208

Water Quality Management Plan

MARICOPA ASSOCIATION OF GOVERNMENTS

1993

208

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MARICOPA ASSOCIATION OF GOVERNMENTS

Prepared by:

BLACK & VEATCH
PROGRESS BY DESIGN

Phoenix

1993

REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO.
20787
JOHN DOUGLAS
KOBRIOK
Date Signed 11-5-93
ARIZONA, U.S.A.

John Douglas Kobriok

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208 WATER QUALITY MANAGEMENT PLAN

CONTENTS

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CONTENTS (Continued)

CONTENTS (Continued)

CONTENTS (Continued)

CONTENTS (Continued)

CONTENTS (Continued)

CONTENTS (Continued)

TABLES

CONTENTS (Continued)

CONTENTS (Continued)

FIGURES

CONTENTS (Continued)

APPENDICES

Acknowledgements

The completion of a complex project such as the Maricopa Association of Governments (MAG) 208 Water Quality Management Plan requires the participation and assistance of many agencies and individuals. The following individuals, agencies and firms contributed to the success of this endeavor.

Advisory Groups

Throughout the project various advisory groups and organizations assisted in the review and development of the plan. These groups and organizations include:

MAG Regional Council

The MAG Regional Council serves as the governing body of MAG and is responsible for establishing and directing all MAG policies and activities. Membership is composed of one elected official, usually the mayor, from each member agency.

MAG Management Committee

The MAG Management Committee serves as the primary advisory body to the Regional Council. Membership is composed of the chief administrator from each member agency (city, town, or county manager).

MAG Water Quality Advisory Committee

The MAG Water Quality Advisory Committee provides recommendations or water quality issues that affect the MAG region such as the update of the MAG 208 Water Quality Management Plan. MAG serves as the designated regional planning agency for water quality management planning in Maricopa County.

Other Agency Participation

Other agencies who provided personnel, review, and guidance on the project are:

- Arizona Department of Environmental Quality.
- Maricopa County Department of Environmental Management, Environmental Quality and Community Services Agency.
- U.S. Environmental Protection Agency.

Funding was provided to the program by the Maricopa Association of Governments and the Arizona Department of Environmental Quality.

Consultants

Black & Veatch was contracted as consultant and prepared the 208 Plan Revision in conjunction with MAG staff. Subconsultants for portions of the project were: Larson & Company, and the GeoWest Group, Inc.

Executive Summary

This document is a comprehensive revision of the Maricopa Association of Governments "208" Water Quality Management Plan. This is the first such complete revision since the Plan was first issued in 1979. Numerous changes have occurred since the first 208 Plan was prepared, including:

- Passage of the Groundwater Management Act of 1980, leading to the creation of the Arizona Department of Water Resources and the implementation of far-reaching conservation programs and requirements.

- Passage of the Environmental Quality Act of 1986, which established programs for regulating and protecting the quality of water resources in Arizona. As an outgrowth of the Act, the Arizona Department of Environmental Quality was created to implement its requirements, and assume many of the water quality regulatory functions formerly performed by the Arizona Department of Health Services.

- A trend throughout the urbanized area of Maricopa County away from large regionalized wastewater treatment plants, and toward more numerous, smaller local water reclamation plants to produce reclaimed water for reuse.

- Numerous amendments to the 1979 208 Plan arising from the trends described above.

- Increasingly stringent standards applicable to discharges to surface water.

- The creation of the Federal "Superfund" and State Water Quality Assurance Revolving Fund (WQARF) programs for identification and cleanup of hazardous waste sites.

The Federal Water Pollution Control Act Amendments of 1972 and 1977 (Clean Water Act) require, under Section 208, that states develop and implement areawide water quality management plans for pollution control. Plans prepared to meet the requirements of Section 208 must: a) identify the treatment works needed to meet anticipated municipal and industrial waste treatment needs of the area over a 20-year period, including construction priorities and schedules; b) establish a regulatory program to implement the plan; c) identify an implementation plan; d) identify non-point sources of pollution; e) identify mine-related sources of pollution, construction activity-related sources of pollution, and salt water intrusion into fresh waters;

f) identify a process to control residual waste disposal; and g) identify a process to control disposal of pollutants on land or in subsurface excavations.

The "208 planning process" provides an opportunity for a designated area to identify its specific areawide waste treatment and water quality management problems and set forth a management program to alleviate those problems. The Maricopa Association of Governments (MAG) has been designated as the areawide water quality management planning agency for the Maricopa County area.

Major issues identified during preparation of this 208 Plan Revision include:

- The population growth of the Maricopa County area will require expanded wastewater collection and treatment systems to handle increased flows.

- Reclamation of wastewater is now an important element in water resources planning in the study area.

- The pollution impacts of stormwater discharges have now been included in National Pollutant Discharge Elimination System (NPDES) permitting requirements.

- Disposal options for nonhazardous liquid wastes, such as septage, are now more limited. Under state law, nonhazardous liquid waste is included as a solid waste by definition. Consequently, nonhazardous liquid wastes issues are being addressed through the MAG Regional Solid Waste Management Planning Program.

- Sludge disposal is an increasingly important issue. New Federal regulations will affect some current sludge processing and disposal practices.

- Surface water quality standards are becoming more stringent.

The 208 program includes two major elements: the Point Source Plan and the Nonpoint Source Plan. During development of the original 208 Plan, a planning process was developed which is now well-established.

The major effort of this 208 Plan Revision was in the Point Source Plan, which compiles the preferred wastewater collection and treatment system for the Phoenix metropolitan area through the year 2010. The Point Source Plan examines population and wastewater flow projections, treatment methods, effluent disposal, reclaimed water reuse, and sludge management. Development of the Point Source Plan has been heavily based on the wastewater management plans developed by the cities and towns of the study area. The cities and towns have developed detailed plans for wastewater management within their planning areas. Wastewater management planning in the study area is a combination of regional and local approaches, as reflected in the Point Source Plan.

During the period since 1979, considerable additional study has been made of the region's groundwater and surface water quality. These studies have contributed to an enhanced understanding of the water resources in the MAG area and have been incorporated into the Nonpoint Source Plan.

Several agencies have responsibilities in the MAG 208 planning process. The U.S. Environmental Protection Agency and the Arizona Department of Environmental Quality have broad regulatory responsibilities. Others, such as the local municipalities and wastewater utilities, deal with the specific wastewater management concerns of individual communities. All have provided input to the regional planning effort. The efforts of the agencies involved have been coordinated and integrated in this MAG 208 Water Quality Management Plan for the Maricopa County area. The public participation process is described in Chapter 7.

Study Area

Over half of Arizona's population resides in Maricopa County, the area encompassed by this report. Urbanization has proceeded horizontally in a mostly low-density urban form, and population growth has exceeded the population projections in the 1979 208 Plan. Several demographic factors have spurred this growth, including in-migration and attractiveness of the area as a retirement location to the nation's aging population.

For the purposes of the 208 Plan Revision, the boundaries of the study area coincide with the boundaries of Maricopa County. The political boundary of Maricopa County is also used by the Bureau of the Census as the boundary for the consolidated metropolitan statistical area (CMSA) for the 1990 decennial census.

Maricopa County is increasing its importance as a center of business activity. The economic emergence of the Pacific Rim is affecting the area, with California firms expanding and relocating here to serve that market. The traditional economic base of tourism, government, and construction is being broadened by the addition of high technology manufacturing, defense/aerospace, and corporate regional offices. Agricultural employment is declining as a percentage of the total largely due to urbanization and mechanization.

Water Resources

The development of Maricopa County is due in large part to its favorable location with respect to supplies of surface water. Maricopa County lies at the confluence of the Salt and Verde Rivers, which are fed by the most prolific watersheds in the state. In recent years, Colorado River water imported for agricultural purposes by the Central Arizona Project (CAP), has become a major additional metropolitan supply of surface water. Other surface water resources of importance include the Agua Fria River, and the Lower Salt and the main stem of the Gila River. Due to the tightening restrictions on groundwater pumping and increasing demands, reliance on surface waters will increase.

Waters in the Salt and Verde Rivers have excellent chemical quality. The watersheds are largely undeveloped, and man-made sources of pollution are not widespread. Agua Fria River water is more highly mineralized than water in either the Salt or the Verde Rivers, and the concentration of most dissolved inorganic constituents is higher. Water quality in the Gila River is generally poor. The water has high salinity due to upstream discharges of irrigation tailwater, mine tailings as well as water from miscellaneous sources. Organochlorine pesticides have also been detected.

A major feature of the CAP in the study area is New Waddell Dam and the interconnection canal at Lake Pleasant. New Waddell Dam will greatly expand Lake Pleasant which will be used for seasonal pumped storage of CAP water. Water stored in Lake Pleasant will be predominantly Colorado River water, blended with smaller amounts of water from the Agua Fria River.

In the planning area, treated effluent is used to supply water for irrigation, industrial uses, fish and wildlife habitat, and recreational purposes. Much of the effluent from the 91st Avenue and 23rd Avenue treatment plants, the two largest sources of effluent in the Study Area, is used as cooling water at the Arizona Nuclear Power Project (ANPP) Palo Verde Nuclear Generating Station.

Groundwater resources in the planning area are significant. Despite the relative abundance of groundwater in the planning area, long-term declines in water levels have resulted from a serious imbalance between recharge and pumpage. Recognition of this imbalance provided the impetus for the enactment of the Groundwater Management Act of 1980. Within the Phoenix Active Management Area (AMA), a permit is needed to legally withdraw groundwater for most uses, and placing new land into agricultural production is generally not permitted. In the Phoenix AMA, the depth to groundwater varies from less than 10 feet to more than 500 feet. In general, the greatest depths occur in the sloping alluvial fans close to the major mountain ranges. Groundwater is shallowest along the channel of the Salt River downstream from Tempe.

Water Quality Standards

In Arizona, the Arizona Department of Environmental Quality (ADEQ) has responsibility for establishing and enforcing water quality standards. Three sets of relevant standards have been established: navigable waters, public water supplies, and aquifers. Standards for navigable waters ("stream and lake standards") are established according to the potential use. Protected uses include: aquatic and wildlife, full body contact, partial human contact, agricultural irrigation, agricultural livestock watering, and domestic water source. Most rivers, streams, and canals in Arizona have a designated use, and numeric standards have been established for each use. Navigable waters are classified as effluent-dominated by ADEQ rule if they consist primarily of discharges of treated wastewater.

Standards for public water supplies, or "drinking water standards," have been established by ADEQ in accordance with the Federal Safe Drinking Water Act. These rules apply to all public and semipublic (serving more than four connections) water systems involved in the collection, storage, treatment or distribution of potable water. The rules do not apply to private agriculture water systems or semi-public systems unless a health hazard has been identified.

ADEQ has established numeric water quality standards for aquifers using a procedure that classifies all aquifers for drinking water protected use by statute. Reclassification is possible only for hydrologically isolated aquifers that are not being used for drinking water if the public benefits outweigh the public costs. No aquifers in the planning area have been reclassified.

Aquifer water quality standards are used as the basis for regulating discharges to aquifers and to guide remedial actions in contaminated aquifers. Discharges to aquifers that are regulated under the Aquifer Protection Permit program are not allowed if they create a violation of standards at an applicable point of compliance. In most of the planning area, groundwater is more highly mineralized than surface water. Notwithstanding the degree of mineralization, in most parts of the planning area, groundwater meets drinking water standards for inorganic constituents.

Since the time that the first MAG 208 Plan was prepared, increased attention has been focused on organic constituents in groundwater, and maximum contaminant levels (MCLs) have been established for several volatile organic compounds. VOCs in concentrations greater than MCLs have been detected in some groundwater, primarily in the urbanized and industrialized parts of the Phoenix metropolitan area. In those parts of the planning area where groundwater quality does not meet MCLs due to human activity, the shallowest groundwater has been the most seriously affected. As a result, municipal drinking water wells have not been significantly affected. With few exceptions, poorer quality groundwater is sealed off from municipal wells using special construction practices. If groundwater from a municipal water supply well exceeds MCLs, the water is treated, blended, or the well is taken out of service.

Point Source Plan

The objective of the Point Source Plan is to identify the preferred wastewater collection and treatment, and effluent reuse or disposal systems for the study area. Applicable regulations and permit requirements are discussed with respect to their role in wastewater system planning. This is followed by specific plans developed for each community in the study area.

Regulatory Programs

The National Pollutant Discharge Elimination System (NPDES) regulates discharges into federally designated navigable waters (waters of the United States). Discharges to the Salt, Gila, Verde, Aqua Fria and other navigable waters are subject to the NPDES program. NPDES permits contain limits that control the amounts of pollutants that can be discharged into navigable waters. State and federal regulations regarding surface water quality and treated wastewater discharge quality are used to define portions of the NPDES permit. Pollutant levels established by the NPDES permit program vary among wastewater treatment facilities depending upon the designated uses of the water.

The Aquifer Protection Permits (APP) program focuses on potential environmental risks to aquifers of the state and upon risks to public health posed by the facilities and activities which utilize these waters. The need for an Aquifer Protection Permit is determined by considering general vulnerability of the aquifer in terms of depth to groundwater and productivity of the aquifer, existing aquifer water quality, and waste hazard potential of the facility. An APP may set requirements for pollutant alert levels based on site-specific conditions, and require notification of the ADEQ and implementation of the appropriate contingency plan if an alert level is exceeded. The APP also requires the permittee to conduct any necessary monitoring activity.

All wastewater treatment facilities required to obtain an Aquifer Protection Permit are required to use Best Available Demonstrated Control Technology (BADCT) in their wastewater treatment process. BADCT addresses procedures for determining the design alternatives for wastewater treatment facilities. BADCT requires all parties who treat wastewater to implement the best feasible treatment processes, operating methods or technology for the specific site. The principal processes impacted by BADCT requirements for most wastewater treatment plants are: disinfection, turbidity removal, and nitrogen removal.

Navigable Water Quality Standards (NWQS) are reviewed every three years as required by the Federal Clean Water Act. Part of the process involves the round-table discussions which are a series of informal meetings for the purpose of gathering public input.

The NPDES Stormwater Regulations developed by the EPA require communities having populations greater than 100,000 to develop stormwater management plans to protect receiving water quality. Phoenix, Mesa, Tempe, Glendale, and Scottsdale have been identified as communities that exceed 100,000 persons per the latest decennial Census.

The regulations call for pollutant reduction to the "maximum extent practicable" (mep). Due to the irregularity of stormwater runoff, numerical standards are difficult to define. The mep approach allows development of standards on a case-by-case basis. Storm frequency and intensity, runoff characteristics, and discharge quality standards are examined to determine the optimal stormwater management plan for each stormwater management agency.

Wastewater Reclamation and Reuse

The state's effluent reuse regulations require wastewater treatment plants to have a permit for authorization to release reclaimed wastewater for reuse. Wastewater effluent reuse falls into two major groups: direct nonpotable reuse and indirect reuse. Direct reuse includes irrigation and lake filling. Indirect reuse involves aquifer recharge and recovery. Direct potable reuse of reclaimed wastewater is prohibited by law, but reclaimed quality requirements for disposal to aquifers meet requirements set by the Safe Drinking Water Act (SDWA). Quality and monitoring requirements for various uses of reclaimed effluent are established in the reuse regulations.

Indirect reuse can also be done using effluent which is discharged to an aquifer for recovery. In these cases an Aquifer Protection Permit (APP) must be obtained. Underground storage can also be done using surplus raw surface water, offering an alternative to conventional storage reservoirs. Underground storage can be affected by these concerns: geological conditions, source water quality and reclaimed water quality.

Selected Point Source Plan

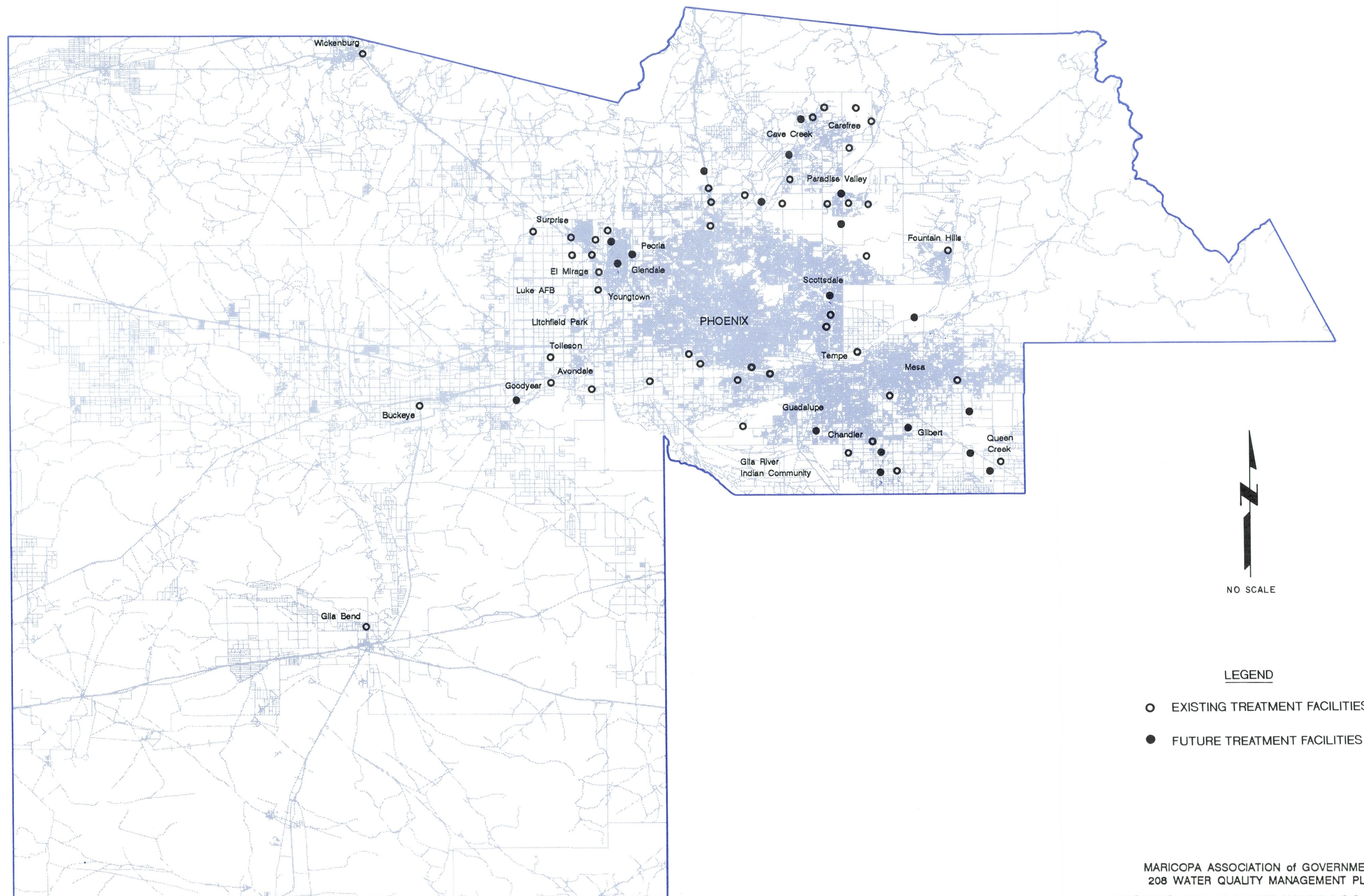
The Point Source Plan in this 208 Plan MAG Revision has been completely updated and reorganized from that presented in the MAG 1979 208 Plan and the MAG 1982 Point Source Plan Update. The new Point Source Plan reflects the major advances which have been made by the communities of the study area in wastewater management planning. Nearly all of the communities have developed carefully-analyzed, detailed wastewater master plans.

Because of the importance of highly-treated effluent or reclaimed water as a source of supply, almost all of the communities in the study area have at least considered the possibility of effluent reuse.

The discussion for each community presented in Chapter 4 describes:

- Planning area.
- Population and wastewater flow projections.
- Existing wastewater collection and treatment systems.
- Effluent disposal and/or reuse.
- Sludge management.
- Planned improvements.
- Improvement costs.

Presented below is a summary of the selected wastewater projects for each community. A composite map of the Point Source Plan is reflected in Figure ES-1.



