards discussed in Chapter VIII. The park-playgrounds are ten acres in size and located, whenever possible, adjacent to an elementary school while the forty acre community park-playfields are situated next to the high schools. In several cases it was not possible to provide for park-playground sites.

A 1964 report entitled "Canal Parks - Guidelines for Their Planning and Development", prepared for Maricopa County, recommended a series of neighborhood size parks at various intervals along canals within the Valley. (58) Although none were recommended within the area, consideration should be given to the development of some of the neighborhood parks as canal parks, e.g. in conjunction with the R.I.D. Canal that crosses the southern urban area.

The White Tank Regional Park, the Estrella Mountain Regional Park, and the Casey Abbott Recreation Area, all part of the County Park system, are within easy driving distance of the entire area.

Golf Courses

The only public golf course within the area is situated in the Casey Abbott Recreation Area. Yet, there are seven existing private or semi-public golf courses, and two additional courses under construction. All golf courses mentioned have 18-holes. Further, as the area continues to urbanize, it may be assumed that more courses will be added. Chapter VIII, under the sub-section "Golf Courses", contains pertinent data on standards.

Statistical Summary of the "Plan"

To recapitulate, Table 24 entitled "Suggested Future Land Area Needs and Population Totals" contains statistical data pertaining to the plan that may be helpful.

Implementing the General Land Use Plan

This planning report was prepared in recognition of the growth trends in the west central portion of Maricopa County and need for a general plan to serve as a guide for future development. This section discusses the planning tools and methods that are, or may become, available to gradually implement the various plans and proposals contained in this report.

TABLE 24

SUGGESTED FUTURE LAND AREA NEEDS AND POPULATION TOTALS

Major Land Use Category	General Plan		Holding Capacity Population	%
	Acres	%		
Urban	33,352	18.35	214,000	87
Urban Uses in Rural Areas ^(a)	3,508	1.93	9,000	4
Rural Non-Farm Residential	26,000	14.31	(23,000 ^(b))	9
Agriculture	96,700	53.20	(
Flood Prone	22,200	12.21	--	--
TOTAL	181,760	100.00	246,000	100

Notes

(a) Luke Air Force Base comprises 2,510 acres of the total, and accounts for the listed population. Also included are schools and recreational facilities.

(b) Total rural non-farm residential and agricultural population.

Zoning Regulations

Zoning regulations are primarily concerned with the use of land, maximum height of structures, and open space around buildings. The first zoning regulations for the unincorporated area of Maricopa County were adopted in 1951 and the present zoning regulations became effective May, 1969. From time to time these regulations are amended to meet new needs and unforeseen conditions. However, the majority of amendments are made as a result of individual applications for change of zoning districting and in the absence of a general land use plan, such as suggested herein for the Study Area, there has not been a general guide by which the merit of individual changes could be evaluated.

The proposed general land use plan discussed in this report is intended to serve as a future guide or yardstick to evaluate the merit of applications for zoning changes in order that various land uses may be harmoniously related to one another. If this general plan is adhered to, the present zoning districts could be gradually adjusted to conform with the plan over a period of years. It should be noted that this positive end result could be accomplished by using more effectively the regulations on "unit plans of development" and "planned shopping center and industrial zoning districts" that are provided for in the zoning ordinance.

Subdivision Regulations

As a companion tool to zoning regulations, subdivision regulations are an essential aid for implementing a land use plan. When land is subdivided for residential development, lots must be provided that meet the minimum requirements under the zoning district regulations applicable thereto with respect to lot size and lots must be designed to permit the provision of front, rear, and side yards that meet the minimum requirements of the zoning regulations.

Currently, the County has subdivision procedures and requirements that are set forth in a manual which deals with the form, content and process of platting land, and with subdivision design principles and standards which should be observed. The County does not accept into its system any street or road that is not built to County standards. In 1971 the State Legislature enacted state enabling legislation that permits counties to prepare, adopt, and enforce regulations concerning subdivision platting.⁽⁵⁹⁾ Notwithstanding lack of enabling legislation, since creation of a planning commission there has been review and processing of subdivisions in the unincorporated area but present legislation will permit improvement of these procedures and requirements for street improvements pursuant to County standards.

Building Code

Building Codes are generally concerned with construction, alteration, addition, repair, removal, demolition, use, location, occupancy, and maintenance of all buildings and structures and certain service equipment.

There is a need for a building code applicable to unincorporated areas of the County. Building codes help prevent premature deterioration and blight. Permissive state enabling legislation had been sought for many years without success, until finally in 1970 the State Legislature enacted it but the legislation lacks specific authority to levy fees. Efforts are being made to correct this deficiency in present legislation. The Board of Supervisors propose to establish a building department in July 1972 to administer a building code if the present state enabling legislation can be amended in the interim to provide for levying fees to defray the cost of administering a building code.

Health Code

Maricopa County has a health code that has as its purpose the establishment of "procedures, standards and regulations for the enforcement of the State laws

and regulations affecting public health" and provisions of this code are applicable to the unincorporated areas of Maricopa County and incorporated cities and towns whose governing bodies specifically request the services of the Maricopa County Health Department. This code includes regulations governing the collection and disposal of solid wastes, domestic water supply, trailer parks, domestic and industrial sewage, sanitation of certain habitable private and public buildings and the keeping of animals. The health code also contains regulations for other items not listed herein.

Flood Control District

Maricopa County has a comprehensive flood control program administered by the Flood Control District of Maricopa County. This program is concerned with flood control problems, recommended solutions to prevent or minimize flood damage, and preparation of cost estimates for the recommended solutions, within or adjacent to the County. Although flood control is the primary objective of this program, consideration has been given to erosion control, recreation, irrigation, water storage, and ground water recharge.

In 1971 the State Legislature enacted legislation that contains language to permit counties to prepare, adopt, and enforce flood-plain regulations in unincorporated areas.⁽⁵⁹⁾ Proposed flood-plain management regulations are presently being considered. These would be contained in amendments to the zoning ordinance and proposed subdivision regulations.

Extension of Utilities

Plans for utilities such as water, sewer, gas, electricity, and telephone should take into consideration the suggested general land use plan and estimated future population distribution as a guide in determining the general location and extent of future service requirements.

Highway Joint Development and Multiple Use

Highway joint development projects have been carried out for a multitude of purposes elsewhere in the nation, but basically the objective sought has been a higher measure of compatibility between the highway facility and its environment.⁽⁶⁰⁾ Under this concept, non-highway activities such as housing, commerce, recreation, and others, are located in airspace above or below the highway or on land adjacent to it. In the Study Area, Interstate 10 offers a splendid opportunity for multiple use. For example, crossings could be provided for hiking and riding trails, and fringe parking lots by freeway interchanges would be helpful to those persons using buses. Additional study on this matter might develop other multiple use possibilities (e.g. schools).

Provision of Schools and Parks

Jurisdictions and school boards responsible for the provision of schools and parks should prepare long-range plans that take into consideration the suggested general land use plan including the amount and distribution of present as well as future population for which facilities would be needed. Such plans should be periodically reviewed and revised when warranted by unforeseen needs. To the fullest extent possible land for school and parks should be acquired in advance of need and in conformance with a plan for a system of schools and parks. Each school district should have a plan for its system of schools and these should be coordinated with each adjoining district.

In many communities elsewhere, subdivisions of land are required to consider any adopted plan for schools and parks where such sites are needed within the area embraced by the subdivision. This enables the concerned public body to acquire needed sites through negotiations with the developer.

Also, since multiple use of schools and parks is highly desirable it would be of value to explore the following approach: let a governmental entity e.g. Parks Department, acquire, develop and maintain a park site that would be adjacent to the school site (with Federal grant assistance), and let another governmental entity e.g. School Board, operate the facility. Admittedly, there may be administrative and other problems. Also, because of the the large land area the County is presently primarily concerned with regional parks.

Interestingly, in May 1971 the Oregon State Legislature approved a bill requiring the construction of footpaths and bicycle trails. This bill requires the state, cities, and counties to allocate about \$1,300,000 per year from highway-user funds to build the paths and trails. This innovative approach should be examined to determine applicability to Maricopa County.

Methods to Acquire and Preserve Open Space Lands

Numerous methods, to acquire and preserve open space lands, which have been used successfully in other parts of the nation for application locally. It will be evident, however, that the various methods suggested herein need more detailed study than limitations of this report permit. In summary, suggested methods include:

1) Large Lot Zoning

Where applicable, this method may be used to preserve the spacious character of certain residential areas in order conserve property values. Also, this method has the beneficial effect of reducing the need for sewers and the amount and extent of various governmental services required in areas of higher population density.