MARICOPA ASSOCIATION of GOVERNMENTS
208 WATER QUALITY MANAGEMENT PLAN

EXISTING AND PLANNED WWTP LOCATIONS

BLACK & VEATCH
1993

FIGURE ES-1

Avondale

Wastewater treatment plant; Phase 1, 3.5 mgd	$12,000,000
Wastewater treatment plant; Phase 2, expand to 7.0 mgd	8,400,000
Interceptor from existing WWTP site to new WWTP site	1,110,000
Sewer extension: Van Buren Street	1,500,000
Sewer extension: McDowell Road	2,000,000
Sewer extensions: Central St., Lower Buckeye Rd., Broadway Rd.	1,530,000
Eastside Interceptor: Broadway Rd./El Mirage Rd.	9,000,000
Westside interceptor: Parallel to Agua Fria River	1,870,000
Westside interceptor extension	1,230,000
Northside Reclamation Plant	8,000,000
Package wastewater plant south of Gila River	500,000
Total	$47,140,000

Buckeye

Expand WWTP to 1.2 mgd (1995)	$1,890,000
Add filters (when required)	400,000
Total	$2,290,000

Carefree

WWTP Improvements; 0.25 mgd expansion	$ 750,000
12-inch Trunk Sewer	380,000
Total	$1,130,000

Cave Creek

Town of Cave Creek collection system and 0.30 mgd wastewater treatment plant	$2,000,000

Chandler	
1990-1995	
Collection System Improvements	
Water Reclamation Plant No. 2, pump-back system	
	$ 6,700,000
1996-2000	
Collection System Improvements	
Ocotillo WRP Expansion to 10 mgd	
Reclamation Plant No. 2, Phase I, (5 mgd)	
	43,200,000
2000-2010	
Collection System Improvements	
Ocotillo WRP Expansion to 20 mgd	
Kyrene and Pecos WRP	
	77,000,000
Total	$126,900,000
El Mirage	
Collector Sewers	$5,133,000
Interceptor Sewers	2,068,000
0.8 mgd Wastewater Treatment Plant	3,331,000
Reclaimed Water Distribution System	1,811,000
Total	$12,343,000
Fountain Hills	
Relief sewers	$840,000
Lift station improvements	730,000
Force main improvements	440,000
WWTP expansion to 2.6 mgd	5,200,000
	$7,210,000
Gila Bend	
WWTP improvements, as per 1978 Facility Plan	$880,000
Line existing ponds	480,000
Dechlorination facilities	75,000
Total	$1,435,000

Gilbert

New Interceptors	$19,720,000
Gilbert WRP Expansion to 11 mgd	6,060,000
New WRP (6 mgd)	18,380,000
Temporary Lift Station	1,050,000
Solids Handling at 91st Avenue WWTP	11,290,000
Effluent Distribution System	1,880,000
	$58,380,000

Glendale

Treatment Facilities	
South WRP; 25 mgd	$50,000,000
Arrowhead WRP; expand to 4.4 mgd	5,000,000
West WWRF; 3 mgd	12,000,000
Subtotal - Treatment Facilities	$67,000,000
Collection System	
Miscellaneous replacement and relief sewers (1990-95)	$1,230,000
Miscellaneous replacement and relief sewers (1995-2000)	380,000
Miscellaneous replacement and relief sewers (2001-2005)	1,850,000
Miscellaneous replacement and relief sewers (2006-2010)	240,000
Subtotal - Collection System	3,700,000
Total	$70,700,000

Goodyear

Northern Area (157th Avenue WWTP)	
Phase I WWTP Expansion to 1.5 mgd	$1,000,000
Phase I Tertiary Treatment	1,000,000
Phase II WWTP Expansion to 3.0 mgd	12,750,000
Phase III WWTP Expansion to 7.0 mgd	6,400,000
Phase IV WWTP Expansion to 15.0 mgd	15,000,000
Area Subtotal	$36,150,000
Central Area (Estrella Plant)	
Interim Plant, 0.04 mgd	$1,200,000
Interim Plant, 0.20 mgd	500,000
Phase I Expansion to 0.80 mgd	1,500,000
Phase II Expansion to 1.60 mgd	2,000,000
Phase III Expansion to 2.40 mgd	2,000,000
Area Subtotal	$7,200,000
Southern Area (Rainbow Valley WWTP)	
Phase I, 3.0 mgd	$12,000,000
Phase II Expansion to 6.0 mgd	9,000,000
Area Subtotal	$21,000,000
Total	$64,350,000

Mesa

Southeast WRP expansion from 4 mgd to 8 mgd	$8,540,000
Northeast WRP (4 mgd initial capacity)	17,080,000
South WRP (8 mgd initial capacity)	24,550,000
Northeast WRP expansion from 4 mgd to 8 mgd	10,670,000
Northwest WRP expansion from 8 mgd to 16 mgd	17,080,000
Southeast WRP expansion from 8 mgd to 12 mgd	8,540,000
Total	$86,460,000

Paradise Valley

Sewer Connections	$2,819,000
Wastewater Reclamation Plant, 0.75 mgd	5,319,000
Total	$8,138,000

Peoria	
Southern Region	
Collection System	$ 3,413,000
WRP Phase I (4 mgd)	8,295,000
WRP Phase II (10 mgd)	24,885,000
Purchase 11 mgd Capacity at Tolleson WWTP at $1.68/gal	18,480,000
Central Region	
Collection System	6,130,000
Beardsley Road Treatment Plant Expansion to 16 mgd	56,620,000
Northern Region	
Collection System	14,800,000
Jomax Road and 67th Ave WRP (1.0 mgd)	4,000,000
Total	$136,623,000

Phoenix	
Collection System	$22,446,300
Booster Stations	4,648,000
Peripheral Areas C&D	
Cave Creek WRP	93,916,000
Biscuit Flats WRP	59,350,000
23rd Avenue WWTP Improvements	90,040,000
91st Avenue WWTP Improvements	326,032,000
Ahwatukee/Foothills WRP Expansion (1.8 mgd)	3,150,000
Recharge/Recovery Sites	206,846,000
Total	$806,428,300

Queen Creek	
WRP Phase I (0.75 mgd)	$5,320,000
WRP Phase II (1.50 mgd)	2,250,000
Total	$7,570,000

Scottsdale

Regional Wastewater Reclamation Plant (Initial 6.0 mgd capacity)	$28,931,000
Advanced Water Treatment Plant (Initial 6.0 mgd capacity)	32,545,000
Associated Collection/Pumpback System	16,214,500
Initial Recharge Recovery System	2,154,100
Reclaimed Water Distribution System	11,750,000
WRP/AWT Expansion to 9.0 mgd	51,960,300
WRP/AWT Expansion to 18.0 mgd	51,960,300
Total	$195,515,200

Surprise

Collector Sewers	$5,133,000
Interceptor Sewers	2,068,000
0.8 mgd Wastewater Treatment Plant (WWTP)	3,331,000
Reclaimed Water Distribution System	1,811,000
Expand WWTP to 1.8 mgd	3,000,000
	$15,343,000

Tempe

Kyrene WRP expansion to 6 mgd	$8,000,000
Rio Salado WRP; first phase, 6 mgd	25,000,000
Total	$33,000,000

Tolleson

Collection System Improvements	$ 1,000,000
WWTP Expansion to 24.9 mgd[2]	14,800,000
Total	$15,800,000

Wickenburg

Airport Industrial Park interceptor	$400,000
Eastside sewer to Town limits	170,000
Total	$570,000

Unincorporated Communities

Development	Treatment Capacity, mgd	
Belmont	10.0	$30,000,000
	4.5	13,500,000
	1.0	4,000,000
Subtotal	15.5	$47,500,000
Spur Cross Ranch	0.32	1,280,000
Rio Verde Utilities	0.9	3,600,000
Sun Lakes	0.7	2,800,000
Sun City West	1.16	4,640,000
Total	18.58	$59,820,000

Small Plant Process

Part of the Multi-City SROG selected point source plan in 1982 was to provide an option to further expansion of the 91st Avenue WWTP and other major treatment plants. This option was the construction of small reclamation plants. Rather than amend the MAG 208 Plan to include every acceptable new small plant, the communities developed a small plant review process.

Using this process, a small plant not specifically identified in the Point Source Plan can be approved as part of the 208 Plan if the plant goes through the Small Plant Review and Approval Process. A small plant is one with an ultimate capacity of 2.0 million gallons per day (mgd) or less. By requiring proposed plants in the area to obtain approval using this formal process, an uncontrolled proliferation of small plants that could cause problems in the future should be prevented. The communities adopted a small plant process goal of allowing the cities and towns the maximum level of control in the approval of small plants. The County must consider the comments of the nearby city or town concerning proposed small plant facilities within three miles of their borders. Plants greater than 2.0 mgd which are not specifically identified in the MAG 208 Plan would be required to go through a formal 208 analysis and amendment.

Environmental Assessment of Point Source Plan

Environmental impacts and issues were considered at both site-specific and areawide levels with the emphasis on assessment of areawide impacts. Impacts were assessed within various environmental categories: air quality, geology/soils, surface water, groundwater, biological resources, cultural resources, aesthetics, public health, land use, population, public facilities and services, economic activity, and public and institutional acceptability.

Annual Update Evaluation

In order to ensure that the MAG 208 Water Quality Management Plan remains an up-to-date document, MAG member agencies will be requested to submit copies of their adopted Capital Improvement Programs annually to MAG. These programs will be reviewed to determine if changes to the wastewater treatment systems have occurred. The changes will then be presented to the MAG Water Quality Advisory Committee. If appropriate, the MAG Water Quality Advisory Committee may make a recommendation to the MAG Management Committee that the 208 Plan be amended to include the updated information.

Nonpoint Source Plan

Nonpoint sources of pollution are those discharges that do not originate from a specific single location. In arid areas such as Maricopa County, the distinction between point and nonpoint sources is not always clear. Groundwater is the receiving water for many nonpoint sources and is also impacted by many point sources. Impacts to groundwater are more difficult to assess and manage than impacts to surface water.

Nonpoint sources of urban pollution include discharges of storm runoff to surface water and groundwater. Stormwater is now regulated as part of the Environmental Protection Agency's (EPA) NPDES permit program.

Pollutants associated with agricultural nonpoint sources include sediment, pesticides, animal wastes, nitrates from both fertilizer and animal wastes, and salinity discharged to surface waters in irrigation return flows and to groundwater by percolation of irrigation water to the water table.

Nonpoint sources associated with land disposal activities in the planning area include landfills, wastewater ponds, and septic tanks. Pollutants associated with these sources include salinity, bacteria, heavy metals, and volatile organic compounds (VOCs). Disposal of liquid wastes at landfills and in industrial wastewater lagoons is another documented source of nonpoint pollution in the planning area. Disposal of industrial wastes in unlined lagoons was an accepted disposal alternative in parts of the planning area prior to the availability of sewers.

Septic tanks in combination with a leach bed or a dry well are used for on-site disposal of domestic liquid wastes in unsewered parts of the planning area. There have been few documented groundwater quality problems attributable to the use of these systems. However, industrial use of septic tanks and leach beds are suspected sources of pollution in some areas.

Unintentional leaks and spills of chemicals and petroleum products were not identified as a nonpoint source category in the original 1979 MAG 208 Plan. However, in the decade since the Plan was completed, leaks and spills emerged as a groundwater quality problem of major proportions in the planning area. The magnitude of the problem began to be identified in the mid-1980s, when state and federal regulations for upgrading underground storage tanks (USTs) were enacted.

In the 1979 208 Plan, control measures were proposed for three categories of nonpoint sources that had been identified: landfills, industrial wastes, and hydrologic modifications. Needs for regional and site-specific groundwater quality monitoring were also described. However, at the time that the Plan was completed, an institutional and regulatory framework did not exist for implementing the recommended measures.

The framework now exists. In the early 1980s, an increasing number of groundwater contamination incidents were identified in Arizona; many of them were in Maricopa County. The Arizona legislature responded with the enactment of the 1986 Environmental Quality Act, creating the Arizona Department of Environmental Quality and establishing the Aquifer Protection Permit program, the pesticide management program, statewide water quality monitoring, the Water Quality Assurance Revolving Fund (WQARF), and the dry well program. Other nonpoint source control programs that existed under ADEQ's predecessor agency, the Department of Health Services, were strengthened, and ADEQ has been given the statutory authority to manage federal programs that target other nonpoint sources such as hazardous wastes and USTs.

Although the regulatory and institutional frameworks for control of most nonpoint sources are now in place, control needs still exist. Because of funding and staffing shortfalls, most programs are underfunded and understaffed and, as a result, they have not reached their full level of effectiveness. The Aquifer Protection Permit Program, ADEQ's main program for controlling nonpoint discharges to groundwater, has completed development of initial rules and is processing permits for new facilities. However, staffing and funding levels are inadequate to address older facilities that were permitted under the predecessor program.

The most urgent need with respect to UST management is also increased staffing to deal with existing and future UST releases. At the existing staffing levels, the program has been overwhelmed by release incident reports. As a result, serious release incidents may not receive adequate and timely attention. The lack of rules for administering the UST program has also reduced its effectiveness. The program is currently operating under the federal regulations, but these are not specific to Arizona issues and needs.

Rules for construction standards and licensing of dry well drillers have not been developed, and the existing registration program is voluntary. As a result, strong controls are lacking. Rules are needed, and a statewide inspection program should be considered to identify and register dry wells. Industrial facilities, particularly those that generate hazardous wastes, should be given highest priority.

The federal and state programs for managing hazardous wastes are among the oldest and most highly developed of the nonpoint source control programs in the planning area. Since 1980, when the federal hazardous waste regulations became fully effective, a complex set of regulations and controls has spawned the development of a brand-new industry to transport, dispose, treat, and recycle hazardous wastes. However, the effectiveness of the Arizona program is seriously hampered by staffing shortages. As a result, inspections of permitted facilities are not completed on schedule, and compliance actions are delayed. At some facilities noncompliance has resulted in known releases of hazardous wastes to the environment. When remediation has been postponed, potential impacts to water quality increase in severity.

Another significant nonpoint source control need with respect to water quality monitoring is an integrated data management program. The benefits of a statewide computerized water quality database that could be used by resource and regulatory agencies, water service organizations, and private facilities would be significant.

Chapter 1 - 208 Program Organization

The Federal Water Pollution Control Act Amendments of 1972 and 1977 (Clean Water Act) are a significant commitment by the Federal government to the elimination of pollution of the nation's waters. Each state is required, under Section 208 of the Act, to develop and implement areawide water quality management plans for pollution control.

Plans prepared to meet the requirements of Section 208 must:

- Identify the treatment works needed to meet anticipated municipal and industrial waste treatment needs of the area over a 20-year period, establish construction priorities for those treatment works, and establish time schedules for the initiation and completion of all treatment works.

- Establish a regulatory program to implement the plan, regulate any facilities which may discharge in the area, and assure that industrial wastes meet applicable pretreatment standards.

- Identify those agencies needed to implement the plan and develop an implementation plan.

- Identify agriculturally and/or silviculturally nonpoint sources of pollution and measures to control them.

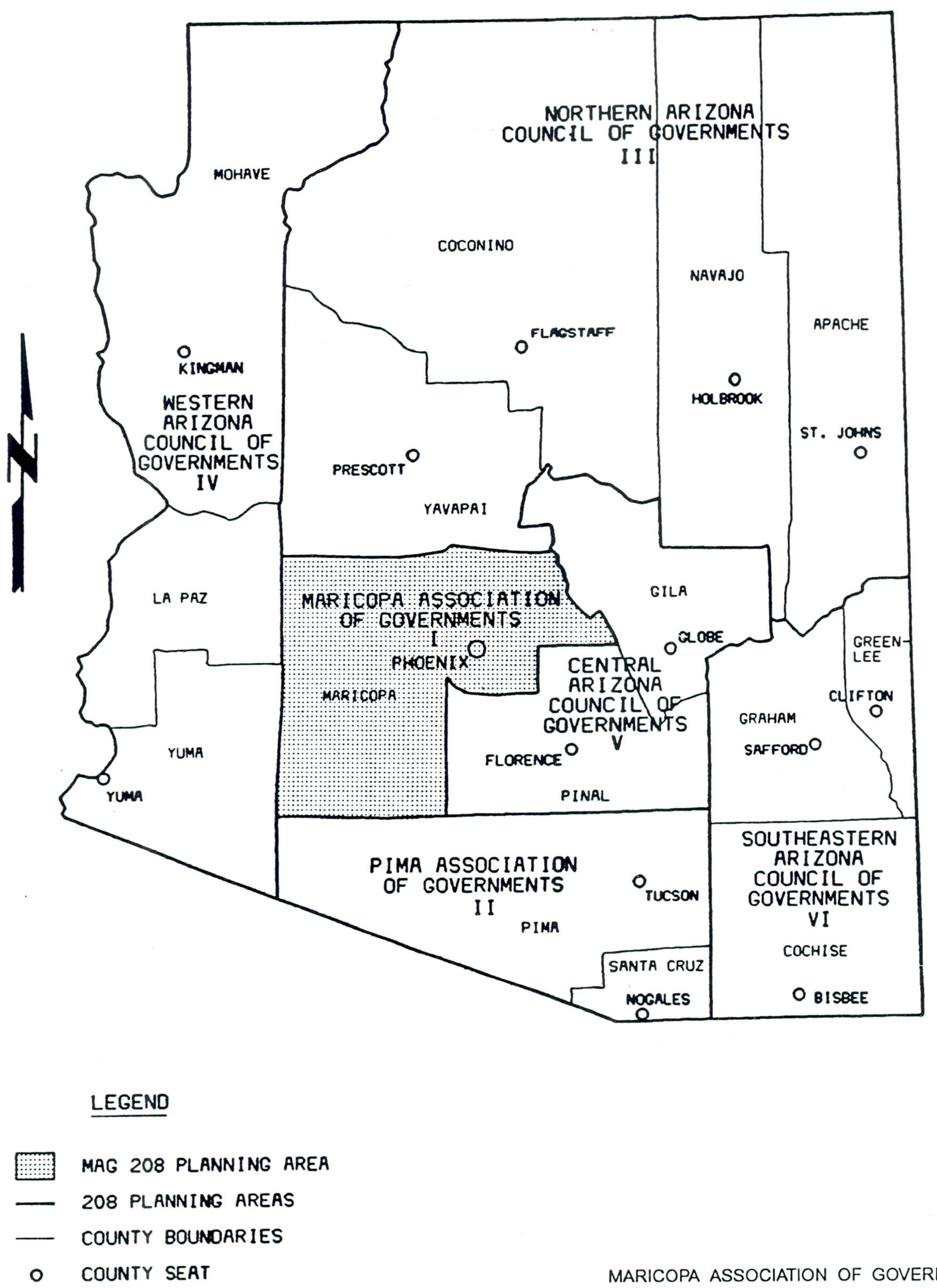
- Develop a process to identify mine-related sources of pollution, construction activity-related sources of pollution, and salt water intrusion into fresh waters and identify methods to control them.

- Identify a process to control residual waste disposal which could affect water quality in the area.

- Identify a process to control disposal of pollutants on land or in subsurface excavations to protect ground and surface water quality in an area.

The "208 planning process" as defined in the Act and its subsequent regulations, guidelines and amendments, provides an opportunity for a designated area to identify its specific areawide waste treatment and water quality management problems and set forth a management program to alleviate those problems.

In Arizona, the six Councils of Government have been designated by the Governor as "water quality management planning agencies." These agencies and their 208 planning areas boundaries are depicted on Figure 1-1. The Maricopa



MARICOPA ASSOCIATION OF GOVERNMENTS
208 WATER QUALITY MANAGEMENT PLAN

**208 PLANNING AREAS
IN ARIZONA**

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FIGURE 1-1

Association of Governments (MAG) has been designated by the Governor and the Environmental Protection Agency (EPA) as the areawide water quality management planning agency for the Maricopa County area.

1.1 MAG 208 Planning Process

The guidelines for 208 planning set forth in the Act are fairly broad so that the various water quality issues existing in different areas of the United States can be addressed appropriately. Each 208 Plan must, therefore, identify the water quality management needs in its planning area and provide a program to develop solutions. The MAG 208 planning process has become an ongoing effort in response to changing water resource issues, regulations, treatment technologies, and demographics. Major issues identified during preparation of this 208 Plan Revision include:

- The population of the Maricopa County area is expected to continue to grow significantly over the next 20 years. This growth will require expanded wastewater collection and treatment systems to handle increased flows.
- Reclamation of wastewater for non-potable reuse and aquifer recharge is now an important element both in wastewater treatment and water resources planning in the study area.
- The pollution impacts of stormwater discharges have been recognized and the Environmental Protection Agency has extended the National Pollutant Discharge Elimination System (NPDES) program to include NPDES permitting requirements applicable to stormwater discharges.
- Disposal options for nonhazardous liquid wastes, such as septage, are now more limited. According to Arizona State Statutes, nonhazardous liquid waste by definition is a solid waste. Regional approaches for nonhazardous liquid waste are being undertaken as part of the MAG Regional Solid Waste Management Planning Program.
- Sludge disposal is an increasingly important issue. New Federal regulations are expected to impact some current sludge processing and disposal practices. In addition, smaller communities which do not have landfills have limited disposal options.
- Surface water quality standards, including those for ephemeral water bodies, are becoming more stringent. The cost of compliance with the resulting

effluent limits has motivated several communities to study or choose other effluent disposal methods, because they appear to be more cost-effective.

The 208 program is comprised of two major elements: the Point Source Plan and the Nonpoint Source Plan. During development of the original 208 Plan, issued in July 1979, a planning process was established which has been in effect for over 10 years and is now well-established. The original 208 Plan has been amended several times since 1979.

The major effort of this 208 Plan Revision was in the Point Source Plan. Point source planning is primarily directed at compiling the preferred wastewater collection and treatment system for the Maricopa County area through the year 2010. Toward this end, the Point Source Plan examines population and wastewater flow projections, treatment methods, effluent disposal, reclaimed water reuse, and sludge management.

Development of the Point Source Plan has been heavily based on the wastewater management plans developed by the cities and towns of the study area. In contrast to the situation described in the original 1979 MAG 208 Plan, most of the cities and towns have developed detailed, carefully analyzed plans for wastewater management within their planning areas. Wastewater management planning in the study area is a combination of regional and local approaches, as reflected in the Point Source Plan.

The selected point source plan has also been analyzed for its environmental impacts and impacts on the water resources in the area. The most important areas reviewed were:

- Surface water and groundwater quality and quantity.
- Aesthetics and public acceptability.
- Land use and population changes.
- Public health.
- Public facilities and economic activities.

During the period since 1979, considerable additional study has been made of the study area's groundwater. Major new regulatory programs, including the federal Superfund and State Water Quality Assurance Revolving Fund (WQARF), have been instituted. These have resulted in much greater knowledge of non-point source pollution in the state and have been incorporated in the Nonpoint Source Plan Element.

1.2 Agency Responsibilities

Several agencies have responsibilities in the MAG 208 planning process. The U.S. Environmental Protection Agency (EPA) and the Arizona Department of Environmental Quality have broad responsibilities. Others, such as the local municipalities and wastewater utilities, deal with the specific wastewater management concerns of individual communities. All have provided input to the regional planning effort. The efforts of the agencies involved are coordinated and presented in this MAG 208 areawide water quality management plan for Maricopa County.

1.2.1 U.S. Environmental Protection Agency (EPA)

On the federal level, the EPA has the responsibility of overseeing the planning efforts necessary to meet the specific requirements of Section 208 and the overall goals of the Clean Water Act.

For the MAG 208 Program, EPA Region IX provides guidance in terms of policy and procedure, and review of documents to assure adherence to the requirements of the Act. EPA also has a review and certification function. Once the water quality management planning is completed and certified by the State, EPA will make final review of the plan for approval.

1.2.2 State of Arizona

The Arizona Department of Environmental Quality (ADEQ) administers both the basin-wide planning and water quality monitoring programs. In addition, ADEQ is responsible for reviewing and enforcing water quality standards for the State and part of the MAG 208 program was to assist in this process.

1.2.3 Maricopa Association of Governments (MAG)

The Maricopa Association of Governments, as a designated 208 planning agency, has the overall areawide planning and implementation responsibility for all of Maricopa County. MAG currently serves as the regional planning agency within the County, and the 208 program is part of its overall Regional Water Quality Management Planning Program.

MAG provides for the integration and coordination of its programs through an established planning structure. MAG also provided staff assistance as well as in-kind services from its member agencies to assure the development of a reasonable, flexible and coordinated water quality management plan. MAG also has ultimate responsibility for the adoption of the final plan. The 208 Plan is primarily implemented by the local jurisdictions within Maricopa County.

1.2.4 *Cities and Towns*

Cities and towns are responsible for planning to provide the collection and treatment facilities necessary to meet the needs of the individual community. At the local level, throughout the 208 planning process, the municipalities assisted by providing information in development of planning boundaries, service areas, and future needs of the community relative to areawide planning. Some members of city staff also served on advisory groups reviewing and selecting preferred alternatives, and assisted with technical and financial data. As stated above, local governments implement the 208 Plan as well as their respective facility plans and master plans.

1.2.5 *Maricopa County*

The Maricopa County Environmental Quality and Community Services Agency (MCEQCSA) assisted with preparation of the section of the Point Source Plan pertaining to those areas not incorporated as municipalities. MCEQCSA also reviewed the Point Source Plan and Nonpoint Source Plan. MCEQCSA has a delegation agreement with ADEQ to perform plan reviews, issue approvals to construct and approvals to operate wastewater treatment facilities throughout Maricopa County, including unincorporated and incorporated municipal areas. This agreements is audited annually by ADEQ.

1.3 Funding

Funding for the MAG 208 program was provided through a grant from the EPA, administered by ADEQ and with matching funds from MAG member agencies.

Chapter 2 - Study Area Description

The purpose of this chapter is to describe the study area for the MAG 208 Water Quality Management Plan Revision.

Over the half of Arizona's population resides in Maricopa County, the area encompassed by this report. The 9,127 square mile county is the seat of government for the state, and it is an economic and financial hub for the entire southwestern United States. The population density of Maricopa County far exceeds that of any other Arizona county, an estimated 225 persons per square mile, yet less than half of the county is urbanized.

Most of the land in the Maricopa County area is public land. Only 30 percent of the land in Maricopa County is in private ownership. More than 40 percent of the county is federally owned, Indian reservations total about 4 percent, and the State of Arizona owns 11 percent. An additional 15 percent of the county is held by other public entities.

The planning area has been one of the fastest growing areas in the state. Urbanization has proceeded horizontally for the most part, in favor of maintaining a mostly low density urban form. Few impediments to this horizontal growth trend have arisen, and those which exist, such as Indian reservations, small mountain ranges, and large tracts of public land, have not as yet contained the spread of the urbanized area.

Population growth has exceeded that predicted in the 1979 MAG Water Quality Management Plan document. This chapter addresses the reasons for that growth and the spatial form that urban development has taken. Current population and land use projections are included in the discussion.

2.1 Planning Area Boundaries

For the purposes of the 208 Plan Revision, the boundaries of the study area coincide with the boundaries of Maricopa County. The political boundary of Maricopa County is also used by the Bureau of the Census as the boundary for the consolidated metropolitan statistical area (CMSA) for the 1990 decennial census.

The regional planning area is divided by MAG into Municipal Planning Areas (MPAs) as depicted in Appendix A. The 24 MPAs generally correspond to the jurisdictions for which they are named, except that additional lands within their strip annexation boundaries are included to allow municipalities to plan for these unincorporated areas.

The MPAs are further split into over 100 districts, and each district is composed of traffic analysis zones (TAZs). There are currently more than 1200 TAZs in the regional planning area. (Appendix A)

The remainder of the study area consists of large unincorporated tracts of generally undeveloped lands outside the MPAs.

This chapter provides an overview of the entire study area and then makes comparisons of five regions within the county: central, northeast, northwest, southeast, and southwest.

2.2 Population and Economy

Maricopa County is the most populous of Arizona's fifteen counties. Since 1940, the population of the county has increased from 187,000 to 2,213,695 in 1990 -- an expansion of well over 1,000 percent in the 50-year period. Maricopa County's growth rate since 1960 has far outstripped that of the United States, and has remained higher than that of the state as a whole during that period. The Phoenix Metropolitan Statistical Area (MSA) rose from 33rd largest nationally in 1970 to 20th in 1988, and projections indicate that the area will be the 13th largest in the United States by the year 2000. Table 2-1 summarizes population growth in the county during the 1980s.

TABLE 2-1
POPULATION GROWTH OF MARICOPA COUNTY
1980 - 1990

Date	Population
July 1980	1,509,175
July 1981	1,530,700
July 1982	1,582,100
July 1983	1,612,100
July 1984	1,701,300
October 1985	1,837,956
July 1986	1,903,900
July 1987	1,998,700
July 1988	2,055,400
July 1989	2,116,500
July 1990	2,213,695
July 1990	2,213,695

Source: U.S. Bureau of the Census; Arizona Department of Economic Security, Population Statistics Unit, February, 1990.

In Arizona, the Department of Economic Security (DES), Population Statistics Unit, is responsible for making population projections for each county. The Maricopa Association of Governments then works with its member communities to allocate the county-wide projections as received from the DES. This Plan is based on the MAG population projections adopted by the Regional Council in 1992. Table 2-2 presents a summary of projected Maricopa County population growth for the duration of the study period. For comparison purposes, projections available for the same time frame from the 1979 MAG 208 Plan are also presented. Population growth is now projected to be more rapid than projected in 1979 when the original 208 Plan was prepared.

TABLE 2-2
POPULATION PROJECTIONS FOR MARICOPA COUNTY
1990-2010

	Current MAG Projection	Projected in 1979 208 Plan
1990	2,213,695	1,827,000
1995	2,525,672	2,047,000
2000	2,876,063	2,297,000
2005	3,234,575	
2010	3,619,378	

Source: Arizona Department of Economic Security, Population Statistics Unit; MAG 208 Water Quality Management Program, 1979; MAG POPTAC Population and Socioeconomic Projections, Nov. 1989.

Several demographic factors have spurred this growth. Perhaps most prominent is in-migration. As part of the so-called Sunbelt, the Maricopa County area is nationally perceived as a land of open spaces and opportunity. In-migrants from the Midwest, the East, and especially from urban California have, until recently, stimulated a strong construction sector and continue to exert a powerful positive influence on almost all other economic sectors.

The area continues to be attractive as a retirement location to the nation's aging population. According to Mountain West Research, retirement migration contributes about 7,000 persons per year to the Phoenix metropolitan area population. This in-migration of retirees is expected to double by the end of the century. This growth has been supplemented over the period by an increasing birth rate in Maricopa County.

According to the population projections, the current population of the planning area of about 2.2 million persons is expected to increase to nearly 3.6 million by the Year 2010, the planning horizon of this study.

Maricopa County is increasing its importance as a center of business activity. The economic emergence of the Pacific Rim is affecting the area, with California firms expanding and relocating here to serve that market. The traditional economic base of tourism, government, and construction is being broadened by the addition of high technology manufacturing, defense/aerospace, and corporate regional offices.

Agricultural employment is declining as a percentage of the total labor force largely due to urbanization and mechanization. No new land can be brought into irrigation in the planning area as a result of regulations promulgated by the Arizona Department of Water Resources.

Total non-agricultural employment in Maricopa County, however, has risen from 842,400 jobs in 1985 to an estimated 933,100 in 1989. Two sectors, services and wholesale and retail trade dominate the economy, each accounting for nearly 250,000 jobs.

The manufacturing employment base in the planning area is the largest in Arizona. It grew from 131,100 jobs in 1985 to an estimated 139,000 jobs in 1989. The proportion of high technology and related manufacturing jobs in Maricopa County is about three times the national average. Government employment has also shown steady increases, providing about 120,000 jobs in 1989.

Two sectors have slumped somewhat since reaching peaks in the mid-1980s. These are finance, insurance, and real estate; and, especially, construction. Declines in these sectors are a result of a real estate marketplace which is currently in the trough of its business cycle. These sectors are expected to rebound in the early to mid-1990s.

2.3 Regional Distribution of Economic and Population Growth

Growth within the metropolitan area since the previous area-wide Water Quality Management Plan has not been equally distributed spatially. The five regions of the metropolitan area, as described below for the purposes of this discussion are distinguished by geographic similarities and do not correspond necessarily to corporate limits.

The **Central Region** could be termed the Valley's major urban core. It is already developed for the most part, but retains more vacant land than most urban cores of the nation's largest cities. Population growth between 1985 and 1990 has been less than 9 percent -- less rapid than in the other four regions. This trend is expected to continue through the year 2010. Similarly, the share of the population living in the Central Region is expected to continue to steadily decline, from 20 percent in 1985 to 13 percent in 2010.

While the employment share of the Central Region is currently the largest of the five, it is expected to lose this dominance over the next twenty or so years, with a disproportionate share of the new employment going to the Southeast Region. One distinction the Central Region is expected to maintain is its ratio of jobs to housing. Projections indicated that the region will continue to be limited in housing with much of the work force commuting from outer regions. Large-scale changes could come in the form of redevelopment of under-utilized land in the central region.

Unlike the Central Region, the **Northeast Region** is largely undeveloped. With abundant land for development, an expanding employment base, and improving transportation, the region is expected to grow rapidly. The region holds about a 14 percent share of the population and is projected to modestly increase its share to 15 percent by 2010.

While the Northeast Region has traditionally been characterized as an affluent residential area, employment around the Scottsdale Airpark and on new sites nearby is projected to increase the region's share of employment from about 10 percent in 1985 to 13 percent in 2010.

The **Northwest Region** is now the second most populous region and is growing rapidly. The region added about 22 percent to its population from 1985 to 1990 and is expected to add nearly 50 percent between 1990 and 2000. The regional share of population is expected to remain more or less constant, however, at about 26 percent of the total.

Employment in the northwest was given a boost in the 1960s and 1970s by the location of high technology manufacturing plants along Interstate 17. This trend continued but at a slower pace in the 1980s. Spin-off employment and service jobs were stimulated during the period. In 1985, the regional share of employment was 17 percent. This share is expected to rise to an 18 percent share in 2000 and fall back to 17 percent by 2010.

The **Southwest Region** is the least populous of the five regions. It continues to be dominated by traditional agriculture (cotton and alfalfa production), but with the completion of Interstate 10 connecting Phoenix with Los Angeles, the region could grow rapidly. It gained approximately 20 percent more population from 1985 to 1990, and is expected to add as much as 65 percent from 1990 to 2000. The Southwest Region could increase its share of the county total from 9 percent in 1985 to 11 percent in 2010.

The smallest employment base of the five regions is currently in the southwest. The share in 1985 was about 6 percent. This is expected to rise to nearly 9 percent by 2010. A shift is occurring from agricultural employment to warehousing, manufacturing, and services.

The **Southeast Region** currently has the largest share of population, about 32 percent in 1988, and should continue to gain in relation to the other regions. In 2010 the region is expected to have over 1.3 million people, or about 35 percent of the total.

The population of the Southeast Region will be stimulated by additional freeways, availablility of land, educational opportunities, and employment centers. The regional share of employment is expected to increase from about 22 percent in 1985 to over 31 percent in 2010.

2.4 Land Use

The large scale land use trends of the 1970s continued in the 1980s. Urban coverage of the Valley continued, particularly to the southeast and the northwest. Land dedicated to agriculture continued to decline, as retired agricultural lands have been converted to urban uses. Estimates of the rate of this conversion have recently been revised downward, however, as a reflection of the slowdown in construction toward the end of the 1980s. Table 2-3 is a projection of the number of acres of agricultural land expected to go out of production in the county over a twenty-year span beginning in 1988.

TABLE 2-3
PROJECTED RETIREMENT OF
AGRICULTURAL LANDS

Period	Area Retired
1988 to 1993	1,700 acres
1993 to 1998	3,200 acres
1998 to 2003	3,700 acres
2003 to 2008	4,200 acres

Source: Salt River Project Land Use Forecasting Model, 1990.

Large tracts of developable land were in demand by developers for planned area developments. These tracts, for the most part, were and are only available outside of the urbanized area. This is a continuation of a development trend which began in the late 1950s with such projects as Sun City. Some cities with room to expand have done so with vigor, to the extent that huge tracts have been annexed to assure control of the tax base in coming decades. In addition, the communities of Cave Creek, Carefree, Queen Creek, Litchfield Park, and Fountain Hills have incorporated since the 1979 Water Quality Management Plan.

The growth of retirement communities, discussed above, has been spatially manifested most notably in the far northwest valley, in the Town of Surprise, for example, and in the far east valley, in east Mesa and in Apache Junction. These communities are characterized by unusually great seasonal shifts in population.

Typically, retail and other commercial activity has followed residential development as the urban fringe expands. The overall retail market of the planning area entered the 1980s with exceptionally high vacancy rates of about 30 percent. The market was over-built and absorption was at record low levels. The decade saw steady improvement until the end of the period when new supplies of space again exceeded absorption. The peak in retail construction activity was 5.6 million square feet in 1986.

At the same time that the periphery of the urban area was expanding, density was being added to the urban core. Residential in-fill in the form of small scale projects has been steady throughout the decade, but the urban fabric continues to be loosely woven. Employment continues to be concentrated toward the center of the urbanized area and along major transportation corridors.

High technology industrial employment growth has boomed along the north Black Canyon Highway and in the Chandler area. Other high tech operations, such as the McDonnell Douglas Helicopter facility in east Mesa, located outside the traditional employment cores have established new patterns of employment within their spheres of influence.

The MAG Freeway and Expressway Plan, funded by a half-cent sales tax, was endorsed by voters in October of 1985. Prior to that mandate, the planning area was served by fewer miles of freeway than perhaps any other metropolitan area of its size in the nation. The plan is now being implemented toward its goal of 230 additional miles of roadway within a dozen corridors.

These transportation improvements will have dramatic effects on land use and development in coming decades. Improved accessibility of certain parts of the area as a result of the new roadways will spur new development. Employment centers such as the one currently located in the vicinity of the Maricopa and Superstition Freeways will likely develop where other major new roadways intersect. Additional nodes of high density development will develop in various locations throughout the valley, especially in response to improved access.

Table 2-4 indicates existing and projected land uses for three categories, residential, commercial, and industrial. The figures for 1988 are based on digitized, remotely-sensed data for a 60 by 60 mile square area centered on the Phoenix metropolitan area, roughly corresponding to the urbanized portion of the county.

TABLE 2-4
EXISTING AND PROJECTED LAND USES
PHOENIX URBAN AREA
(acres)

	1988	1993	1998	2003	2008
Residential	255,300	+21,600	+24,700	+25,200	+26,900
Commercial	61,800	+7,600	+8,800	+9,700	+9,200
Industrial	32,800	+4,900	+5,800	+6,600	+6,300
Total	349,900	384,000	423,300	464,800	507,200

Source: Salt River Project Land Use Forecasting Model, 1990.

According to the estimates shown in Table 2-4, urbanized acreage is expected to increase by nearly 70 percent by 2008.

2.5 Growth Outside the Urbanized Area

The popularity of exurban living continued to grow in the 1980s, with unplanned development occurring in outlying areas such as New River and Laveen. The affordability of large lots and less stringent development controls create a strong appeal to those who would view Arizona as an open frontier and yet require relative proximity to the urban area to earn a living. This lifestyle and its accompanying forms of land use will likely continue to proliferate until greater controls are instituted by Maricopa County in the unincorporated area or all outlying developable lands are annexed by cities.

2.6 References

Arizona Department of Economic Security, Population and Statistics Unit, various publications.

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U.S. Department of Energy, *Draft Environmental Impact Statement: Superconducting Super Collider, Vol. IV, Appendix 5a*, August 1988.

Valley National Bank, *Arizona Statistical Review*, December 1989, 93 pp.

Chapter 3 - Description of Water Resources

This chapter provides an overview of the planning area's water resources, which include local and imported surface water, groundwater, and reclaimed water. Water quality standards, current at the time the plan document was prepared, also are reviewed. The standards are likely to be revised and expanded in the future.

Excerpts from the Arizona Department of Environmental Quality's (ADEQ) *Arizona Water Quality Assessment 1992* pertinent to the planning area are also presented in this document as Appendix D.

3.1 Local Surface Waters

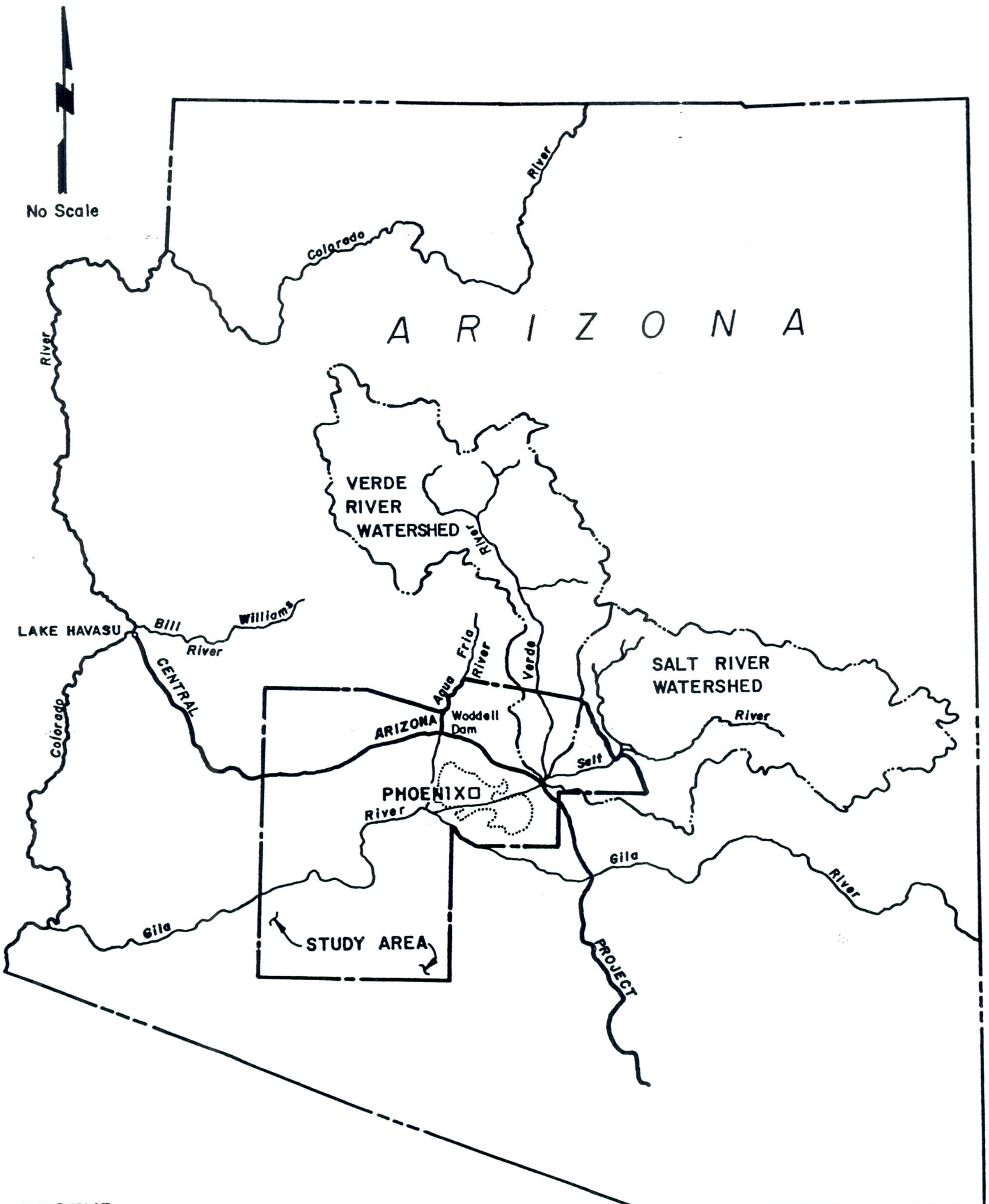
3.1.1 Introduction

The development of Maricopa County into a major agricultural and population center of the Southwest U.S. is due in large part to its favorable location with respect to supplies of surface water. Maricopa County lies at the confluence of the Salt and Verde Rivers, two rivers that drain the most prolific watersheds in the state. Water user organizations in the planning area have the legal right to most of the flow. Prior to the importation of water from the Colorado River, the Salt and Verde Rivers represented more than 90 percent of the developed surface water supply of Maricopa County.