2) Exclusive Agricultural - Conservation Zoning

The present "Rural" zoning regulations are of assistance in conserving agricultural land and open space inherent in agricultural use of land. An agricultural conservation zoning district would protect agricultural land by excluding other non-related uses. This method has been used successfully both in California and Hawaii. To date, this method has never been used in Arizona but it could implement the "Agricultural" category shown on the General Plan.

3) Cluster or Density Zoning

This method permits a developer to reduce the land space usually required around each house as long as compensating amounts of open space are provided within the same development. The open space land thus provided is held in common ownership and maintained by a homeowner's association. This method would be appropriate for the "Urban Residential" category.

4) Fee Simple Purchase

Under this method, a public entity would purchase outright the needed open space land. From a public relations viewpoint this is generally the most acceptable and commonly used procedure. However, it often proves to be slow and it may result in certain inequities in the price paid for land.

5) Condemnation

This method is probably used more frequently for acquiring rights-of-way for streets and highways than for open space purposes.

6) Urban Redevelopment

Where such legislation is available it provides a method for acquiring individually owned parcels for redevelopment in accordance with an adopted plan. It utilizes the powers of eminent domain, and this method could be used by the municipalities in the area.

7) Installment Purchase

A price per acre for an entire tract is agreed to by the land owner and the public authority. Then, the public authority agrees to purchase a stipulated number of acres annually until the entire tract is acquired. In return, the entire tract is removed from the tax rolls when the initial agreement is signed. This method could be used for the acquisition of lands that are not suitable for development such as flood prone areas.

8) Acquisition of Tax Delinquent Land for Public Purposes

This method has been utilized elsewhere such as in Florida.

9) Less than Fee Interest

This method involves the acquisition of conservation, scenic, and development easements, or leasing. The purpose is to preserve selected properties in their natural state or to deter uses that would be inconsistent with open space aims. This method would be useful to develop the needed hiking and riding trails system.

10) Tax Incentives

Two controversial methods are: tax differential and tax deferral schemes. In the former method, a particular class of land is favored with a lower or differential assessment. In the latter method, all taxes on land located within a planned or existing open space site would be deferred as long as it remains in an open type of land use. Note: Taxes on improvements are collected. However, if an owner of such a site decides to develop for a non-open space use, then all deferred taxes would have to be paid before building permits would be issued. California has used this approach.

11) Gift

A successful method is the encouragement and acceptance of donations of land. This method has won acceptance because under existing Federal law,

taxpayers may be entitled to income tax deductions for contributions to programs designed to conserve the Nation's natural beauty. The donations may consist of outright gifts of land or conservation and scenic easements.

A final note: when local jurisdictions or agencies lack funds, there are private conservation groups that may purchase the land and hold it until the local jurisdiction can purchase it for public park purposes. One such group is the "Nature Conservancy" that has its headquarters in Washington, D.C. Interestingly, this group employs a tactic called "checkerboarding" to stop the bulldozer. This tactic calls for the purchase of scattered but strategic parcels in a desirable open space area, thereby, discouraging anticipated urban development.

General Improvement District

Recently adopted State enabling legislation (Arizona Planned Communities Act) permits owners of 4,000 acres or more to petition the Board of Supervisors for the establishment of a general improvement district. Upon approval by the State Community Development Council, the district will have power to develop and operate water, drainage and sewer systems, public recreational facilities, arterial streets, garbage collection, fire protection, and the like. Before the district can engage in any development, it must submit to said Council an application that provides in detail all of the plans for the proposed development. The Act specifically states: "No plan shall be approved unless it can be shown that a total community will be developed as provided herein, as distinguished from a plan providing merely for the development and subdivision of land." McCulloch Properties has submitted the first development plan for "Fountain Hills" (in Eastern Maricopa County) under this Act.⁽⁶¹⁾

This Act might be useful for future development of areas in the southern part of the Study Area (e.g. those lands between the Agua Fria River and the City of Tolleson, and from Camelback to Buckeye Road) where single land holdings are large enough or if land holdings were consolidated to aggregate 4,000 acres in total size.

Public Understanding and Support

Public understanding of planning problems and needs within the Study Area and support of measures available for implementation of planning proposals and objectives are essential if maximum benefits are to be obtained from this study. Suggestions for improvements of this report will be helpful and carefully taken into consideration. The information and data contained in this report should be reviewed at periodic intervals and planning proposals should be updated and refined as conditions and circumstances warrant. In this manner, this report will become a viable document.

In conclusion, it is appropriate to include an excerpt from an editorial on Arizona's future growth that appeared in the Arizona Republic within the past year:⁽⁶²⁾ "... But it is also well to remember that there is no way, outside an absolute dictatorship, to plan growth down to the finest detail. What we should strive for is a broad outline that protects our natural assets, but leaves room for innovation and diversity..."