Other developed surface water resources of historical importance in the planning area include: (1) the Agua Fria River, and (2) the Lower Salt River and the main stem of the Gila River below the confluence with the Salt. The Hassayampa and Santa Cruz Rivers are tributaries to the Gila River in the planning area, but their normal flows are fully appropriated by upstream users and they carry only floodwaters into the planning area.

In addition to the traditional sources of supply from the planning area's rivers, two other sources of surface water are assuming an increasing role in meeting the planning area's needs: imported water from the Colorado River delivered via the Central Arizona Project (CAP) aqueduct, and treated wastewater effluent. Due to the tightening restrictions on groundwater pumping and increasing demands due to population growth, use of these waters will continue to increase as treatment works and interconnection facilities are constructed.

Figure 3-1 depicts the planning area's major local and imported surface water supplies.



LEGEND

SALT RIVER PROJECT WATER SERVICE AREA

RIVER WATERSHED BOUNDARY

STUDY AREA

MARICOPA ASSOCIATION OF GOVERNMENTS
208 WATER QUALITY MANAGEMENT PLAN

MAJOR LOCAL AND IMPORTED SURFACE WATER SUPPLIES

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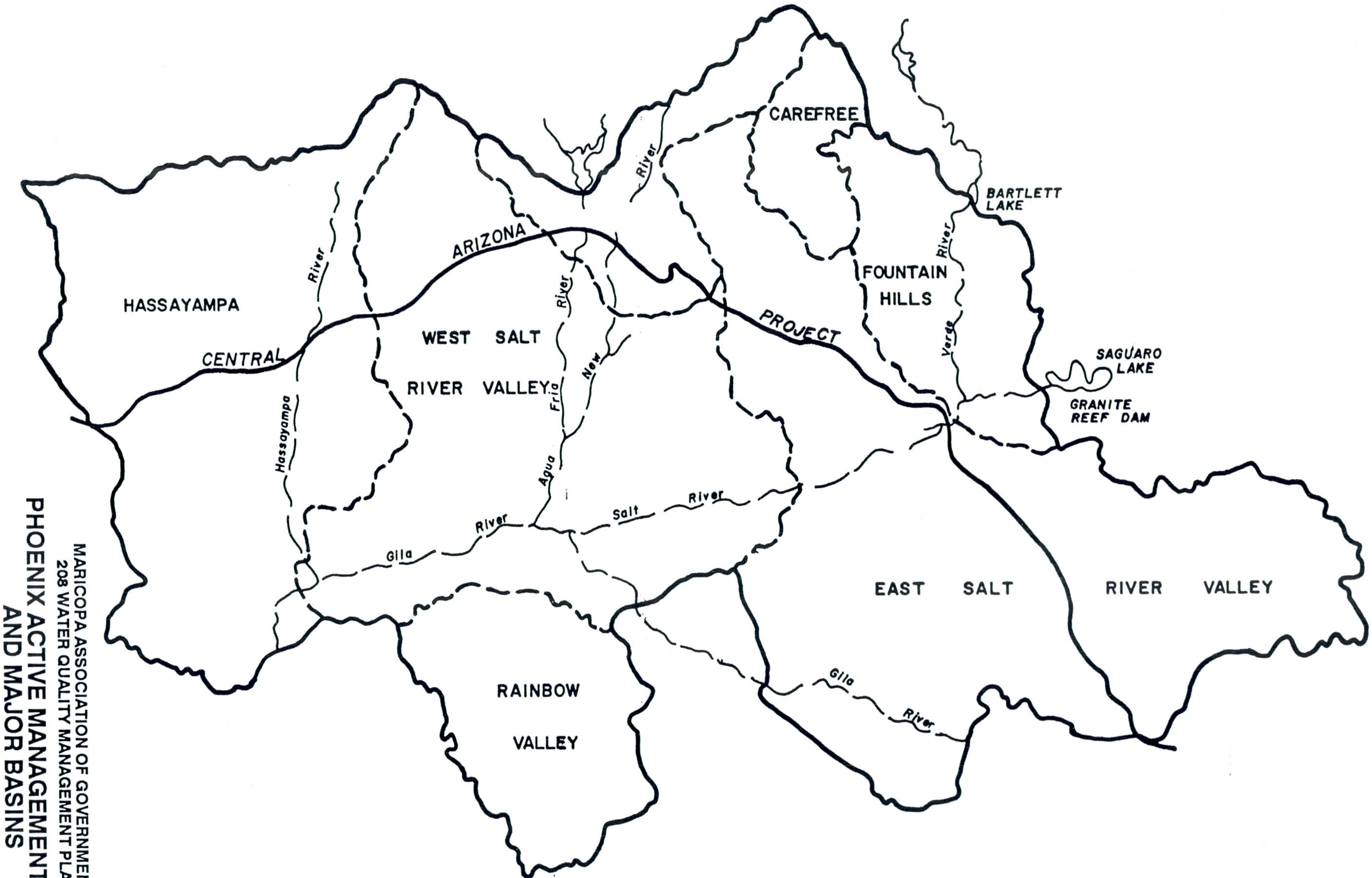
FIGURE 3-1



MARICOPA ASSOCIATION OF GOVERNMENTS
208 WATER QUALITY MANAGEMENT PLAN

PHOENIX ACTIVE MANAGEMENT AREA AND MAJOR BASINS

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FIGURE 3-2

3.1.2 *Salt and Verde Rivers*

The Salt and Verde Rivers drain an area of approximately 13,000 square miles of east-central and north-central Arizona. These watersheds are also depicted on Figure 3-1. Elevations within the watersheds vary from about 1,300 feet above mean sea level near the confluence of the rivers, to about 13,000 feet at the highest mountains.

3.1.2.1 Reservoirs and Canals. Flows in both rivers are highly erratic, and a system of six reservoirs has been constructed to provide a more dependable source of water supply. The reservoirs, which are operated by the Salt River Project (SRP), have a combined storage capacity of about 2 million acre-feet (ac ft). Most of this storage is at Roosevelt Lake, which current has capacity of 1.4 million ac ft. Roosevelt Dam is being modified, and that project will increase the available storage volume by 268,000 ac ft (Salt River Project, 1985).

Water is released from the reservoirs on the Salt and Verde Rivers in response to irrigation and municipal demands in the planning area. The water is diverted into the SRP distribution system at Granite Reef Dam, which lies about 3 miles downstream from the confluence. Except for periods of excess runoff when the storage capacities of the reservoirs are exceeded, the channel of the Salt River below Granite Reef Dam and through much of the planning area is typically dry.

At Granite Reef Dam, water is diverted into the north side and south side canal system via the Arizona Canal and the Southern Canal. The Arizona Canal feeds the Crosscut and the Grand Canals, and the Southern Canal feeds the Roosevelt, Eastern, Consolidated, Tempe, and Western Canals. Except for the Roosevelt Canal, which is owned by the Roosevelt Water Conservation District (RWCD), all of the canals are owned and operated by SRP.

Water in the canals is used to meet agricultural, irrigation, and municipal needs. In 1988, a recent year for which data have been summarized, SRP delivered a total of 945,000 ac ft of water. About 314,000 ac ft was supplied to cities for municipal use, 312,000 ac ft was delivered to agricultural customers for irrigation, and the remainder was used for other purposes such as urban irrigation (Salt River Project, undated).

3.1.2.2 Flows. The combined average annual inflow of the Salt and Verde Rivers to the reservoir system is about 1.25 million ac ft for the 96-year period ending in

1985 (Salt River Project, 1985), but extremes in flow are common. For example, in the highest flow year of record, 1905, the inflow was 5.2 million ac ft, which was more than 10 times the inflow of the previous year. Long periods of relative drought have also been recorded. Between 1942 and 1964, a period which included much of the rapid post-war growth of the planning area, the average inflow was only 794,000 ac ft per year. However, extended periods of above-average inflows have also been recorded. In the seven-year period between 1978 and 1984, the average inflow to the reservoir system was 2.1 million ac ft per year, or nearly twice the average.

Outflows from the Salt and Verde Reservoir system are smaller than the inflows due to losses from evaporation, seepage, and spills. At Granite Reef Dam, the average diversion was about 940,000 ac ft per year for the ten-year period ending in 1980 (Smith, 1982). During this period, a total of about 5.9 million ac ft was spilled due to insufficient storage capacity in the reservoir system.

Water that is spilled from the Salt and Verde Reservoirs is released into the Salt River channel and flows through the planning area. In the past, large releases have caused significant damage to facilities and structures that were built in the floodplain. During several releases in recent years, portions of landfills in the floodplain were eroded or submerged.

Releases from the reservoir system on the Salt and Verde Rivers also have impacts on groundwater. The river bed is highly permeable and is as much as 100 feet above the water table in some reaches. As a result, large volumes of river water infiltrate during releases. Measurements that were made during and after a release in 1965 indicated that the average infiltration rate in the Salt River channel through the planning area is 1.0 to 2.5 ft/day (Briggs and Werho, 1966). During a more recent release in 1973, infiltration contributed an estimated 500,000 ac ft to the groundwater beneath the river channel, and the water level in wells near the river rose as much as 52 feet (Babcock, 1975).

3.1.2.3 Water Quality. Waters in the Salt and Verde Rivers have excellent chemical quality. The watersheds are largely undeveloped, and man-made sources of pollution are not widespread. However, dissolved inorganic constituents are present, and in both rivers, concentrations of the inorganic constituents vary inversely with the flow (Salt River Project, undated). During periods of high flow, the concentrations of dissolved constituents are lowest due to the predominance of surface runoff and precipitation. During periods of low inflow, concentrations of dissolved constituents are higher due to the increased percentage of groundwater and discharge from springs.

The mean concentrations of selected dissolved inorganic constituents in waters of the Salt and Verde Rivers at two sampling stations above the confluence are listed in Table 3-1 for 1988. Compared to water in the Salt River, water in the Verde River is lower in total dissolved solids (TDS) and higher in bicarbonate (HCO_3). Water in the Salt River has higher concentrations of sodium (Na) and chloride (Cl), mainly due to discharges from salt springs into the river channel.

Table 3-1 also shows the mean concentrations of inorganic constituents in water at the head of the north side and south side canal systems (Arizona and Southern Canals, respectively). Differences in concentrations in the two systems are due to incomplete mixing of the river water in the 3-mile reach between the confluence and Granite Reef Dam. Water in the Arizona Canal has characteristics of Verde River water (higher bicarbonate), whereas water in the South Canal has characteristics of Salt River water (higher sodium and chloride). The differences are more pronounced during years in which flows are higher than recorded in 1988.

TABLE 3-1
MEAN WATER QUALITY IN THE
SALT AND VERDE RIVER SYSTEMS IN 1988
Units: milligrams per liter (mg/l)

Constituent	Verde River at Beeline Highway	Salt River below Stewart Mountain Dam	Arizona Canal at Granite Reef	Southern Canal at Granite Reef
Total Dissolved Solids	250	574	424	455
Calcium	35	46	41	42
Magnesium	22	13	16	15
Sodium	29	156	100	112
Carbonate	213	162	189	185
Sulfate	35	67	46	51
Chloride	14	206	118	135
Fluoride	0.24	0.23	0.21	0.22
Nitrate	1	1	1	1

Source: Salt River Project, undated.

3.1.3 Agua Fria River

The Agua Fria River drains an area of about 1,500 square miles in Central Arizona. Elevations in the watershed vary from about 900 feet at the confluence of the Agua Fria and Gila Rivers to about 8,000 feet in the Bradshaw Mountains. Because of the smaller watershed and the lower elevation, flows in the Agua Fria River are lower than flows in the Salt and Verde Rivers.

3.1.3.1 Reservoirs and Canal. One dam (Waddell Dam) has been constructed on the Agua Fria River to form Lake Pleasant, which is owned and operated by the Maricopa County Municipal Water Conservation District #1 (Maricopa Water District). At present, the available storage capacity of Lake Pleasant is about 150,000 ac ft. However, a new dam is being constructed by the U.S. Bureau of Reclamation immediately downstream of the old one to provide water storage for the Central Arizona Project. When New Waddell Dam is completed in 1992, the available storage in Lake Pleasant will be about 800,000 ac ft.

Until the interconnection with the Central Arizona Project is complete, water from Lake Pleasant is released only into the Agua Fria River channel and then diverted into the Beardsley Canal 1.5 miles downstream at the Camp Dyer Diversion Dam. Under normal conditions, the Maricopa Water District #1 appropriates the entire flow of the river for irrigation use so the channel of the Agua Fria River is normally dry below the diversion dam.

3.1.3.2 Flows. During a recent 10-year period for which records have been summarized (1970 to 1980), average inflow to Lake Pleasant was about 81,000 ac ft per year. For the same period, average diversions were about 34,000 ac ft per year and a total of 565,000 ac ft was spilled from the system.

Nearly all of the water that was spilled from Lake Pleasant during the period between 1970 and 1980 was released in 1978, 1979, and 1980. Prior to 1978, water had been spilled on only three occasions since Waddell Dam was first constructed in 1927. Water released from Lake Pleasant flows downstream through the communities of Surprise, El Mirage, Youngtown, Glendale, and Avondale before it enters the Gila River. During periods of high runoff, flow from New River enters the Agua Fria River. The New River basin, which is mainly unregulated, includes Skunk Creek.

3.1.3.3 Water Quality. The water of the Agua Fria River below Lake Pleasant is more mineralized with higher concentrations of most dissolved inorganic constituents than water in either the Salt or the Verde Rivers. The concentration of sulfate, in particular, is several times higher in water from the Agua Fria River than in either the Salt or Verde Rivers. Water quality data for the Agua Fria River below Lake Pleasant for two recent years (1985 and 1990) are listed in Table 3-2.

TABLE 3-2
WATER QUALITY FOR THE
AGUA FRIA RIVER BELOW LAKE PLEASANT
Units: milligrams per liter (mg/l)

Constituent	August 22, 1985	July 2, 1990
Total Dissolved Solids	770	620
Calcium	78	72
Magnesium	44	28
Sodium	128	87
Carbonate	166	158
Sulfate	315	280
Chloride	96	76
Fluoride	0.3	0.5
Nitrate	0.2	0.2

Source: Maricopa Water District files.

3.1.4 Lower Salt and Gila River

From Granite Reef Dam to about 19th Avenue, the Salt River channel is mostly dry. However, further downstream, close to the confluence with the Gila River, the channel carries a perennial flow that is a combination of gravel quarry pumpage, wastewater treatment plant effluent, irrigation tailwater, natural groundwater discharge, and water from miscellaneous sources.

Water in the Lower Salt River and the Gila River is diverted for irrigation use at three locations. At the Buckeye Heading, near the confluence of the Salt and Gila Rivers, a portion of the flow is diverted into the Buckeye Canal for irrigation use in the Buckeye Water Conservation and Drainage District. Further downstream, in the channel of the Gila River, water is diverted into the Arlington Canal by the Arlington Canal Company, and at Gillespie Dam, most of the remaining flow in the Gila is diverted into the Enterprise and Gila Bend Canals.

The average flow in the Gila River above the diversions at Gillespie Dam varied in 1989, and the total discharge for the 1989 water year was about 140,000 acre-feet.

About 95,000 acre-feet was diverted, and the total discharge at the dam was about 45,000 acre-feet. During the summer months, when irrigation demand was highest, no flow was recorded in the Gila River below Gillespie Dam. (U.S. Geological Survey, 1990)

Water quality in the Gila River is generally poor. Water flow in the perennial reaches of the Middle Gila Basin are predominantly effluent, releases from impoundments and/or agricultural return flows. The water quality is impacted by upstream discharges of irrigation tailwater, inflows of groundwater containing high concentrations of total dissolved solids (TDS), as well as water from mine tailings. Organochlorine pesticides in fish tissue have also been detected, and portions of the river have been posted to warn of the hazard of fish consumption.

Table 3-3 lists the water quality data for the Gila River at Gillespie Dam. The salinity (TDS) is three to ten times higher than the salinity of the Salt, Verde, or Agua Fria Rivers, and most of the increase is due to increased concentrations of sodium, sulfate, and chloride. The concentrations of nitrate reported in the Table 3-3 equal the EPA's Maximum Contaminant Level (MCL) for drinking water. Concentrations of heavy metals are also monitored in the Gila River at Gillespie Dam; in the 1989 water year, no heavy metals were detected in concentrations that exceeded the U.S. EPA's MCLs.

TABLE 3-3
WATER QUALITY FOR THE
GILA RIVER AT GILLESPIE DAM
Units: milligrams/liter (mg/l)

Constituent	February 16, 1989	August 15, 1989
Total Dissolved Solids	2,540	2,600
Calcium	170	170
Magnesium	78	73
Sodium	600	630
Carbonate	355	322
Sulfate	530	580
Chloride	890	890
Fluoride	0.10	2.2
Nitrate	45	45

Source: Maricopa Water District files.

3.2 Central Arizona Project

The Central Arizona Project (CAP) includes a 335-mile long aqueduct system that delivers water from Lake Havasu on the Colorado River to municipal and irrigation users in Maricopa, Pinal, and Pima Counties. The aqueduct system has been completed to Tucson, and water has been delivered to the planning area, for several years.

A major feature of the CAP in the planning area, now nearing completion of construction, is New Waddell Dam and the interconnection canal at Lake Pleasant. New Waddell Dam will greatly expand Lake Pleasant which will be used for seasonal pumped storage of CAP water. During the winter, water will be pumped from the CAP aqueduct to Lake Pleasant, and during the summer, water will be released from the Lake into the aqueduct. New Waddell Dam will increase the storage capacity in Lake Pleasant from about 150,000 ac ft to more than 800,000 ac ft. Once the connection is complete, water stored in Lake Pleasant will be predominantly Colorado River water, blended with smaller amounts of water from the Agua Fria River.

A second interconnection to the CAP aqueduct has been constructed at Granite Reef Dam. The Granite Reef interconnection can be used to deliver CAP water into the SRP canal system as a means of delivering water to users in the Phoenix area who are remote from the CAP aqueduct.

The cities of Glendale, Phoenix, Scottsdale, and Mesa have municipal water treatment plants (WTPs) on the CAP canal system. In 1989, a recent year for which data are available, a total of about 79,000 acre feet of CAP water was delivered to municipal water organizations in the planning area, meeting about 14 percent of the total municipal water use. CAP water use for municipal purposes will increase significantly in the future.

Water quality in the CAP aqueduct is monitored by the CAWCD (Central Arizona Water Conservation District) headquarters. Concentrations of selected constituents for the 1989 water year are summarized in Table 3-4.

TABLE 3-4
WATER QUALITY FOR THE
CAP AQUEDUCT AT 7TH STREET FOR 1989
Units: milligrams per liter

Constituent	Mean Concentration
Total Dissolved Solids	571
Calcium	66
Magnesium	27
Sodium	83
Carbonate	145
Sulfate	238
Chloride	67
Fluoride	0.30
Nitrate	<0.10

Source: Central Arizona Project.

3.3 Wastewater Treatment Plant Effluent

In the planning area, treated effluent is used to supply water for irrigation, industrial uses, and recreational purposes.

Much of the effluent from the 91st Avenue and 23rd Avenue treatment plants, the two largest sources of effluent in the planning area, is used as cooling water at the Arizona Nuclear Power Project (ANPP) Palo Verde Nuclear Generating Station. According to the terms of the contract, the Palo Verde Generating Station has the right to up to 177,300 ac ft per year of effluent. To date, the maximum amount used in any year was 57,000 ac ft in 1989. Effluent is supplied to Palo Verde via pipeline, and excess flow is discharged to the Salt River channel or to irrigation canals.

Smaller amounts of effluent from other wastewater treatment plants in the planning area are reused elsewhere. These plants are discussed in the Point Source Plan (Chapter 4).

3.4 Groundwater

3.4.1 Introduction

Groundwater resources in the planning area are significant. In 1975, the Arizona Water Commission estimated that 153.6 million ac ft of groundwater was stored in the alluvial deposits of the Salt River Valley above a depth of 1,200 feet. Deeper deposits contain a greater volume.

Despite the relative abundance of groundwater in the planning area, long-term declines in water levels have resulted from a serious imbalance between recharge and pumpage. Recognition of this imbalance provided the impetus for the enactment of the Groundwater Management Act of 1980. The Act led to the establishment of Active Management Areas (AMAs) areas which are subject to regulation by the Arizona Department of Water Resources (ADWR). With the AMAs, the right to pump groundwater and develop new groundwater supplies are regulated by ADWR. Most of Maricopa County and all of the Salt River Valley lies in the Phoenix AMA. Within the Phoenix AMA, a permit is needed to legally withdraw groundwater for most uses, and placing new land into agricultural production is generally not permitted.

3.4.2 Geologic Setting

Groundwater in the planning area occurs mainly in unconsolidated and semi-consolidated basin-fill deposits of sand, gravel, silt, and clay. These sediments were eroded from nearby bedrock upland areas by rivers and streams over a period of five million years or more.

Because no wells have penetrated the full thickness of the basin fill in any of the major groundwater basins in the planning area, the total thickness of the basin fill deposits is not known. In the Salt River Valley, the maximum thickness is more than 10,000 feet, based on indirect measurement methods.

In a 1977 report for the Central Arizona Project, the Bureau of Reclamation divided the basin fill deposits of Maricopa County into three units: the Upper Alluvial Unit, the Middle Fine-Grained Unit, and the Lower Conglomerate Unit. Each has different water-bearing characteristics.