CHAPTER XI

SUMMARY OF MAJOR FINDINGS AND RECOMMENDATIONS

Major Findings

1. Introduction. This report discusses existing conditions and trends in economics, population, housing, land use, public facilities and utilities within an area that is bounded on the north and west by the Beardsley Canal, on the east by 91st Avenue, and on the south by the Gila and Salt Rivers. The area embraced in the study contains about 342 square miles of land of which 285 square miles or about 180,000 acres have been tabulated and discussed in this report.

Irrigation on a large scale was made possible by the enactment of Federal legislation on homesteading and irrigation canals in the 1860's and 1870's. The Grand Canal that traverses a portion of the Study Area opened in 1878, just a decade after the opening of the Valley's initial canal.

2. Economic Survey. The economic base within the area is primarily a combination of the following principal activities: government, manufacturing, and agriculture. In fact, these three activities account for about 75% of total employment. The Study Area 1970 assessed valuation is estimated to be approximately \$75,000,000, which represents 6% of the total assessed valuation of Maricopa County. Although the area is recognized as being predominantly rural in character, it is surprising to note that non-agricultural employment overwhelmingly exceeds agricultural employment by more than a 5 to 1 ratio. Overall, employment totals 19,800 persons. It is estimated that there are about 200 employers for non-agricultural activities. A Luke Air Force Base survey

conducted during April, 1970, revealed that annual expenditures by the Base surpassed \$65,000,000 of which almost 90% was for its gross payroll. The Base working population totalled 8,300 persons.

In the Study Area it is estimated that there are about 310 farms. Average size of each farm is 350 acres, while the median size is 160 acres. Total employment on farms is estimated to be 3,200 persons. The ten principal crops grown in Maricopa County are also grown in the Study Area. Included in this listing cotton, citrus, alfalfa, and sugar beets. Related agricultural activities are of substantial significance, including: 30 dairies, 17 licensed cattle feed lots, 9 cotton gins, 7 crop duster strips, and the like.

3. Existing Conditions. The geology of the area forms the framework for the physical setting. It is located within the desert region of the Basin and Range Province. The general slope of the land presents no problem for present or future development. There are three major kinds of soils within the Study Area. All three kinds are suitable for agriculture, although there is a variation in the management and cultivation practices required for each kind. Flooding has occurred in the area despite the completion of the nine-mile long Trilby Wash Detention Basin, two smaller detention basins, the McMicken Dam, and its outlet channel.

Overall, the availability of water is the critical problem in the Study Area, as it is in the region. Staff estimates indicate that slightly over 555,000 acre-feet of water are used annually while total yearly input is slightly over 325,000 acre-feet, a deficiency of approximately 230,000 acre-feet of water. The "missing water" is obtained by "mining" groundwater reserves. Also the overwhelming usage of water is for agricultural purposes. In fact, only slightly more than 2% of the total used is for urban purposes. As based on 1964 data, it is estimated that the upper aquifer in the Study Area contained about 10,000,000 acre-feet water. Yet, if the present rate of depletion were to remain constant,

this invaluable groundwater source would be dry by the year 2010. Depth to groundwater, and the effects of "mining" the aquifer, vary considerably in the area. As based on 1965-1970 U.S. Geological Survey data for twenty-six index wells, the water level dropped almost nine feet per year in the north-central portion while rising almost fourteen feet per year in the south-east portion. In the Study Area, there has been a deterioration of both surface and subsurface water quality. Only the top northern portion of the area does not have a limiting factor (soluble salt content, hardness, and fluorides). Even though there are limiting factors affecting water quality, water can be treated to satisfactory quality.

4. Population and Housing. The estimated 1970 population for the Study Area is 51,356 persons. Of this total, 20,637 resided in incorporated communities, while 30,719 resided in unincorporated areas. The majority of the area has a density of less than one-half person per acre. The communities of Surprise, El Mirage, Tolleson, Avondale, Goodyear, and Cashion are heavily populated areas with ten or more persons per acre. In Maricopa County only 9.33% of the population is sixty-five years of age or older, while it is 22.92% within the Study Area. The higher percentage is attributable to the retirement communities of Sun City and Youngtown.

Based on the 1970 Census there are an estimated 18,720 housing units within the area. Further, 67.6% of all housing units are owner occupied, 24.6% renter occupied, 4.4% vacant year-round, and 3.4% vacant on a seasonal or migratory basis.

5. Land Use and Zoning. The Study Area contains 176,320 acres of land (excluding 5,440 acres within incorporated cities and towns). An analysis of the adjusted total shows that only 11,530 acres or 6.6% are developed for urban uses. The differential of 164,790 acres or 93.4% is either used for agricultural purposes, or is vacant or desert. Specifically, about 109,000 acres of land or

60% of the area are irrigated. The two sources of irrigation water are surface and groundwater. Six major service canals traverse the area. Publicly owned land within the Study Area amounts to 11,975 acres or almost 7% of the Study Area; of this amount, 5,500 acres or 46% is owned by the State of Arizona.

The present amended County zoning ordinance has been in effect since May 29, 1969. Under the ordinance there are nineteen zoning districts, of which fifteen occur within the Study Area. An analysis revealed that the amount of land zoned for various purposes is far greater than the amount of land actually used for various purposes. Overall, 172,070 acres or 95% is zoned Rural-43 or one home per acre.

A critical planning consideration is the protection of Luke Air Force Base by preventing new urban development from locating in the immediate vicinity of the Base within Noise Zone 2 thereof. This zone is described as follows by Base officials (in terms of the possible reaction of people who live in the zone): "Individuals may complain, perhaps vigorously. Concerted group action is possible". Noise Zone 2 accounts for 22,752 acres of land.

6. Major Streets and Highways. Two State Highways and numerous County Roads serve the overwhelming portion of the area. Most of the principal County roads are on the section line established by the U.S. Geological Survey when the land was originally surveyed. There are approximately 443 miles of maintained "section line" roads in the Study Area. Approximately 60% of these roads are paved. The heaviest traffic is on the two State highways, and in the eastern half of the Study Area. In addition to the State highways, four County roads carried more than 4,000 vehicles per day.

7. Transportation and Mass Transit. There is no scheduled air service originating within the Study Area. Phoenix-Litchfield Municipal Airport, a general aviation facility, totalled 164,000 movements during the 1970-71 fiscal year. Local passenger and freight service by bus is provided along the two State

highways. Also, Sun City has an internal bus system. Two railroads provide freight service to the Study Area, but no passenger trains stop in the area. No major freight service companies are headquartered in the area.

8. Public Schools, Parks, and Recreation Facilities. There are five high school districts and nine elementary school districts, containing three high schools and fifteen elementary schools respectively, which fall within the Study Area. All of the school districts within the Study Area are organized on the 8-4 plan. As based on recognized site standards, most school sites are seriously deficient in area both from the standpoint of design as well as average daily attendance. Estimated attendance figures for the present school year indicate that most of the schools in the area are approaching or already exceed the capacity for which they were originally intended. It is interesting to note, however, that the number of pupils per classroom is either equal to or below nationally recognized standards.

There are twelve separate municipal park areas with a total of 171 acres. Eleven of the parks fall within the neighborhood category and consist of a total of fifty-one acres. Existing park acreage is only 41% of the desired total and this must be considered to be quite inadequate. There are several large County parks and recreational areas within easy access of residents of the Study Area, which more than meet current and future requirements.

9. Public Utilities and Related Facilities. There are nine governmental water utilities, which are either within the area or extend into it. In addition, there are twenty-one private water companies although some are inactive. The eleven larger communities in the Study Area dispose of their sewage by different methods. Eight of these communities provide sewage disposal; the three communities that rely on septic tanks are El Mirage, Surprise, and Cashion. Solid waste disposal operations vary in the area. The three methods used include: sanitary landfill, landfill, and dump. The only sanitary landfill in the area is operated by the City of Glendale. Four public utilities plus the U.S. Bureau of

Reclamation currently operate a total of approximately 254 miles of high capacity public utility lines in the area. Over half, 132 miles, are electric power lines. Most of the utility routes are in the southern and eastern thirds of the area.

Major Recommendations

1. Future Population. It has been estimated that the total county population may increase to 2,550,000 persons by 1995, which is more than two and one-half times the present population. If 5.3% of the aforementioned population resides in the Study Area, this would amount to a population of 135,150 persons by 1995 or more than two and one-half times the present population. The 1995 planned holding capacity population is 246,000 persons, which total serves as the control figure for the suggested general land use plan. This vast difference in estimates points up the difficulty of forecasting population for a limited geographical area such as the area under study.