The Upper Alluvial Unit, which varies in thickness from less than 200 to more than 1,200 feet thick, is most permeable and, where it is saturated, yields large quantities of water to wells. However, in parts of the planning area, the water quality has been degraded by contaminants.

The Middle Fine-Grained Unit consists of finer-grained sand, silty clay, and evaporite deposits such as gypsum and halite. This Unit is absent near the mountains at the margins of the basins, but it may be 1,500 to 2,000 feet thick near the centers of the basins. The Middle Fine-Grained Unit is generally not considered a prolific aquifer, although interbeds of coarse grained sands yield moderate quantities of water to wells in parts of the planning area.

The Lower Conglomerate Unit (sometimes referred to as the Lower Alluvial Unit) consists of pebble- to cobble-sized rock fragments in a finer-grained matrix of sand, salt, and clay. The degree of cementation is variable. The thickness of the Unit varies; it is absent or indistinguishable from the Upper Alluvial Unit near the margins of the basins and is thickest near the centers. More than 2,000 feet of the Unit has been drilled. The Unit mainly provides water to wells located closest to the margins of the basins; near the centers of the basins it is deeply buried. Because of cementation, the Lower Conglomerate Unit is not as prolific a source of groundwater as the Upper Alluvial Unit.

3.4.3 Groundwater Basins

The planning area includes all or part of the following major groundwater basins:

- East Salt River Valley.
- West Salt River Valley.
- Rainbow Valley.
- Hassayampa.
- Lake Pleasant.
- Carefree.
- Fountain Hills.

The locations of these basins are shown on Figure 3-2. Together, they comprise the Phoenix AMA.

Portions of other groundwater basins are in Maricopa County, including the Gila Bend Basin, the Lower Gila Basin, and the Harquahala Basin.

3.4.4 Depth to Groundwater and Direction of Flow

In the Phoenix AMA, the depth to groundwater varies from less than 10 feet to more than 500 feet. In general, the greatest depths occur in the sloping alluvial fans close to the major mountain ranges. Groundwater is shallowest along the channel of the Salt River downstream from Tempe. In this reach, intermittent ponded water and/or flow water has been present at times during most recent years due to discharge to the river channel.

The direction of groundwater flow in the Phoenix AMA has been greatly influenced by groundwater pumpage. In four areas, pumpage has created particularly significant depressions in the water table surface: eastern Mesa, north Scottsdale, Deer Valley, and near Luke Air Force Base.

Groundwater moves towards the water table depressions from areas of higher elevation, and the direction of natural groundwater flow has been reversed in some areas. Before the extensive pumping of groundwater in the planning area, the natural direction of groundwater flow was towards the Salt River in most of the basin. Now, groundwater flows away from the Salt River in parts of the planning area.

3.4.5 Groundwater Budget

The main components of the water budget for a groundwater basin are recharge, withdrawal, and change in storage. Under undisturbed conditions, recharge and discharge are in close balance in groundwater basins, and the amount of groundwater in storage does not change significantly from one year to the next. However, in the Phoenix AMA basin, groundwater withdrawals have exceeded recharge for most of the period for which records are available. Storage has been depleted and the position of the water table has declined. The greatest declines have occurred outside of the area served by the Salt River Project and have created the water table depressions discussed earlier.

In the Phoenix AMA, components of groundwater recharge can be divided into general categories. These categories and the estimated quantities for 1985 are listed in Table 3-5, based on data obtained from the ADWR, Phoenix AMA.

TABLE 3-5
GROUNDWATER BUDGET, 1985
PHOENIX ACTIVE MANAGEMENT AREA

Recharge	Volume, acre-feet
Agricultural irrigation	443,407
Canal seepage	113,386
Municipal sources[1]	65,031
Effluent seepage	61,673
Natural sources	41,000
Industrial sources	8,125
Other	1,701
Total Recharge	734,323
Withdrawals	
Municipal water supply	196,434
Agricultural and other pumpage	969,219
Total	1,165,653

[1]Includes recharge from urban irrigation.

Source: Arizona Department of Water Resources, Phoenix AMA.

The estimated difference between recharge and discharge for the Phoenix AMA in 1985 was 431,330 acre-feet (ac ft). This is less than the deficit in earlier years. In 1970, the State Water Commission estimated that the deficit for the Salt River Valley alone (which would not consider the other basins in the Phoenix AMA) was approximately 600,000 ac ft. The difference between the two figures may be the result of decreased groundwater pumpage due to increased availability of surface water as well as decreases in irrigated acreage.

The groundwater "deficit" is made up of water that is withdrawn from storage in the aquifer. In the Salt River Valley alone, the total estimated volume of water in storage in the alluvial aquifer is about 150 million ac ft in the interval between the ground surface and a depth of 1,200 feet.

Smaller amounts of groundwater are withdrawn by processes for which quantity estimates are not readily available. These include pumpage for dewatering at sand and gravel quarries (mainly along the lower reaches of the Salt River), natural discharge to rivers and drains, evapotranspiration, and subsurface outflow to adjacent basins.

3.5 Water Quality Standards

In Arizona, the Arizona Department of Environmental Quality has responsibility for establishing and enforcing water quality standards. Three sets of relevant standards have been established:

- Navigable waters.
- Public water supplies.
- Aquifers.

These are discussed in the following sections.

3.5.1 Navigable Waters

Standards for navigable waters ("stream standards") are established according to the designated use that is existing or obtainable. Protected uses include: (1) aquatic and wildlife (cold water fishery, warm water fishery, ephemeral and effluent-dominated waters (EDW)), (2) full body contact, (3) partial body contact, (4) agricultural irrigation, (5) agricultural livestock watering, (6) domestic water source, and (7) fish consumption. Most rivers, streams, and canals in Arizona have at least one designated use, and numeric standards have been established for each use.

For the unique waters category of navigable waters, standards are established on a case-by-case basis. Navigable waters are classified as "unique waters" by ADEQ rule upon a finding that they constitute an outstanding public resource or that they are associated with a threatened or endangered species or its habitat. No unique waters are presently designated in the planning area.

Navigable waters are classified as "effluent-dominated" by ADEQ rule if they consist primarily of discharges of treated wastewater. The following surface water bodies are designated by ADEQ as effluent-dominated waters in the MAG planning area:

- Agua Fria River (Surprise Wastewater Treatment Plant (WWTP) to 5 km downstream from the outfall).
- Agua Fria River (Avondale WWTP to Gila River confluence).

- Gila River (Salt River confluence to the Gillespie Dam).
- Salt River (23rd Avenue WWTP to the Gila River confluence).
- Unnamed Wash (Gila Bend WWTP to the Gila River confluence).
- Unnamed Wash (Luke Air Force Base WWTP to the Agua Fria River confluence).
- Agua Fria River (El Mirage to 8 km downstream from the outfall).

3.5.2 Public Water Supplies

Rules for public water supplies, or "drinking water standards," have been adopted by ADEQ in accordance with the federal Safe Drinking Water Act (SDWA). The U.S. EPA and ADEQ are in the process of implementing new standards being developed as a result of the SDWA Amendments of 1986. These rules apply to all public and semipublic (serving more than four connections) water systems involved in the collection, treatment, storage and/or distribution of potable water. These rules do not apply to private agricultural water systems or semi-public water systems unless a health hazard has been identified.

The following surface waters have been designated as domestic water supplies by the ADEQ in the MAG planning area:

- Agua Fria River (Above Lake Pleasant).
- Apache Lake.
- Phoenix area canals (Granite Reef Dam to municipal WTP).
- Saguaro Lake.
- Salt River (Stewart Mountain Dam to the Verde River).
- Salt River (Verde River to 2 km below Granite Reef Dam).
- Bartlett Lake.
- Verde River below Bartlett Dam to confluence with Salt River.

Three categories of water systems are defined in ADEQ's rules on water supply systems: public (subdivided into community, non-transient non-community, and transient non-community), semi-public, and private agricultural. The most restrictive water quality standards generally apply to public systems.

Numeric water quality standards for water supply systems, known as maximum contaminant levels (MCLs), have been established for six general categories of contaminants: microbiological, inorganic chemicals, turbidity, organic chemicals, radiochemicals, and volatile organic chemicals and trihalomethanes.

In addition to contaminants for which MCLs have been established, monitoring for other contaminants and characteristics is required for certain types of water systems. Community and non-community water systems are required to monitor for 13 organic contaminants and physical characteristics. Community water systems are required to monitor for 6 corrosivity characteristics. Community and non-transient non-community water systems are required to monitor for 36 volatile organic chemicals. No enforceable standards have been established for these contaminants and characteristics; however, for many of them, guidance levels have been established in the form of secondary MCLs or Action Levels.

3.5.3 Aquifer Standards

ADEQ has established numeric water quality standards for aquifers using a procedure that is similar to that which has been used for surface waters, with one important difference: all aquifers in Arizona have been classified for drinking water protected use by statute. Reclassification is possible only for (1) hydrologically isolated aquifers, (2) aquifers that are not being used for drinking water, or (3) if the public benefits significantly outweigh the public costs for allowing degradation of an aquifer below standards.

No aquifers in the planning area have been reclassified, and reclassification may be unlikely. All aquifers are presently being used for drinking water, and no hydrologically isolated aquifers are known to occur naturally. However, reclassification is theoretically possible for parts of aquifers that can be isolated by artificial means.

Water quality standards for aquifers that have been classified for the drinking water protected use are the same as MCLs as primary drinking water standards. These standards include microbiological constituents, inorganic chemicals, turbidity, organic chemicals, and volatile organic chemicals. No aquifer standards have been established for those constituents for which secondary MCLs, guidance levels, or Action Levels have been established.

For reclassified aquifers, standards would be established by rule.

Aquifer water quality standards are used as the basis for regulating discharges to aquifers and to guide remedial actions in contaminated aquifers. Discharges to aquifers that are regulated under the Aquifer Protection Permit program are not allowed if they create a violation of standards at an applicable point of compliance. Remedial actions are also required to attain aquifer water quality standards to the extent practicable.

In most of the planning area, groundwater is more mineralized than surface water, and in some areas, dissolved inorganic minerals are present in discernable concentrations. This mineralized groundwater is "hard," or it may have a salty taste. Its usefulness for domestic, industrial, and agricultural purposes is reduced.

Notwithstanding the degree of mineralization, in most parts of the planning area groundwater meets drinking water standards, or MCLs (maximum contaminant levels), for inorganic constituents. The inorganic constituent that occurs most widely in concentrations greater than its established MCL is nitrate. Less commonly, concentrations of fluoride, chromium, and arsenic exceed the corresponding MCLs.

The highest concentrations of nitrate in groundwater generally occur in areas with a long history of irrigated agriculture where the total dissolved solids concentration is also high. In the Salt River Valley, these areas include parts of Gilbert, Chandler, Glendale, and Peoria. Nitrate in concentrations greater than the MCL also occurs in parts of other groundwater basins in the planning area.

Since the time that the first MAG 208 Plan was prepared, increased attention has been focused on organic constituents in groundwater, and MCLs have been established for several volatile organic compounds (VOCs). Some VOCs are carcinogenic, and MCLs are several orders of magnitude lower than the MCLs for inorganic constituents. Therefore, the reliability and accuracy of sampling and analytical techniques for VOCs are extremely important.

VOCs that have been detected in groundwater in concentrations greater than established MCLs in the planning area are listed in Table 3-6 along with the applicable MCL. Commonly used acronyms are also listed.

TABLE 3-6
VOCS DETECTED IN GROUNDWATER
MAG PLANNING AREA

Compounds (acronym)	MCL, micrograms per liter (ug/l)
Trichloroethylene (TCE)	5
1,1,1-Trichloroethane (TCA)	200
1,1-Dichloroethylene (DCE)	7
1,1-Dichloroethane (DCA)	5
Benzene	5

Other organic compounds that occur less commonly in concentrations greater than corresponding MCLs include carbon tetrachloride, vinyl chlorides, and p-dichlorobenzene.

VOCs in concentrations greater than corresponding MCLs have been detected in some groundwater, primarily in the urbanized and industrialized parts of the Phoenix metropolitan area. Industrial uses of chemicals in the older parts of the metropolitan area predate the enactment of strict regulations that govern their uses, and on-site disposal was not uncommon where a municipal sewer system was not available. In some places the occurrences of VOCs in groundwater are the result of known discharges of chemicals, and remedial projects are under way to reduce or eliminate these contaminants. In other areas, the sources of VOCs have not been identified, and investigations are underway. These investigations and remedial projects are discussed further in Chapter 5 covering nonpoint sources.

In those parts of the planning area where groundwater quality does not meet MCLs due to human activity, the shallowest groundwater has been the most seriously affected. As a result, municipal drinking water wells supplied from groundwater have not been significantly affected. With few exceptions, poorer quality groundwater is sealed off from municipal wells using special well construction practices. If groundwater from a municipal water supply well exceeds MCLs, the water is treated, blended, or the well is taken out of service.

Groundwater pumped from irrigation wells more frequently exceeds MCLs. Historically, irrigation wells have been constructed primarily for pumping efficiency, and water quality was a minor consideration. In this case, well casings may be perforated from top to bottom, and poorer quality water from shallower depths is therefore pumped with deeper water.

Chapter 4 - Point Source Plan

The objective of the Point Source Plan is to identify the preferred wastewater collection and treatment, and effluent reuse or disposal systems for the study area. Applicable regulations and permit requirements are discussed with respect to their role in wastewater system planning. This is followed by specific plans developed for each community in the Study Area.

4.1 Permits and Protected Uses

4.1.1 NPDES Permits

The National Pollutant Discharge Elimination System (NPDES) is established by Section 402 of the Federal Clean Water Act. The NPDES permit program regulates discharges into federally designated navigable waters (waters of the United States). Discharges to the Salt, Gila, Verde, and Agua Fria Rivers, as well as other navigable waters, are subject to the NPDES permit program.

The State of Arizona is required to establish standards to meet the goals set forth by the Clean Water Act. NPDES permits contain limits that control the amounts of pollutants that can be discharged into navigable waters. State and federal regulations regarding surface water quality and treated wastewater discharge quality are used to establish portions of the NPDES Permit. Pollutant levels established by the NPDES permit program vary among wastewater treatment facilities depending upon the designated use of the receiving water. The NPDES permit defines monitoring requirements including biomonitoring.

Arizona has not been granted primacy status and therefore NPDES permits are researched and drafted by ADEQ and issued by the EPA. Permits are generally issued for a term of five years. Current Maricopa County NPDES Permit holders are listed in Table 4-1.

4.1.2 Aquifer Protection Permits and Implementation of BADCT

The Aquifer Protection Permit (APP) Program focuses on potential environmental risks to aquifers of the state and upon risks to public health posed by the facilities and activities which utilize these waters. The need for an Aquifer Protection Permit is determined by considering general vulnerability of the aquifer in terms of depth to groundwater and productivity of the aquifer, existing aquifer water quality, and waste hazard potential of the facility. Other determining factors include potentially affected drinking water population and existing documented

TABLE 4-1
CURRENT NPDES PERMITS IN MARICOPA COUNTY

Facility Name	Address	City	Permit No.
Ameron Inc.	P.O. Box 20505	Phoenix	AZ0021794
Avondale, City of - WWTP	525 N. Central Ave.	Avondale	AZ0023281
AMCOR Investments - Estrella WWTP	7600 N. 15th St., #200	Phoenix	AZ0023582
Buckeye, Town of - WWTP	P.O. Box 157	Buckeye	AZ0022900
Canyon Lake Associates	P.O. Box 5880	Mesa	AZ0021440
El Mirage, City of - WWTP	12000 W. Peoria	El Mirage	AZ0023272
Gila Bend, Town of - WWTP	P.O. Box 1	Gila Bend	AZ0020231
Goodyear, City of - WWTP	119 N. Litchfield Rd.	Goodyear	AZ0022357
Loral Systems Group -- Def Sys Div	1300 S. Litchfield Rd.	Litchfield Park	AZ0000108
Mesa, City of - SE Water Recl Plant	P.O. Box 1466	Mesa	AZ0022748
Mesa, City of - NW Water Recl Plant	2200 W. 8th St.	Mesa	AZ0022870
Phoenix, City of - 23rd Ave	2301 W. Durango	Phoenix	AZ0020559
Phoenix, City of - 91st Ave	2301 W. Durango	Phoenix	AZ0020524
Phoenix, City of - The Foothills	16950 S. Central Ave.	Phoenix	AZ0023124
Phoenix, City of - Tatum Ranch	4410 E. Dixileta Dr.	Phoenix	AZ0023205
Spur Cross Ranch WWTP	2600 N. 44th St.	Phoenix	AZ0023167
Tempe, City of - Kyrene Reclam Plant	311 W. Guadalupe Road	Tempe	AZ0023248
Tolleson, City of - WWTP	9555 W. Van Buren St.	Tolleson	AZ0020338
Tortilla Flat Resort	Box 34	Tortiall Flats	AZ0022390
U.S. Air Force - Luke AFB/Gila Bend	Luke AFB/Gila Bend AF Aux	Gila Bend	AZ0110469
U.S. Air Force - Luke AFB/Litch Park	832 C.E.S./DEMU	Luke AFB	AZ0110221
U.S. Air Force - WAFB Facility 1084			AZ002337
U.S. Air Force - WAFB - Chandler	82/RG/DEVE	Williams AFB	AZ0110230
Wickenburg, Town of - WWTP	P.O. Box 1269	Wickenburg	AZ0020044

pollution problems associated with the facility. In general, to obtain an APP, an applicant must demonstrate: (1) that Best Available Demonstrated Control Technology (BADCT) has been used, and (2) pollutants will not reach an aquifer.

4.1.2.1 Best Available Demonstrated Control Technology (BADCT). The Environmental Quality Act (ARS 49-243.B1) stipulates that all wastewater treatment facilities required to obtain an Aquifer Protection Permit (APP) use the Best Available Demonstrated Control Technology in their wastewater treatment process (BADCT). "Best" is defined to be the method which achieves optimum pollutant reductions. "Available" refers to being commonly procurable. "Demonstrated" is defined as proven in reliable operation under comparable circumstances. "Control Technology" is defined as a wastewater treatment process or pollutant concentration which represents the result of a selected treatment process. The overall objective of BADCT is to reduce the pollutant load on the state's aquifers as much as is technically feasible. Two key concepts are that BADCT is site specific and that BADCT is determined through negotiation between the applicant and the ADEQ.

Monitoring wells may be placed immediately downgradient of the discharge site to demonstrate that the groundwater meets Aquifer Water Quality Standards. Otherwise, it must be demonstrated "that the combination of pollutant concentrations, discharge quality, discharge control technology, and site characteristics assures that is no reasonable probability of pollutants reaching the water table" (BADCT Guidance Document Draft, ADEQ).

BADCT addresses procedures for determining the design alternatives for wastewater treatment facilities. BADCT requires all parties who treat wastewater to implement the best feasible treatment technology for the specific site. Wastewater treatment facilities, surface impoundments, sewage/sludge ponds, septic tanks of capacities greater than 2,000 gallons per day, point source discharges to navigable waters, and land treatment facilities are required to obtain an Aquifer Protection Permit (APP) with BADCT incorporated into the design. This requirement applies to all new and existing facilities. ADEQ regards recharge or underground storage and recovery projects to include only the basins, injection wells, or other facilities utilized for the recharge of the aquifer but not facilities designed for the purpose of wastewater treatment. BADCT, therefore, is not required for the recharge facilities, but is required for the water reclamation plant producing the effluent to be recharged.

In evaluating BADCT for a treatment plant, ADEQ considers pollutant removals achieved and other impacts due to the site characteristics and operational processes of recharge facilities which receive effluent. Site-specific factors which may influence BADCT include: hydrogeological characteristics, soil properties, vadose zone properties, depth to groundwater, surface water, and climate.

New facilities, whose construction or contracting began after August 13, 1986, (BADCT Guidance Document Draft, ADEQ) are required to implement BADCT. Existing facilities (those constructed or contracted prior to August 13, 1986) are to be evaluated for economic and technical feasibility of retrofitting the facility with more effective discharge controls (BADCT Guidance Document Draft ADEQ). BADCT is determined by starting with an effluent limit based on the application of treatment technologies to meet "optimum" pollutant reductions, summarized as follows:

Parameter	Maximum value
Fecal coliform	2.2 CFU/100 ml (geometric mean)
Turbidity	1.0 NTU
Nitrogen	1.0 to 10 mg/1 as N (actual value will depend on process type and size of facility)
Fluorides	Safe Drinking Water Act MCL
Hazardous Substances	Safe Drinking Water Act MCL
Hazardous Substances	Action level or concentration without MCL's representing 1 x 10^{-6} cancer risk, whichever is lower
Hazardous Substances pursuant to ARS 49-243.D	None detectable

These optimum limits may be modified by the application of site characteristics and other specific pollutant control processes while considering engineering feasibility, water conservation, non-groundwater environmental effects, and cost. Regardless of the BADCT selected, facilities may not violate Aquifer Water Quality Standards at the applicable point of compliance.

The following facilities, treatment processes, or disposal methods are considered by ADEQ to meet BADCT:

- Wastewater facilities which are designed and operated for zero discharge of pollutants. However, evaporation as a means of disposal may not meet the water conservation criteria for BADCT.

- The reuse of reclaimed water at consumptive rates.

- Septic tank systems which conform to the density, size, and construction requirements of the rules and engineering bulletins (ADEQ-Wastewater Engineering Requirements Bulletin No. 12, June 1989 edition).

- Facilities which discharge to non-effluent dominated, perennial streams with mean annual flows greater than 5,000 cubic feet per second, if the facilities do not violate the standards and conditions of a valid NPDES permit.