2. Future Land Area Requirements for Urban Development. There is a close statistical relationship between the amount of land used for various urban purposes and population units of one-hundred persons. The estimated 1995 urban land area requirements are based on the assumption that future residential development will occur in the designated urban core areas at an average density of seven persons per gross acre except for Sun City and Youngtown, which have been developed at densities of about five persons per gross acre. Overall, it is estimated that 33,352 acres will be required to accommodate an urban population of 214,000 persons. This density would be necessary in the designated urban core areas in order to provide the necessary public utilities and facilities.

3. Proposed Regional Land Use Policies. The following general land use policies are suggested: 1) Prohibit excessive use of water in the Phoenix region, to allow for stabilization and, if possible, recharge of the underground water reservoirs; 2) Permit new urban and rural non-farm residential development on

lands that are well-suited for those purposes; 3) Preserve the best agricultural lands for agricultural uses; and 4) Promote outdoor recreation and other open space land uses within and around urban areas.

4. General Land Use Plan. A "Suggested Future Land Use Pattern" has been prepared to show the general location and extent of residential, commercial, industrial, agricultural, and flood prone areas. Also, shown are the general locations and types of schools, airports, other public facilities, major streets and highways, hiking and riding trails, and parks and recreation areas.

5. Luke Air Force Base. The future size and function of Luke Air Force Base cannot be predicted. For purposes of this report, it is assumed that the Base will maintain its summer 1971 size and function. It should be emphasized, however, special attention must be given to future land use patterns in the vicinity of the Base. This is necessary because major alterations of flight patterns cannot be made without seriously jeopardizing safety of flight and endangering life and property. For this reason, any intensive use of the land area within Noise Zone 2 is not recommended.

6. Residential Land. Proposed urban residential land area comprises 16,798 acres.

The category "Urban Residential" applies to various types of residential uses and lot sizes permitted in the urban core areas. It is anticipated that the majority of single-family residential development would be located on 8,000 to 18,000 square foot lots. Also, multi-family residential areas should be encouraged as long as the overall density of seven persons per gross acre is not exceeded for the tract of land under development. By securing compact and contiguous residential development, the Plan will serve residents more effectively, as follows: 1) urban sprawl will be curtailed, 2) community identification will be retained since the urban core areas are centered around existing communities,

3) scattered pockets of development will be discouraged, 4) subdivision design can be more flexible, 5) residential uses will be insulated from the interstate freeway, and 6) and the like.

7. Commercial Land. The General Plan provides for two broad categories of commercial land use: planned shopping centers and general commercial areas, for a total of 1,655 acres. A positive attempt has been made to eliminate many deficiencies associated with conventional business districts such as: areas of slow vehicular traffic, time-consuming and hazardous intersection delays, conflicts of pedestrian and vehicular traffic, and inadequate parking. As a result, the economic base will be strengthened.

The recommended Plan provides for a total of 685 acres for three types of planned shopping centers: neighborhood, community, and regional. All proposed sites are provided with access via principal roads, and are sufficiently spacious to provide for a safe internal circulation system, ample parking, and future expansion.

General commercial areas include existing central business districts, and designated highway commercial areas paralleling the interstate freeway for a total of 970 acres. By grouping the latter type of activity, it is possible to meet the needs of both freeway users and local residents.

8. Industrial Land. Industrial areas total 1,760 acres. It is anticipated that new industry, in the urban core areas, will be light as heavy industry is neither desirable nor needed. Agricultural-oriented industrial uses that are generally considered as obnoxious (feed lots, cotton gins, and the like) should be restricted to the designated agricultural areas, away from population concentrations.

It is anticipated that a sizeable segment of the population will be employed locally. When combined with future commercial activity, the area will have a sound economic base. To illustrate: 1) industrial areas are conveniently located in respect to population concentrations, 2) extensive industrial areas are provided along the interstate freeway to take full advantage of safe, high-speed market connections, and 3) the designated industrial area of Litchfield Road is conveniently located to both the Phoenix-Litchfield Municipal Airport and the freeway.

9. Agricultural Land. Agriculture should continue to be the predominant land use in the Study Area. For it to remain an important segment of the economy, however, agriculture should be protected against urban encroachments. In turn, by safeguarding the proposed agricultural areas, the urban core areas will be buffered by green fields. The recommended agricultural pattern totals 96,700 acres (12,000 acres of presently used agricultural lands are recommended for conversion to urban-type uses). Overall, about one-half of the land in the Study Area will still be useable for agriculture and related farm activities (cotton gins, dairies, feed lots, and hydroponic establishment). It must be emphasized that it will be in order to use those lands for that specified purpose, and not to permit creeping urbanization in the form of scattered subdivisions.