The principal processes impacted by BADCT requirements for most wastewater treatment plants are: disinfection, turbidity removal, and nitrogen removal.

Disinfection. Historically, effluent disinfection has been accomplished by chlorination. Though effective disinfection is accomplished, residual chlorine can combine with organic material to form trihalomethanes (THM's), a number of which are suspected to be carcinogens. Alternate disinfection technologies include chlorination followed by dechlorination, bromine chloride, and chlorine dioxide. BADCT design for new facilities discourages the use of chlorine derivatives for treatment uses. However, when it is used, the design must also include the final treatment process of dechlorination, in order to reduce the formation of trihalomethanes in the receiving waters. Ozone and ultraviolet (UV) disinfection are the preferred practice for new facilities. For large plants, the UV process is probably less expensive.

Turbidity. Turbidity removal typically is accomplished by filtration. Most filtration at wastewater treatment plants is accomplished by granular media or diatomaceous earth filtration.

- Filtration is considered to be an available and established wastewater treatment technology.

- BADCT stipulates that in most cases site-specific characteristics will modify turbidity requirements. However, turbidity will usually not be a pollutant of concern for discharge to groundwater due to the tertiary filtering capacity of a granular vadose zone in the soil. In some extreme cases where the water table is at a depth less than 20 feet and the soil substrate is a coarse sand, gravel, or cobbles, turbidity removal by filtration may be incorporated into BADCT.

Nitrogen. Nitrogen-related compounds, specifically ammonia and nitrates, must be removed to levels below 10 mg/l (as N) to meet BADCT. Denitrification involves biological processes carried out in either suspended growth reactors or fixed growth reactors. In some cases removal to below 5 mg/l has been demonstrated.

4.1.2.2 APP Procedures. Any person who engages or intends to engage in an operation or an activity which may result in a discharge to an aquifer may request, on a form provided by the Department of Environmental Quality (ADEQ), that the department determine the applicability of the APP rules to the operation or activity. Within 45 days of a request for "determination of applicability," the ADEQ will advise, in writing to the person making the request, whether they are subject to permit requirements.

If the ADEQ determines that an operation requires an APP, then an application must be filed, usually within 90 days. Upon request by the applicant, the ADEQ will schedule and hold a pre-application conference with the applicant to discuss the permit requirements. In addition, the applicant may submit to ADEQ for review and comment, a proposal for meeting any of the informational requirements of the permit application. A response to the proposals will be made within 30 days of their receipt. Within 90 days after the receipt of a completed application, the ADEQ will notify the applicant of its preliminary decision to either issue an APP or deny the application. There are additional provisions to allow for public comment regarding an APP decision should it be deemed necessary.

Applicants for an APP are required to provide the ADEQ with the name and mailing address of the applicant, facility owner, and facility operator, a legal description of the facility location, the operating life of the facility, and any Federal or state environmental permits issued to the applicant. Applicants are required to submit topographic maps of the facility and surrounding land area, facility site plans, and facility design plans indicating proposed and as-built features.

Regarding discharge, the applicant is required to submit the chemical, biological and physical characteristics, the rates, volumes and frequencies, and the location of past and proposed discharges. A full description of the BADCT to be employed including a description of considerations leading to the BADCT selection will be submitted. The applicant is required to demonstrate that Aquifer Water Quality Standards will not be violated at the point of compliance and if a pollutant limit has already been exceeded, that no further aquifer quality degradation will occur due to the proposed project.

The applicant must demonstrate technical and financial ability to construct, operate, and close the facility according to the conditions of the permit. Technical capability may be demonstrated by providing licenses, certifications, professional training, and work experience relevant to the design, construction or operation of the facility. Financial capability must be demonstrated by the Chief Financial Officer of the applicant. Financial capability requirements will be partially determined based on a submitted cost estimate of constructing, operating, closing, and maintaining a proper closed status of the facility.

The ADEQ may also require other relevant information needed to furnish the permit. This information includes a detailed proposal indicating the alert levels, discharge limitations, monitoring requirements, contingency plans, compliance schedules, temporary closures, closure, and post closure plans which the applicant proposes. A hydrogeologic study may be required to define the discharge impact area for the operational life of the facility and to demonstrate that the facility will not contribute to a violation of any Aquifer Water Quality Standard.

An APP may set requirements for pollutant alert levels. The alert levels are based on the site-specific conditions described in the application. The alert level may be based upon a pollutant which indicates the potential appearance of another pollutant. An APP may prescribe measurement of an alert level at the point of release, point of compliance, or any intervening point. An APP requires notification of the ADEQ and implementation of the appropriate contingency plan if an alert level is exceeded.

The APP requires the permittee conduct any monitoring activity necessary to assure compliance with any other APP condition and applicable water quality standards.

The permittee is also required to make reports to the ADEQ. The permittee must notify ADEQ within five days after the permittee becomes aware of a permit condition violation or an exceedance of an alert level, with written report of the violation of a permit condition or alert condition submitted within 30 days of the incident.

The APP requires that a contingency plan be implemented in the event that a discharge results in a violation of a permit condition, violation of an Aquifer Water Quality Standard, an exceedance of an alert level, or imminent and substantial endangerment to the environment or public health. The contingency plan will contain a plan to provide emergency response on a 24 hour basis in the event that a condition arises which results in imminent and substantial endangerment of the environment and public health. An emergency response coordinator will be designated for the activation of the contingency plan and emergency response measures. The emergency response coordinator is required to notify the ADEQ immediately in the event that emergency response measures are taken or those portions of a contingency plan that addresses an imminent and substantial endangerment are activated.

Certain facilities have been given class exemption status including: facilities which treat, store, or dispose of hazardous waste, have a permit, or have an interim status, pursuant to the Resource Conservation and Recovery Act or rules pursuant to ARS 49-922. Underground storage tanks containing regulated substances, per ARS 49-1001(8), and solid waste disposal facilities located in unincorporated areas and serving four or fewer households are also exempt. Other facilities that are specifically exempt from the APP Program are listed in ARS 49-250.

4.1.3 Navigable Water Quality Standards

Navigable Water Quality Standards (NWQS) are reviewed every three years as required by the Federal Clean Water Act. The most recent NWQS became final on February 14, 1992.

Most surface waters in Maricopa County are considered as navigable waters. Navigable waters include waters that have been, are, or could be used for interstate commerce. This broad definition allows intermittent and ephemeral water bodies to be defined and regulated.

Classes of surface waters are identified by the NWQS. Effluent Dominated Waters (EDW) consist primarily of discharges of treated wastewater. The definition for Ephemeral Waters contains two parts. The first states that an ephemeral stream flows only in response to precipitation and that the channel is always above the water table and that it does not harbor a self-sustaining fish population. The second definition states that ephemeral streams only flow in response to precipitation but also states that the duration of flow does not exceed 21 days. The Unique Waters category exists to protect waters of high recreational or ecological value.

In addition to classifications of surface waters, waters are further defined by designated uses. These uses are:

- Domestic Water Source (DWS).
- Full Body Contact (FBC).
- Partial Human Contact (PHC).
- Aquatic & Wildlife, warm water fishery (A&Ww).
- Aquatic & Wildlife, effluent-dominated water (A&W edw)
- Aquatic & Wildlife, cold water fishery (A&Wc).
- Aquatic & Wildlife, ephemeral (A&We).
- Agricultural Irrigation (AgI).
- Agricultural Livestock Watering (AgL).
- Fish Consumption (FC).

Most waters are designated for several uses. The Navigable Water Quality Standards lists navigable waters that lie within Maricopa County and existing and proposed uses of these waters.

The NWQS draft contains ADEQ rules concerning antidegradation, use attainability analysis, site specific standards, and waivers of water quality standards. The antidegradation rule prevents degradation of existing water quality. Provisions have been made for limited degradation. Limited degradation may be allowed for high quality surface waters, i.e., waters that exceed existing use standards provided certain requirements are met.

The NWQS are divided into two groups. Narrative standards cover water quality factors that are not quantifiable. Numeric standards set specific numerical water quality standards that can be verified by chemical or biological methods.

Narrative standards cover aesthetic qualities such as settleable solids, taste and odor of both water and organisms, and color of the water. Pollutants that cause excessive or nuisance growth of algae or other aquatic plants are prohibited. Toxic pollutants or combinations of pollutants that are toxic are prohibited. Any substance that contributes to a violation of aquifer water quality standards (AWQS) is prohibited. Narrative standards also prohibit oils, greases, or other floating pollutants.

Numeric standards have applications for navigable waters and effluent dominated waters. Numerical standards cover fecal coliform, pH, thermal discharge, turbidity, dissolved oxygen, phosphorus, and nitrogen. Several standards vary with the designated use. Site specific standards have been developed for some waters. Effluent dominated waters (EDW) have relaxed criteria for dissolved oxygen. The new dissolved oxygen standards for EDW's will be 1.0 mg/l.

4.2 Wastewater Reclamation and Reuse

The effluent reuse permit program, implemented by the State of Arizona in 1985, allows reuse of reclaimed wastewater for a variety of applications such as agriculture, urban lakes, golf course irrigation, ponds, and industrial uses. The state's effluent reuse regulations require wastewater treatment plants to have a permit for authorization to release reclaimed wastewater for reuse.

Wastewater effluent reuse falls into two major groups: Direct nonpotable reuse and indirect reuse. Direct reuse includes irrigation and lake makeup. Indirect reuse involves aquifer recharge and recovery. Direct potable reuse of reclaimed wastewater is prohibited by law, but reclaimed water quality requirements for disposal to aquifers meet requirements set by the Safe Drinking Water Act.

Indirect reuse of effluent usually involves discharge to an aquifer for recovery. In these cases an Aquifer Protection Permit (APP) must be obtained. APP requirements and procedures are discussed in Section 4.1.2.2 of this document.

Reuse is gaining popularity in light of water conservation requirements and increasingly stringent stream discharge standards. Reclaimed effluent may be used for irrigation without aquifer recharge. Effluent quality requirements vary for different irrigation uses, but generally they are less stringent than for aquifer recharge. Crops that may be consumed raw may not be irrigated with reclaimed wastewater. Golf courses, parks, and other public areas must irrigate during off-hours to avoid direct human contact. In addition, public areas irrigated with reclaimed wastewater must be posted with warning signs. Irrigation pipe must be color coded or otherwise marked to indicate non-potable water. Reuse of industrial wastewater is not subject to reuse regulations if it does not contain or originate from domestic human waste, or if it is not used for processing food products. Due to the wide variety of industrial reuses, quality criteria for industrial reuses are determined on an individual basis.

Direct potable reuse is prohibited by law. Indirect potable reuse is possible through recharge/recovery.

Reuse permits define requirements for effluent quality, storage, and monitoring. Most reclamation facilities are required to provide 5-day storage of effluent for periods when no demand other than surface irrigation exists or when effluent quality does not meet standards. Discharges to surface waters are regulated based on Navigable Water Quality Standards, which vary according to the classification of surface water bodies. These facilities that have the potential for stream discharges must obtain NPDES permits and meet NPDES permit requirements for discharges. Irrigation sites using reclaimed wastewater must be capable of containing a 10-year, 24-hour duration rainfall event to prevent discharge of effluent due to flooding.

Contaminants or organisms for which no standard is given typically are not subject to routine monitoring. However, if ADEQ feels the contaminants exist in excess of safe levels, corrective action and monitoring may be required.

Monitoring requirements are specified by the reuse permit. Reuse permits specify monitoring frequency, type, and procedures and requirements for records-keeping and access. Other monitoring may be required to comply with Navigable Water Quality Standards or Aquifer Water Quality Standards.

There are incentives to encourage reuse of wastewater. Water conservation measures set forth by the Arizona Department of Water Resources (ADWR) encourage reuse of treated wastewater to makeup for decreases in potable water supply. The gradual elimination of aquifer overdraft and groundwater mining mandated by the 1980 Groundwater Management Act places a burden on water suppliers to meet projected demands. In some cases, treated wastewater can be exchanged for water rights to groundwater or surface water. Treated wastewater might also be sold to help offset costs of treatment facilities.

4.3 Stormwater Regulations and Permits

The NPDES Stormwater Regulations developed by the EPA were promulgated on October 31, 1990. Those regulations require communities having populations greater than 100,000 to develop stormwater management plans to protect receiving water quality. Phoenix, Mesa, Tempe, Scottsdale, and Glendale have been identified as communities that exceed 100,000 persons per the latest decennial Census.

The regulations call for pollutant reduction to the "maximum extent practicable" (mep). Due to the irregularity of stormwater runoff, numerical standards are difficult to define. The mep approach allows development of standards on a case-by-case basis. Storm frequency and intensity, runoff characteristics, and discharge quality standards are examined to determine the optimal stormwater management plan for each stormwater management agency.

The municipal permitting program is divided into two parts. The first involves a screening analysis for discharge sources and current stormwater management; the second part addresses plans for future discharge controls and stormwater management. Both parts address legal authority to control discharges, source identification, discharge characterization (quantitative), stormwater management systems, and financial resources for a stormwater management program. The second part also addresses estimated pollution reduction and groundwater quality impacts.

Part 1 covers the majority of the source identification. Part 2 may amend the source identification if necessary. The application must provide locations of all outfalls to waters of the U.S., all NPDES permit holders who discharge to the storm sewer system, existing land uses, all large structural controls such as retention and detention basins, and all landfills or municipal waste storage sites. This information is to be included with a USGS 7.5 minute topographic map extending one mile beyond the stormsewer service boundaries, or an approved equivalent map.

The discharge characterization includes monthly precipitation records, quantitative stormwater runoff data, receiving waterbody quality and use, and a screening program for illegal connections. Part 2 must further define sampling points, estimated pollutant loads and a monitoring program for collection of data.

The management program of Part 1 must describe operation and maintenance programs for structural and source controls, best management practices, emergency spill response programs, and programs to identify illicit connections and discharges. The Part 2 proposed management program must describe programs to reduce pollutants from new development, roadway drainage, landfills, treatment facilities, and agricultural wastes.

The EPA has given the larger cities (over 250,000 persons) two years to complete the application; of the MAG member agencies, Phoenix is in this category. Cities with populations between 100,000 and 250,000 have 30 months to complete the permit applications. Status reports must be submitted on an annual basis.

Individual "industrial" sites may potentially be subject to the NPDES stormwater program as well. They are responsible for discharges of stormwater leaving the individual site. Municipal facilities expected to be subject to this include wastewater treatment plants, sludge management facilities, and landfills.

The Maricopa Association of Governments is closely coordinating with the Maricopa County Flood Control District in order to develop a regional approach for complying with the requirements of the Federal Stormwater Management Program. A Regional Stormwater Task Force has been established by MAG to develop this regional approach. The Task Force is composed of representatives from MAG member agencies and is staffed by the Maricopa County Flood Control District.

4.4 Aquifer Recharge of Surface Waters

Underground storage of surplus raw surface water offers an alternative to conventional storage reservoirs. Underground storage is affected by these concerns: geological conditions, source water quality and reclaimed water quality.

Geological considerations are the primary concern of site selection. The chosen aquifer system must allow adequate transmissivity for ease of injection and recharge without a high degree of groundwater migration. A site must also be chosen so as not to experience or cause adverse effects from or to other groundwater users in the area.

Reclaimed water quality is a function of the recharge water quality and soil conditions. Soil contaminants common to some parts of the Maricopa County study area include nitrogen compounds, TCE and VOC's. Nitrate contamination is frequently associated with a history of heavy agricultural use of these lands and use of on-site septic systems. Pesticide contamination is also scattered through this region. Within highly developed areas, a variety of organic contaminants appear: DBCP, EDB, TCE, and others.

The recharge source water quality has a significant impact on recovered water quality. Source water must be of low turbidity or clogging of injection wells or percolation beds will be likely. Recharging may cause migration of bound contaminants due to saturation of the vadose zone.

Two major surface water recharge projects are under development within the Maricopa County area. The Agua Fria River Project, funded by the City of Phoenix, is planned to recharge 30,000 acre-feet per year (af/yr) of CAP water using spreading basins in the streambed. If successful, the project could eventually be expanded to 200,000 af/yr. The Granite Reef Underground Storage and Recovery Project (GRUSP) is a joint venture by SRP, the Salt River Pima-Maricopa Indian Community, Phoenix, Mesa, Tempe, Chandler, Gilbert, and Scottsdale. The expected GRUSP recharge capacity is 200,000 af/yr. The source will be a blend of Central Arizona Project, Salt River, and Verde River waters.

4.5 Selected Point Source Plan

The Point Source Plan in this 208 Plan Revision has been completely updated and reorganized from that presented in the 1979 208 Plan and the 1982 Point Source Plan Update. The new Point Source Plan reflects the major advances which have been made by the communities of the Study Area in wastewater management planning. Nearly all of the communities have developed carefully-analyzed, detailed wastewater master plans. The plans have been developed by individual municipalities and agencies, but they reflect a thorough awareness of the water quality management issues facing the region.

Because of the importance of highly-treated effluent or reclaimed water as a source of supply, almost all of the communities in the Study Area have at least considered the possibility of effluent reuse. Because of the cost of distributing water to users, a local approach to reclamation and reuse is in most cases the most cost-effective. This has led many communities to plan local, smaller treatment plants to retain the water in their community and minimize the cost of delivering reclaimed water.

The Point Source Plan is based on discussions with and review of planning documents and records provided by the individual MAG member agencies. In addition, the Multi-City Subregional Operating Group (SROG) was contacted to obtain its regional perspective. The Multi-City SROG consists of the cities of Glendale, Mesa, Phoenix, Scottsdale, Tempe, and Youngtown, and operates the regional 91st Avenue Wastewater Treatment Plant. The Point Source Plan is organized to provide individual discussions of each community, so that all of the components of the Plan can be conveniently found in one location in the documents. It is also organized regionally, in six groups: (1) central area (Phoenix), (2) southwest area, (3) northwest area, (4) northeast area, (5) southeast area, and (6) outlying communities beyond the immediate Phoenix area.

The discussion for each community describes:

- Planning area.
- Population and wastewater flow projections.
- Existing wastewater collection and treatment systems.
- Effluent disposal and/or reuse.
- Sludge management.
- Planned improvements.
- Improvement costs.

Information sources included MAG population projections, meetings and discussions with each MAG member community in the study area, and review of the communities' wastewater planning document. The meetings with the communities provided information on waste flows, treatment processes, permits, intergovernmental agreements, and planned facilities. Existing reports provided information on the collection system, treatment facilities, effluent disposal, and effluent reuse.

The MAG 208 Water Quality Plan contains three types of population estimates and projections. The three types are:

1. Municipality Resident Population Estimates and Projections *approved* by the MAG Regional Council in January 1992 - Specifically, these figures include the: July 1, 1991 Municipality Resident Population Projections; July 1, 1992 - July 1, 1994 Municipality Resident Population Projections; 1995-2040 Resident Projections by District; and 1995-2020 Resident Projections by Traffic Analysis

Zone (see Appendix B). In approving these figures, it was noted by MAG that the projections are interim and are subject to the following conditions:

- The projections were prepared to be consistent with the April 1, 1990 Census.

- These projections have been prepared by MAG to be consistent with the new County Control Totals developed by the Arizona Department of Economic Security as required by Executive Order 88-10.

- The methodology for preparing these projections is based on a model developed in 1989 and does not reflect changes in economic conditions.

- The projections model was based on adopted land use plans.

- These projections were determined by adding known changes to date for the 1990 to 1995 projections and by using the same distribution of the change in population in succeeding five-year intervals from 1995 to 2040 as had been adopted by the Regional Council in November 1989.

- These projections will be superseded when more complete Census data are available, and when MAG develops a new socioeconomic projections model, which will draw upon the Census data as input.

- These projections should be used with caution. They are subject to fluctuation as a result of recent changes in economic conditions.

2. Nonresident Population Projections - The nonresident population data was approved by the MAG Regional Council in November 1989. The nonresident figures include seasonal population (people who are in the local area for up to 6 months) and transient population (people who are in the local area for 2 weeks or less). Since wastewater treatment capacity is needed to serve the nonresident population, these population figures have been included in the 208 Plan. The nonresident population projections are included in the same Appendix as the resident estimates and projections.

3. Other Population Projections - As noted by MAG in approving in January 1992 population estimates and projection, population figures should be used with caution because they are subject to fluctuation as a result of changing economic

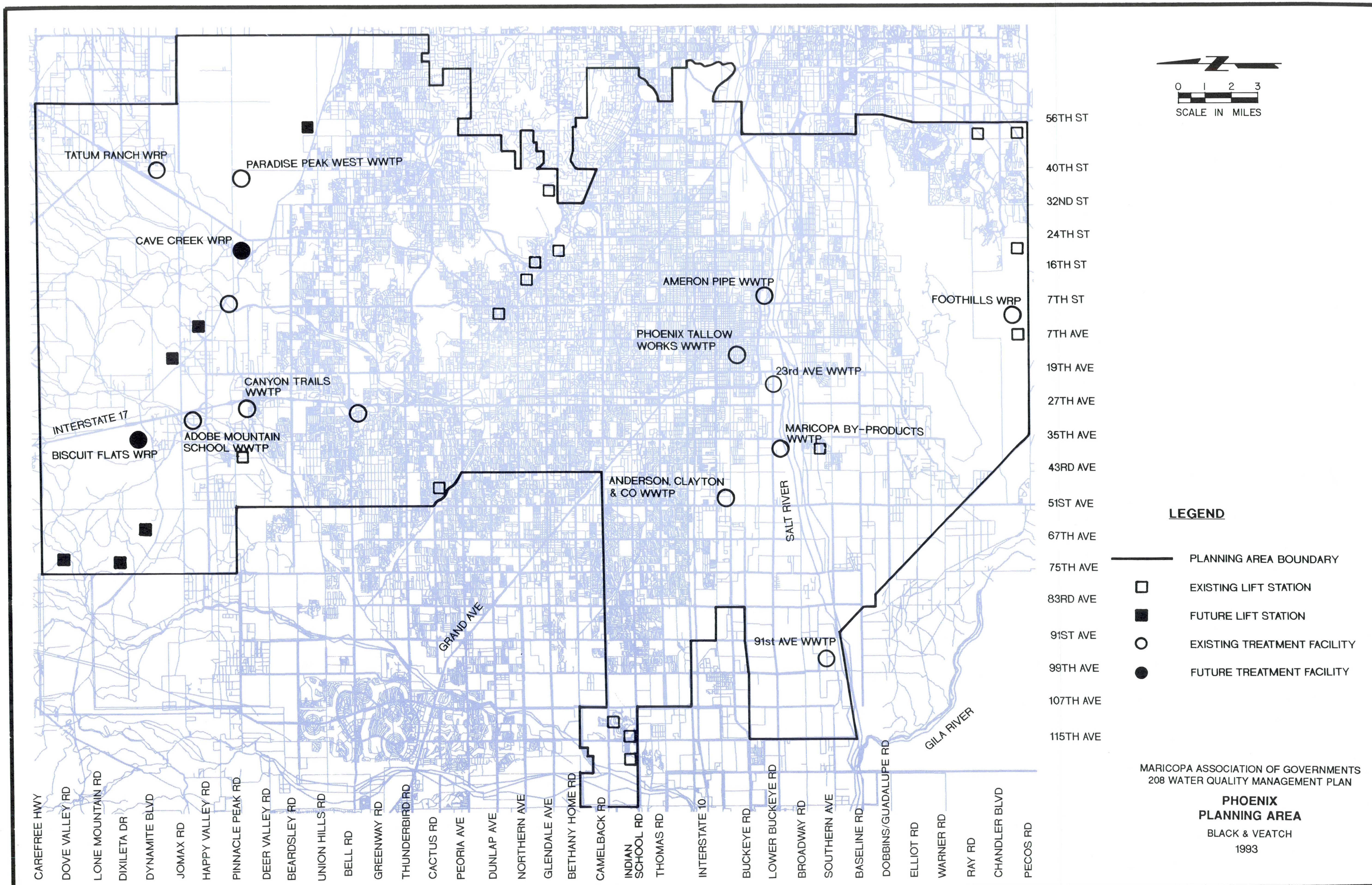
conditions. In some cases, the MAG approved population projections have not yet taken into account some of the master plans recently approved by local jurisdictions. In other cases, the MAG approved projections may not reflect the same timing of the population growth as identified in approved master plans. Consequently, other population projections are sometimes used in the MAG 208 Plan as appropriate and necessary to adequately address wastewater treatment needs in the region.

4.5.1 Central Region

4.5.1.1 Phoenix

The planning area for Phoenix consists of MAG Districts 6, 14, 15, 18 through 20, 31 through 36, 47 through 49, 55 through 59, 63, 64, 69 through 72, 78, 86, 87, and 94 and is depicted on Figure 4-1. The City of Phoenix is the designated wastewater management agency for this area. Phoenix provides wastewater collection and treatment service to almost all of this area. Some low-density areas, including most of the City west of 67th Avenue, and some of the far northern areas are served by septic tanks.

Population and Flow Projections. Table 4-2 presents the 1992 MAG-adopted population projections for the Phoenix municipal planning area, including subtotals for areas in which wastewater treatment facilities exist or are planned.



TATUM RANCH WRP
PARADISE PEAK WEST WWTP
CAVE CREEK WRP
CANYON TRAILS WWTP
INTERSTATE 17
ADOBE MOUNTAIN SCHOOL WWTP
BISCUIT FLATS WRP
AMERON PIPE WWTP
FOOTHILLS WRP
PHOENIX TALLOW WORKS WWTP
23rd AVE WWTP
MARICOPA BY-PRODUCTS WWTP
ANDERSON, CLAYTON & CO WWTP
SALT RIVER
GRAND AVE
91st AVE WWTP
GILA RIVER
56TH ST
40TH ST
32ND ST
24TH ST
16TH ST
7TH ST
7TH AVE
19TH AVE
27TH AVE
35TH AVE
43RD AVE
51ST AVE
67TH AVE
75TH AVE
83RD AVE
91ST AVE
99TH AVE
107TH AVE
115TH AVE
CAREFREE HWY
DOVE VALLEY RD
LONE MOUNTAIN RD
DIXILETA DR
DYNAMITE BLVD
JOMAX RD
HAPPY VALLEY RD
PINNACLE PEAK RD
DEER VALLEY RD
BEARDSLEY RD
UNION HILLS RD
BELL RD
GREENWAY RD
THUNDERBIRD RD
CACTUS RD
PEORIA AVE
DUNLAP AVE
NORTHERN AVE
GLENDALE AVE
BETHANY HOME RD
CAMELBACK RD
INDIAN SCHOOL RD
THOMAS RD
INTERSTATE 10
BUCKEYE RD
LOWER BUCKEYE RD
BROADWAY RD
SOUTHERN AVE
BASELINE RD
DOBBINS/GUADALUPE RD
ELLIOT RD
WARNER RD
RAY RD
CHANDLER BLVD
PECOS RD
0 1 2 3
SCALE IN MILES
LEGEND
PLANNING AREA BOUNDARY
EXISTING LIFT STATION
FUTURE LIFT STATION
EXISTING TREATMENT FACILITY
FUTURE TREATMENT FACILITY
MARICOPA ASSOCIATION OF GOVERNMENTS
208 WATER QUALITY MANAGEMENT PLAN
PHOENIX
PLANNING AREA
BLACK & VEATCH
1993

FIGURE 4-1

TABLE 4-2
PHOENIX
POPULATION PROJECTIONS

Year	Phoenix Municipal Planning Area Total[1]	Peripheral Areas C and D[2]	Ahwatukee/ Foothills[3]	Remainder
1990	1,023,084	2,396	32,525	988,163
1995	1,112,020	5,373	62,849	1,043,798
2000	1,201,353	18,710	68,239	1,114,404
2005	1,297,922	52,141	71,677	1,174,104
2010	1,410,732	90,339	74,851	1,245,542

[1]Entire Phoenix Municipal Planning Area.
[2]MAG Districts 14, 15, and 20: (all except TAZ's 138, 139, 168-171).
[3]MAG District 94.

Based upon a unit wastewater flow of 100 gpd, flow projections for these areas of Phoenix are presented in Table 4-3. Flow received from the Town of Paradise Valley is also presented.

TABLE 4-3
PHOENIX
FLOW PROJECTIONS

Year	Phoenix Municipal Planning Area Total (mgd)	Peripheral Areas C and D (mgd)	Ahwatukee/ Foothills (mgd)	Remainder - Phoenix MPA (mgd)	Town of Paradise Valley Flow[1] (mgd)	Total Flow - Phoenix System
1990	102.31	0.24	3.25	98.82	0.34	102.65
1995	111.20	0.54	6.28	104.38	0.46	111.66
2000	120.14	1.87	6.82	111.44	0.51	120.65
2005	129.79	5.21	7.17	117.41	0.57	130.36
2010	141.07	9.03	7.49	124.55	0.62	141.69

[1]Source: 208 Plan element, Town of Paradise Valley.

Existing Collection System. Almost all wastewater generated in Phoenix is collected and conveyed to either the 23rd Avenue or 91st Avenue wastewater treatment plants (WWTP's). In general, flows from the central portion of Phoenix are conveyed to the 23rd Avenue WWTP. The 23rd Avenue WWTP expansion project currently under way will allow the plant to treat all the flows projected to reach the plant. Flows from north, south, and portions of west Phoenix are collected and transported to the 91st Avenue WWTP, along with wastewater from the other communities belonging to the Multi-City Subregional Operating Group (SROG). The Multi-City SROG members own treatment capacity on the 91st Avenue WWTP under a Joint Exercise of Powers Agreement. The Agreement provides that the City of Phoenix is the lead agency and owns and operates the plant.

The collection system for the Tatum Ranch development in far northeast Phoenix is connected to the rest of the Phoenix system but wastewater is treated at the Tatum Ranch WRP so the water can be reused.

Existing Wastewater Treatment. The 23rd Avenue and 91st Avenue plants provide the vast majority of wastewater treatment for the study area. The Tatum Ranch WRP is an interim facility with 0.6 mgd capacity, and it may be taken out of service once the wastewater system in that area of Phoenix enables flow to be conveyed from Tatum Ranch to a larger WRP elsewhere. Unit processes of the Tatum Ranch WRP include comminution, the activated sludge process using a sequential batch reactor, filtration, and chlorine disinfection.

The 91st Avenue treatment plant currently provides a total capacity of 153.75 mgd treatment capacity. The City of Phoenix' portion is 83.77 mgd. The 91st Avenue WWTP includes the following unit processes: screening, grit removal, primary sedimentation, fine-bubble aeration, secondary clarification , effluent chlorination, and dechlorination. The plant performs secondary treatment using the activated sludge process. Nitrification/ denitrification is being proposed to be added in the near future.

The 23rd Avenue WWTP is currently under construction for expansion and upgrading of the treatment process. The expanded 23rd Avenue WWTP is designed to treat an annual average capacity of 64 mgd. The plant will perform biological nutrient removal as well as filtration and dechlorination, in addition to the existing treatment processes.

The Ahwatukee/Foothills WRP provides 0.6 mgd of treatment capacity in that area of southeast Phoenix.

After the completion of the upgrade and expansion project currently under way, effluent from the 23rd Avenue WWTP will be discharged to a Roosevelt Irrigation District canal or to the Salt River depending on the irrigation demand. Studies are under way to eliminate the discharge to the Salt River from the 23rd Avenue WWTP. A portion of the effluent from the 91st Avenue WWTP is delivered to the Palo Verde Nuclear Generating Station (PVNGS) under a 50 year agreement which began in 1985. The SROG is obligated to make up to 140,000 acre-feet per year of 91st Avenue WWTP effluent available to PVNGS. During 1989, only 57,000 acre-feet were taken. Effluent not delivered to PVNGS is discharged to the Salt River.

Residual solids from both the 91st and 23rd Avenue treatment plants are dried, and then removed from the treatment plants for agricultural reuse under a five-year agreement with a private entity.

Additional small wastewater treatment plants, not operated by the City of Phoenix but within the Phoenix planning area, are summarized in Table 4-4.

TABLE 4-4
PHOENIX
SMALL WASTEWATER TREATMENT PLANTS

Facility Name	Design Capacity (gpd)	Process
Paradise Peak West	75,000	--
Arizona Dept. of Corrections - Adobe Mountain School	--	--
Ameron Inc. Pipe Division	--	--
Anderson, Clayton & Co.	--	--
Central Arizona Project - Salt/Gila Pumping Station	5,000	Activated Sludge
Maricopa Byproducts	--	--
Phoenix Tallow Works	--	--

Future Wastewater System Development. As underdeveloped areas are urbanized, wastewater collection and treatment service will be extended to those areas. It is planned that areas south of the Central Arizona Project (CAP) aqueduct or Jomax Road will continue to be served by the 23rd and 91st Avenue WWTP's. The remaining area north of either the CAP aqueduct or Jomax Road ("Peripheral Areas C and D") will be served by the planned Cave Creek WRP and Biscuit Flats

WRP. The Cave Creek WRP will be located near Cave Creek Road in the vicinity of the north bank of the CAP aqueduct. The Cave Creek WRP's ultimate capacity is planned to be 17 mgd, with the initial phase constructed by year 2005, and ultimate construction completed by year 2035. The Biscuit Flats WRP is planned for an ultimate capacity of 12.5 mgd. The initial phase would be constructed by year 2005, with ultimate development of the plant completed by year 2035. The processes to be performed by these plants are yet to be defined. For planning purposes, the following unit processes have been identified: screening, primary sedimentation, nitrification/denitrification, treatment, filtration, and chlorine disinfection.

It is planned that all effluent from these WRP's will be reused for turf irrigation or aquifer recharge. Effluent reuse plans will be refined as development proceeds. Residual solids from the two WRP's will be discharged to the City's collection system tributary to the 91st Avenue WWTP.

Treatment expansions will also be necessary in the existing service area. The 23rd Avenue WWTP is being expanded to 64 mgd capacity. The process includes denitrification and filtration. An additional 30 mgd treatment capacity is planned for the SROG service area at the 91st Avenue WWTP; this will be constructed either as an expansion of the existing treatment plant or at a separate location. This would amount to a total of 183.75 mgd in treatment capacity for SROG members. The Ahwatukee/Foothills WRP is planned for expansion to 2.4 mgd. Wastewater flow projections for each potential treatment plant service area are presented in Table 4-5, based on per capita flow of 100 gpcd.

TABLE 4-5
PHOENIX
WASTEWATER FLOW ALLOCATION PROJECTIONS

Year	Ahwatukee/ Foothills WRP	Peripheral Areas C & D: Tatum Ranch, Cave Creek, and Biscuit Flats WRP's	23rd Avenue and 91st Avenue WWTP's
1990	0.6	0.24	101.47
1995	0.6	0.54	110.06
2000	2.4	1.87	115.87
2005	2.4	5.21	122.18
2010	2.4	9.03	129.64

The multi-city SROG is currently in the midst of a major study to identify the optimum plan for management of residual solids. Preliminary indications are that the current arrangements for sludge disposal will remain in place for the foreseeable future.

The practice of accepting non-hazardous liquid wastes (NHLW) at the 23rd Avenue WWTP from areas outside Phoenix will be discontinued at the end of 1993. Maricopa County will be taking over treatment and disposal of NHLW in January 1994. The issue of NHLW management is currently being evaluated through the MAG Regional Solid Waste Planning Program.

Summary of Proposed Improvements

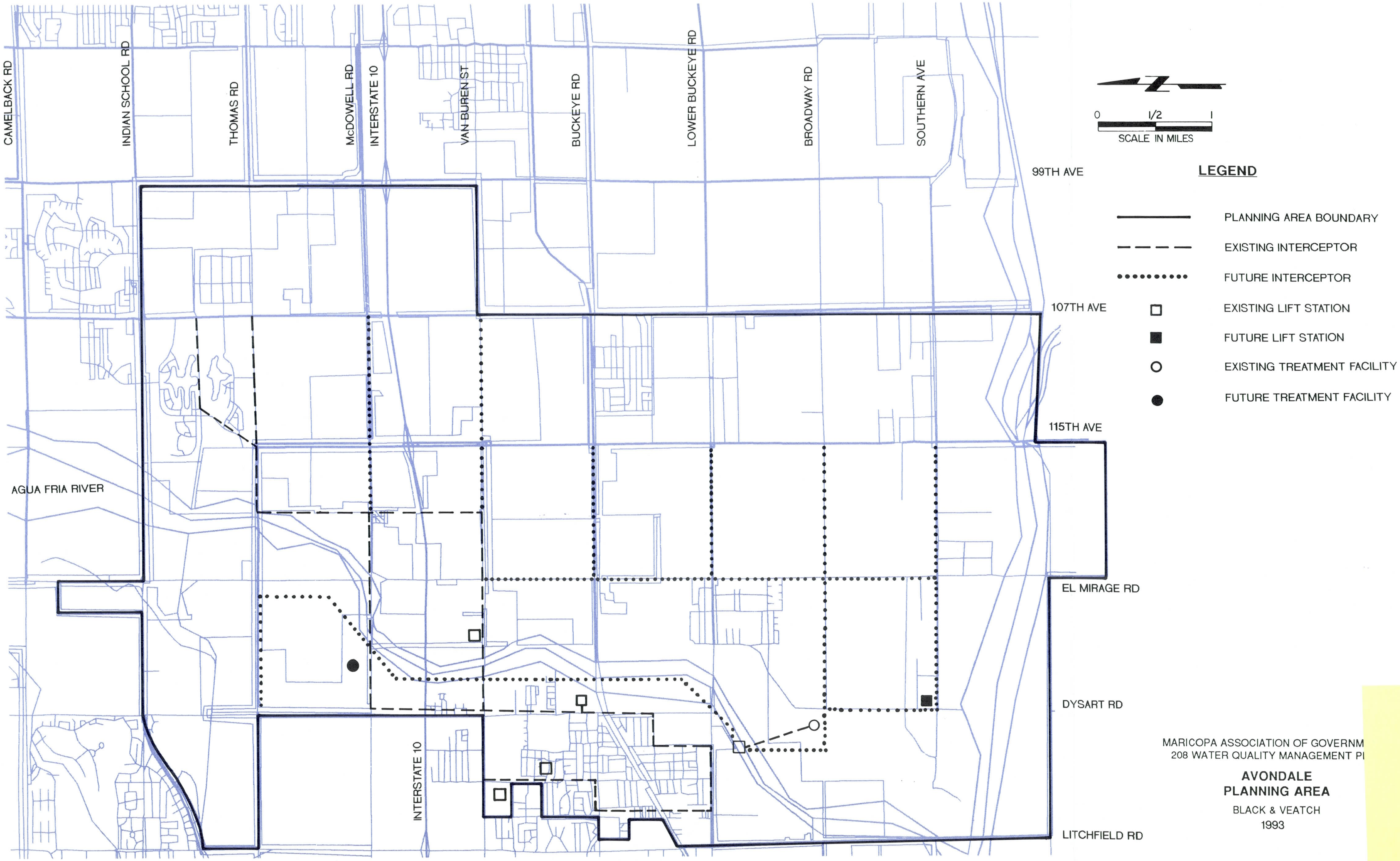
Item	Estimated Cost[1]
Collection System	$22,446,300
Booster Stations	4,648,000
Peripheral Areas C&D	
Cave Creek WRP	93,916,000
Biscuit Flats WRP	59,350,000
23rd Avenue WWTP Improvements	90,040,000
91st Avenue WWTP Improvements	326,032,000
Ahwatukee/Foothills WRP Expansion (1.8 mgd)	3,150,000
Recharge/Recovery Sites	206,846,000
Total	$806,428,300

[1]August 1990 Dollars (ENR Cost Construction Index = 4750).

4.5.2 Southwest Area

4.5.2.1 Avondale

Wastewater collection and treatment service is provided by the City of Avondale. In 1988, Avondale completed a 201 Facility Plan for development of a new treatment plant and expansion of the collection system. The existing Avondale service area, depicted on Figure 4-2, covers approximately 10 square miles consisting of the developed center of the community plus an area to the northeast approximately bounded by Van Buren Street, Indian School Road, 99th and 107th Avenues, and the Agua Fria River. Plans for ultimate development envision a service area bounded



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AVONDALE PLANNING AREA

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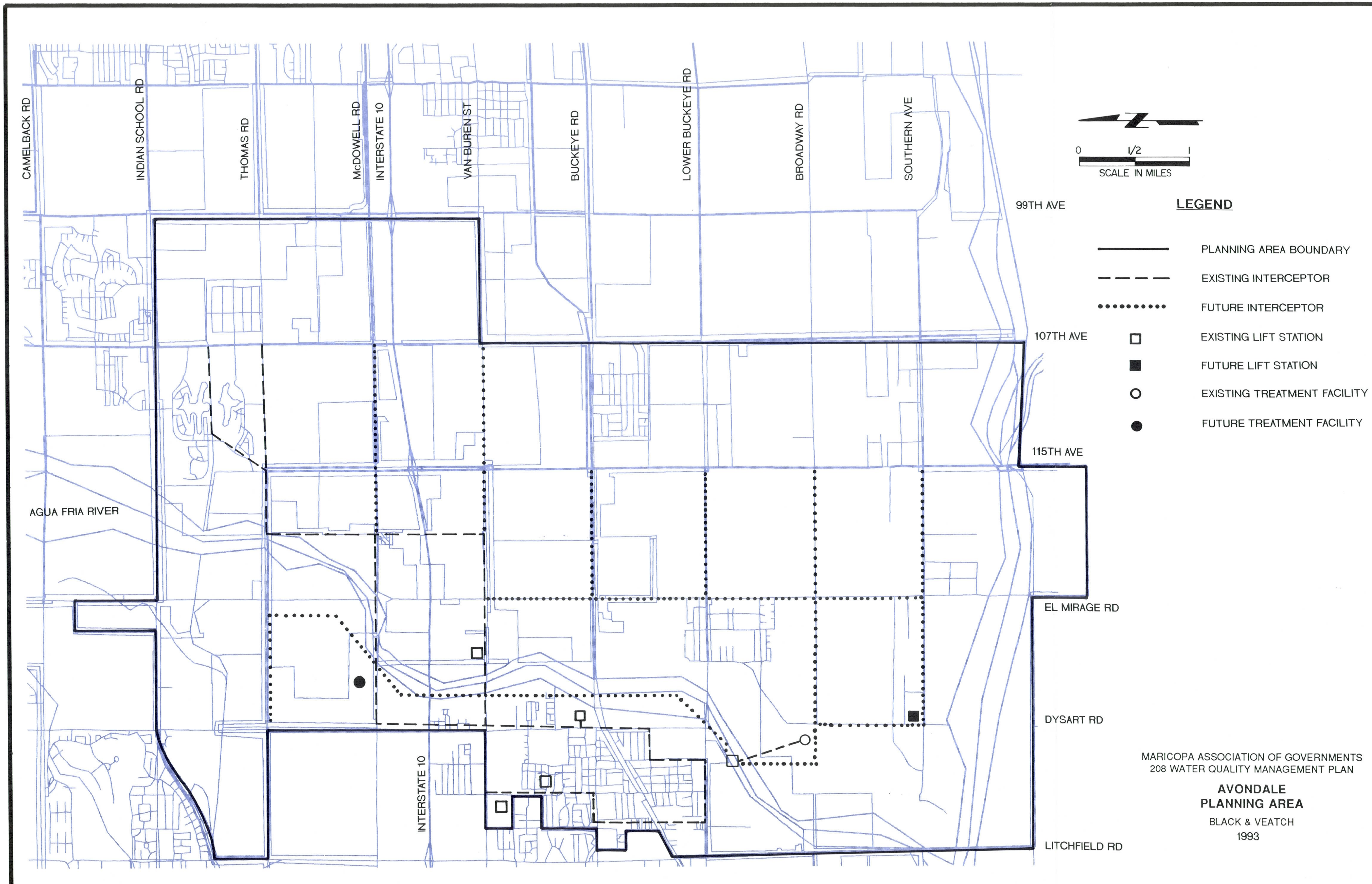
FIGURE 4-2



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AVONDALE PLANNING AREA

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1993

FIGURE 4-2

by Indian School Road on the north, Litchfield and Dysart Road on the west, 107th and 99th Avenues on the east, and extending approximately 12 miles south of the Sierra Estrella mountain range. The City of Avondale is the designated wastewater management agency for this area. Avondale will also be serving the communities of Cashion, Las Ligas, and Rio Vista.