10. Flood Prone Land. Flood prone land areas total 22,200 acres or about 12% of the Study Area. It is strongly recommended that at this time the flood prone areas be protected against any further encroachment, urban or rural, which will reduce the flood-carrying capacity of any floodway. At some point in the future, when corrective and preventive measures have been implemented to reduce significantly the problem of flooding, this Plan should be amended accordingly where warranted.

11. Public Schools. The General Plan proposes a system of schools based on the standards and pupil enrollments previously discussed. The total number of students projected for 1995 would require forty-eight elementary schools and seven high schools, for a total of 1,166 acres. These totals provide only for resident students. School sites should be acquired in advance of need whenever

feasible. Also, an in-depth school plant study should be prepared for the County.

In addition, a 275 acre site is shown on the Plan for a Junior College. The site could accommodate both a liberal arts school and a trade school with sufficient open space to provide for a well-planned campus. The proposed site is centrally located in the southern half of the Study Area and is readily accessible by freeway.

12. Phoenix-Litchfield Municipal Airport. The City of Phoenix is encouraging the initiation of air freight service at this location. This service would benefit both the agricultural and industrial interests that are or will locate in the vicinity.

13. Other Public Facilities. It is recommended that the County property on the northeast corner of Dysart Road and Van Buren Street be used as a "Southwest County Service Center". The uses recommended include low cost housing, a park, sheriff's detention facility, juvenile probation office, site maintenance shop, and a service center for minor repairs and storage of vehicles and equipment. Also, when required, other facilities might be added such as court functions. Presently, the site is partially used for low cost housing and a neighborhood clinic.

Recently, the County Health Department estimated that approximately 640 acres will be needed for sanitary landfills to meet the needs of the projected population within the Study Area. It is premature at this time to designate these sites, but it is recommended that one large site be in the northern portion and another one in southern portion.

Also, a new study should be undertaken to design a sewer system that would conform to the recommendations contained in this report.

14. Major Streets and Highways. The proposed major street and highway system totals approximately 146 miles. The proposed I-10 (Papago West Freeway) will cross the southern portion of the Study Area, between Van Buren Street and McDowell Road, for a distance of about thirteen miles. It is expected to be completed in the mid-1970's. Two freeways proposed by other groups (the Paradise and the Buckeye) are not shown on the Plan because neither appear to be warranted.

There are approximately 133 miles of major streets and highways. Most of these roads will require additional rights-of-way for extension or widening, and should be provided in advance of need. These facilities should be divided four-lane routes when the average daily traffic count approaches 5,000 vehicles. In addition, to safeguard their design capacity, intersections should be protected against needless curb cuts to avoid congestion.

15. Public Transportation. There will be a considerable number of persons dependent upon public transportation. It is reasonable to expect that service should be provided to: 1) link the designated urban core areas, 2) serve major employment centers (especially those by the interstate freeway), and 3) connect with Central Phoenix. It is recommended that an efficient bus transit system be developed. This subject is complex and beyond the scope of this report; therefore, it is further recommended that the matter be studied in more detail.

Yet, one observation is in order: historically, in other parts of the nation, where densities are low such as in the Phoenix urban area automobiles are used to assemble sufficient passengers at a loading point near a public transit stop. These loading points are known as "fringe parking lots" or "park-and-ride" areas. Fortunately, the area under review contains several sites where this approach could be used (on County property in Avondale; and at employment centers along the freeway). Basic to this suggestion is the assumption that bus transit must be considered a public service and not a profit-making operation.

16. Hiking and Riding Trails. New trails are under study by County officials, and others, but no definite locations have been established yet.

17. Parks and Recreation Areas. In the Study Area, not only for the future, but also to make-up present deficiencies, the greatest need for public parks and recreational facilities is the provision of space within or near centers of urban concentration. The emphasis should be on neighborhood and community facilities. To meet the projected holding capacity population of the area, it is estimated that fifty neighborhood park-playgrounds and ten community park-playfields will be needed.

The park-playgrounds are ten acres in size and located, whenever possible, adjacent to an elementary school while the forty acre community park-playfields are situated next to the high schools. Consideration can also be given to the development of some of the neighborhood parks as canal parks. The size and accessibility of regional parks is such that there is no problem, either now or in the future.

18. Implementing the General Land Use Plan. This planning report was prepared in recognition of the growth trends in the west central portion of Maricopa County and need for a general plan to serve as a guide for future development. This section discusses the planning tools and methods that are, or may become, available to gradually implement the various plans and proposals contained in this report.

19. Zoning Regulations. The proposed general land use plan discussed in this report is intended to serve as a future guide or yardstick to evaluate the merit of applications for zoning changes in order that various land uses may be harmoniously related to one another. If this general plan is adhered to, the present zoning districts could be gradually adjusted to conform with the Plan over a period of years. It should be noted that this positive end result could be

accomplished by using more effectively the regulations on "unit plan of development" and "planned shopping centers and industrial zoning districts" that are provided for in the zoning ordinance.

20. Subdivision Regulations. In 1971, the State Legislature enacted state enabling legislation that permits counties to prepare, adopt, and enforce regulations concerning subdivision platting. Notwithstanding lack of enabling legislation, since creation of a planning commission there has been review and processing of subdivisions in the unincorporated area but present legislation will permit improvement of these procedures and requirements for street improvements pursuant to County standards.

21. Building Code. The County Board of Supervisors propose to establish a building department in July, 1972, to administer a building code if the present state enabling legislation can be amended in the interim to provide for levying fees to defray the cost of administering a building code.

22. Flood Control District. In 1971, the State Legislature enacted legislation that contains language to permit counties to prepare, adopt, and enforce flood-plain regulations in unincorporated areas. Proposed flood-plain management regulations are presently being considered. These would be contained in amendments to the zoning ordinance and proposed subdivision regulations.

23. Extension of Utilities. Plans for utilities such as water, sewer, gas, electricity, and telephone should take into consideration the suggested general land use plan and estimated future population distribution as a guide in determining the general location and extent of future service requirements.

24. Highway Joint Development and Multiple Use. In the Study Area, Interstate 10 offers a splendid opportunity to multiple use. For example, crossings could be provided for hiking and riding trails, and fringe parking lots by freeway interchanges would be helpful to those persons using buses. Additional study on this matter might develop other multiple use possibilities (e.g. schools).

25. Provision of Schools and Parks. The joint use of school and park sites on a year-round basis is the most efficient and desirable form of operation. In order to attain maximum mutual benefits, there will have to be continued and increased cooperation among a number of diverse jurisdictions.

26. Methods to Acquire and Preserve Open Space Lands. Numerous methods, to acquire and preserve open space lands, which have been used successfully in other parts of the nation warrant consideration for application locally. In summary, suggested methods include: 1) large lot zoning, 2) exclusive agricultural-conservation zoning, 3) cluster or density zoning, 4) less than fee interest (easements or leasing), 5) tax incentives, and 6) gifts.

27. General Improvement District. Recently adopted State enabling legislation (Arizona Planned Communities Act) permits owners of 4,000 acres or more to petition the Board of Supervisors for the establishment of a general improvement district. This act might be useful for future development of areas in the southern part of the Study Area.

28. Public Understanding and Support. Public understanding of planning problems and needs within the Study Area and support of measures available for implementation of planning proposals and objectives are essential if maximum benefits are to be obtained from this study. Suggestions for improvements of this report will be helpful and carefully taken into consideration. The information and data contained in this report should be reviewed at periodic intervals and planning proposals should be updated and refined as conditions and circumstances warrant. In this manner, this report will become a viable document.

APPENDIX A
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WEST CENTRAL MARICOPA COUNTY, ARIZONA



SUGGESTED FUTURE LAND USE PATTERN

LEGEND

- | | | | |
|--|-------------------------|--|-------------------------|
| | URBAN RESIDENTIAL | | PUBLIC AND SEMI-PUBLIC |
| | DESERT AREAS | | ELEMENTARY SCHOOL |
| | COMMERCIAL | | HIGH SCHOOL |
| | NEIGHBORHOOD COMMERCIAL | | AGRICULTURE |
| | COMMUNITY COMMERCIAL | | FLOOD PRONE AREA |
| | REGIONAL COMMERCIAL | | HIKING AND RIDING TRAIL |
| | HIGHWAY COMMERCIAL | | FREEWAY |
| | INDUSTRIAL | | INTERCHANGE |
| | PARKS AND RECREATION | | GRADE SEPARATION |
| | NEIGHBORHOOD PARK | | MAJOR STREET OR HIGHWAY |
| | COMMUNITY PARK | | OTHER STREET OR HIGHWAY |

May, 1972
G.L.B.