At one time, the Cities of Avondale and Goodyear had formed the Avondale-Goodyear Subregional Operating Group. That SROG, however, was subsequently dissolved.

Population and Flow Projections. Significant growth is projected to occur in Avondale. It is expected that all development within the boundaries of the service area will receive sewerage service provided by the City. Table 4-6 presents the population and flow projections based on current MAG population projections and 100 gpcd unit flow.

TABLE 4-6
AVONDALE
POPULATION AND FLOW PROJECTIONS

Year	Population	Flow, mgd[1]
1990	19,902	1.99
1995	27,103	2.71
2000	34,448	3.44
2005	39,090	3.91
2010	56,571	5.66

[1]Based on 100 gpcd unit flow.

Existing Collection System. The existing collection system serves the developed area of Avondale and an area to the northeast as described above. As a result of the Facility Plan, Avondale's old treatment plant, located near Lower Buckeye Road on the west bank of the Agua Fria River, has been abandoned. The new treatment plant is sited east of the Agua Fria, near the intersection of Broadway and Dysart Roads. Conveyance of wastewater to the new treatment plant included construction of an interceptor sewer from the old plant to the new plant site. The construction of this interceptor was completed in 1992. Planned for construction by year 1993-94 are major interceptor sewers in El Mirage Road and west on Broadway Road to the treatment plant, and another near the west bank of the Agua Fria. The existing collection system includes four pump stations, three of which will remain in service. The fourth lift station, on Van Buren Street, will be abandoned when the interceptors are extended that far. Construction of the sewer in El Mirage Road will significantly reduce the amount of pumping needed for wastewater from the east side of the river. When the area south of the new treatment plant develops, a fifth pump station will be required to transmit flow to the new plant site.

Existing Treatment Facilities. Construction of Avondale's new treatment plant was substantially completed, and the plant became operational, on August 5, 1992.

Plans developed for this new plant to replace the previously existing facility were processed by MAG and ADEQ and approved by EPA in June, 1988. An amendment to the 208 Plan was made by MAG to enable the new plant to proceed. After the new treatment facility was constructed, the old plant was closed. Reasons for abandoning the existing plant as set forth in the Facility Plan include various deficiencies identified by the Maricopa County Department of Health Services; the need for extensive refurbishment or replacement of structural and mechanical components, significant improvements required for aquifer protection, a limited area for expansion, and the inconvenient location of the existing plant relative to the area to be served in the future. It was estimated that 75 percent of the influent would require pumping if the treatment facility remained west of the Agua Fria River.

The initial treatment plant process is designed to treat 3.5 mgd and consists of mechanical screening, grit removal, extended aeration in an oxidation channel, secondary clarification, chlorination, dechlorination, and discharge to the Agua Fria River. The aeration process is designed to perform nitrification/denitrification as well.

Avondale obtained a change in point of discharge for its existing NPDES permit for discharge to the Agua Fria River. The City has an existing plan for sludge disposal. Future options to be considered include reuse by an agricultural marketing firm, landfilling, or composting and reuse. In phase 2, treatment capacity will be increased to 7.0 mgd. An additional oxidation channel, two primary sedimentation basins, one trickling filter, a solids contact channel, and an anaerobic digester will be added.

Future Wastewater System Development. Construction of the first phase of the new treatment plant with treatment capacity of 3.5 mgd will meet projected requirements until approximately year 2002. Construction of the second phase to bring treatment capacity to 7.0 mgd will meet the projected service area flow for the duration of the study period.

The City is also considering the construction of a water reclamation plant in the northern portion of the City north of Interstate 10, although at present, a site is not proposed. The reclaimed water produced by the facility would be used for landscape irrigation, aquifer storage/recovery, and other purposes.

During the first phase, effluent will be discharged to the Agua Fria River. The City has expressed interest in a future recharge project involving discharge to or near the Agua Fria River. Further study will be needed to develop this potential project. Another alternative that is being considered for the future is effluent reuse. An ADEQ effluent reuse permit would be required.

The Facility Plan states that a number of the existing sewers have limited capacity due to flat grades and small diameters; it will be necessary to replace or parallel these sewers to provide for future increases in flow. A new 48-inch diameter interceptor and 16-inch force main were constructed to convey flow from the old treatment plant site to the new treatment plant. A major new sewer system, with diameters ranging from 24 to 48 inches will be constructed along El Mirage and Broadway Roads to convey most of the flow from the area east of the Agua Fria River. Existing pump stations will remain in service for areas west of the river. A fifth pump station will be required after year 1995 or possibly sooner to convey flows from areas south of the new treatment plant site.

Depending on the pace of development and the required needs of the area, a package plant may be required to treat wastewater south of the Gila River. This would be necessary because of the natural barrier that the Gila presents and the infeasibility of installing a force main under the Gila River waterway to convey flows north from a fifth pump station. Once an adequate road bridge is constructed, a force main can be included in the utility corridor of the bridge which will then feasibly convey sewage flows from a future pump station. Population density is planned to be low south of the Gila River so a package plant could be a feasible alternative in the near future. Effluent produced from the package plant could be reclaimed for use in landscaping, golf courses, lake systems, or recharging of the aquifer.

Summary of Proposed Improvements

Item	Estimated Cost [1]
Wastewater treatment plant; Phase 1, 3.5 mgd	$12,000,000
Wastewater treatment plant; Phase 2, expand to 7.0 mgd	8,400,000
Interceptor from existing WWTP site to new WWTP site	1,110,000
Sewer extension: Van Buren Street	1,500,000
Sewer extension: McDowell Road	2,000,000
Sewer extensions: Central St., Lower Buckeye Rd., Broadway Rd.	1,530,000
Eastside Interceptor: Broadway Rd./El Mirage Rd.	9,000,000
Westside interceptor: Parallel to Agua Fria River	1,870,000
Westside interceptor extension	1,230,000
Northside Reclamation Plant	8,000,000
Package wastewater plant south of Gila River	500,000
Total	$47,140,000

[1]All costs are in August 1990 dollars (ENR Construction Cost Index = 4750).

4.5.2.2 Buckeye

Wastewater collection and treatment service is provided by the Town of Buckeye. The system currently serves an area of approximately 2 square miles chiefly consisting of the core of the incorporated area, some adjacent unincorporated areas, and extending north on Miller Road toward Interstate 10. The bulk of the existing service area corresponds to MAG Traffic Analysis Zone (TAZ) 984, within MAG District 66. It is planned that approximately 14 square miles of land around the periphery of this area will be provided with service by the existing wastewater treatment plant as development proceeds. This would include TAZ 802 and a portion of TAZ 803. The Town of Buckeye is the designated wastewater management agency for this area. Preliminary plans for ultimate development of the service area envision a service area of approximately 200 square miles. This service area comprises the Town's 125 square mile existing strip annexed area plus the approximately 75 square mile planned Sun Valley area. Figure 4-3 depicts the Buckeye planning area.

Population and Flow Projections. The Buckeye system is expected to serve the incorporated town and portions of the surrounding area. The projected service population presented through year 2000 in Buckeye's 1987 MAG 208 Plan

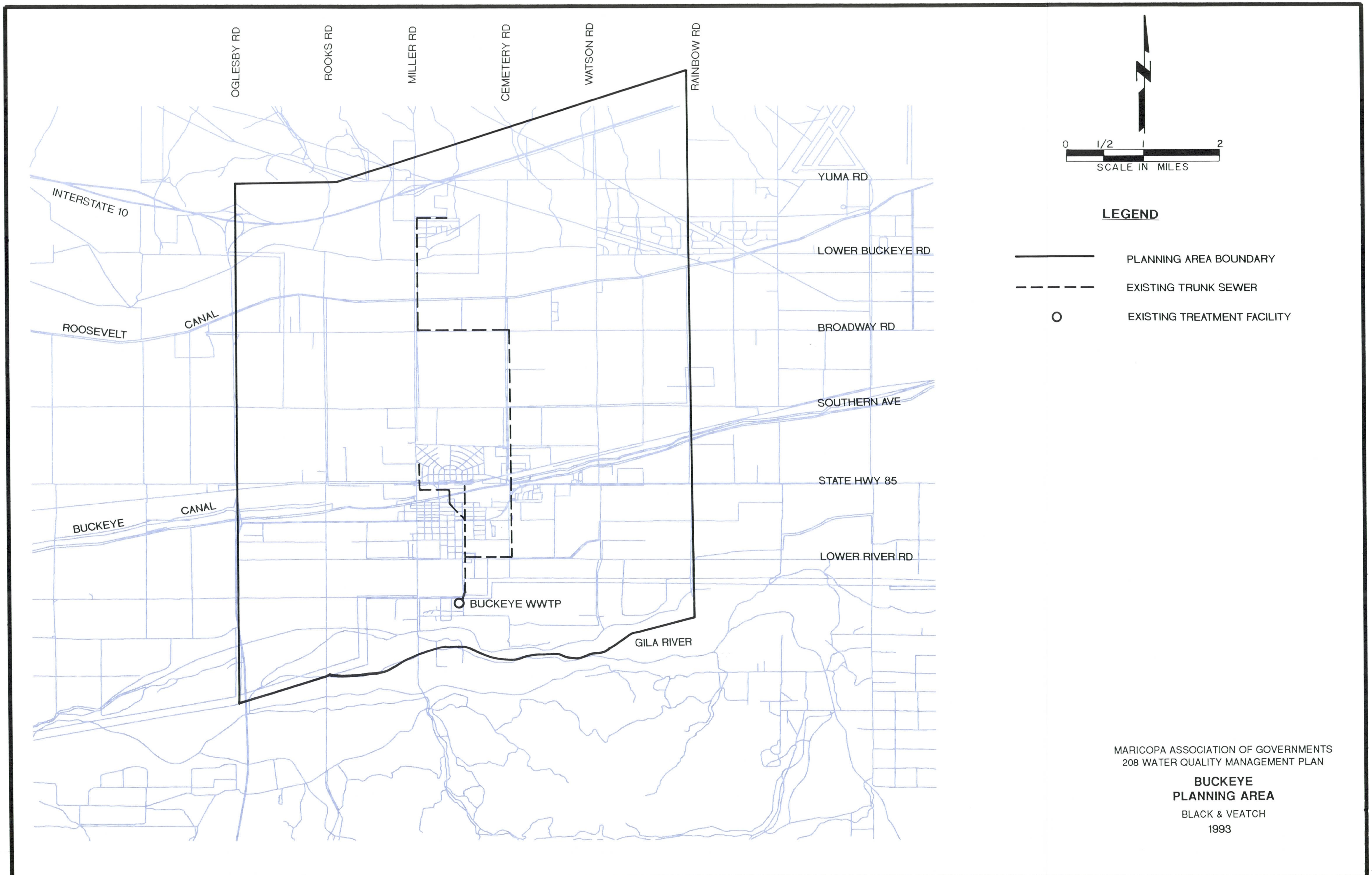
OGLESBY RD
ROOKS RD
MILLER RD
CEMETERY RD
WATSON RD
RAINBOW RD
INTERSTATE 10
YUMA RD
LOWER BUCKEYE RD
ROOSEVELT CANAL
BROADWAY RD
SOUTHERN AVE
STATE HWY 85
BUCKEYE CANAL
LOWER RIVER RD
BUCKEYE WWTP
GILA RIVER
0
1/2
1
2
SCALE IN MILES
LEGEND
PLANNING AREA BOUNDARY
EXISTING TRUNK SEWER
EXISTING TREATMENT FACILITY
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FIGURE 4-3

amendment is significantly greater than the population currently projected for the Town of Buckeye alone. Table 4-7 presents population projections, based on current MAG population projections (adopted 1992) for the areas currently served by the Buckeye system and planned to be added to the system in the future.

Based on the MAG-adopted populations and a 100 gpcd unit flow rate, wastewater flow projections are also presented in Table 4-7.

TABLE 4-7
BUCKEYE
POPULATION AND FLOW PROJECTIONS

	Districts 65 & 66		Districts 117 & 118				
Year	Sewered	Unsewered	Sewered	Unsewered	Total Population	Total Sewered Population	Wastewater Flow[1], mgd
1990	5,184	4,593	0	197	9,974	5,184	0.52
1995	6,494	4,350	0	214	11,058	6,494	0.65
2000	6,958	4,113	0	227	11,298	6,958	0.70
2005	10,144	1,167	0	243	11,554	10,144	1.01
2010	11,573	0	259	0	11,832	11,832	1.18

[1]Based on 100 gpcd.

Existing Collection System. The existing collection system serves the developed center of Buckeye and also extends north along Miller Road. The 201 Facility Plan prepared in 1987 reported that the collection system, built in 1947, is in good condition. The system consists of a large number of 6-inch sewers, some 8-inch sewers, and one trunk sewer consisting of a combination of 10-inch, 15-inch, and 18-inch pipe. In some locations, 6-inch sewers collect flow from lateral lines. Although the Facility Plan did not report any significant problems with the collection systems flow-carrying capacity, the use of 6-inch sewers on anything other than deadend laterals is not considered to be good practice, and these sewers should be monitored in the future as flows increase. For sewers constructed in the future, a minimum 8-inch diameter should be used.

The collection system requires no pumping for transport of wastewater to the treatment plant.

Existing Treatment System. In 1989, a new 0.6 mgd wastewater treatment plant was placed into service by the Town of Buckeye. The plant performs the extended aeration version of the activated sludge process by means of an oxidation ditch. The oxidation ditch is equipped with a "boat" clarifier for solids removal. Effluent is chlorinated for disinfection, dechlorinated, and discharged to the Arlington Canal. Sludge is dried on sand beds and will be removed from the plant periodically by Enviro-Gro Technologies, Inc. for agricultural reuse. It is planned that filters will be added to the plant to enable production of reclaimed water for turf irrigation when demand for reclaimed water permits. A proposed municipal golf course may become the reuse site. The plant is designed with provisions for future expansions by adding oxidation ditches and additional chlorination facilities. The plant has a NPDES permit for disposal to the Arlington Canal.

Future Wastewater System Development. Depending upon the rate at which sewerage service is expanded to Buckeye's planned wastewater service area, the 0.6 mgd capacity of the Buckeye wastewater treatment plant will be exceeded around the year 1995. When capacity of the first phase is reached, it is planned that a duplicate second 0.6 mgd treatment train will be placed into service for total treatment capacity of 1.2 mgd. The treatment plant site is planned for three treatment trains ultimately providing a total of 1.8 mgd treatment capacity. Based upon the flows projected herein, 1.2 mgd should be adequate for the duration of the planning period to year 2010.

Very preliminary planning has been done for development of a significantly expanded service area covering approximately 70 square miles in the vicinity of Buckeye. This plan envisions four treatment plants located along the Gila River. The very preliminary nature of these plans make it impossible to include these potential facilities in the 208 Plan.

Because the entire service area forms a single drainage basin sloping gradually toward the Gila River, it should be possible to develop the collection system with minimal need for pumping. Future development of the collection system should avoid the use of sewers smaller than 8 inches in diameter.

Summary of Proposed Improvements

Item	Estimated Cost[1]
Expand WWTP to 1.2 mgd (1995)	$ 1,890,000
Add filters (when required)	400,000
Total	$ 2,290,000

[1]Costs have been adjusted to August 1990 levels. (ENR Construction Cost Index = 4,750).

4.5.2.3 Goodyear

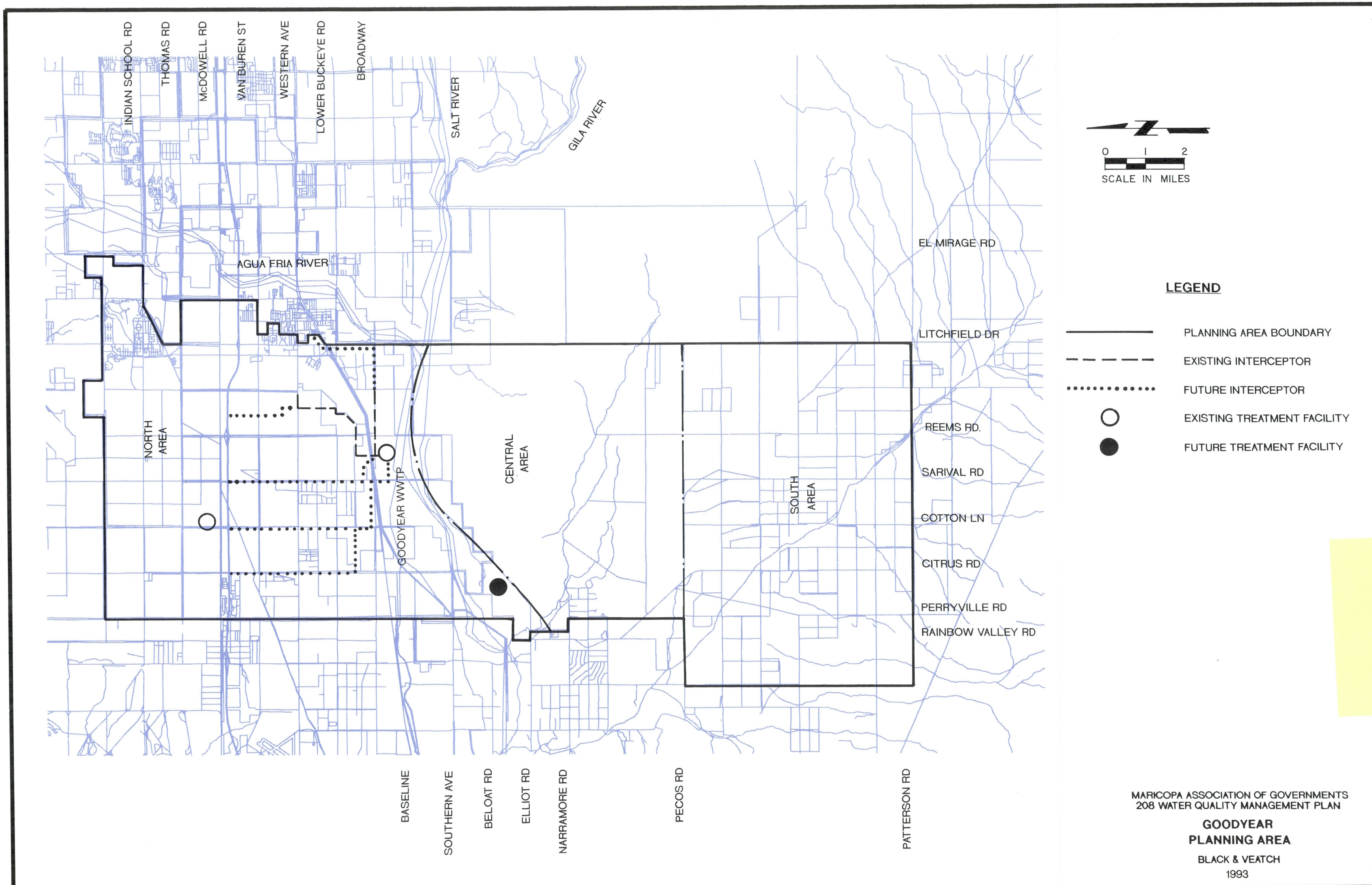
The City of Goodyear comprises 115 square miles of incorporated land. The total planning area for wastewater services consists of MAG Districts 53, 54, 67, 84, and 101. The City boundaries are generally described as west of Dysart, south of Camelback, east of Perryville Road, and north of Patterson Road.

The City has established three (north, central, and south) wastewater service areas. Each area is or will be served by separate wastewater treatment facilities in the City as described herein. Figure 4-4 depicts the Goodyear Planning Area.

Population and Flow Projections. Goodyear is projected to grow at a moderate pace within the planning area described above. Goodyear has an opportunity to exceed the growth conditions experienced in the past ten years in the east Phoenix valley. This is due to its location and proximity to the Pacific Rim and West Coast; its rail and air transportation; its freeway and road systems; availability of land; and infrastructure and political climate.

The City has master-planned its wastewater infrastructure to serve the ultimate build-out for the City, based on a population of 350,000 by 2030. This will require the following treatment plant capacities at ultimate development:

North	21.0 mgd
Central	2.4 mgd
South	12.0 mgd
Total	35.4 mgd



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GOODYEAR PLANNING AREA

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FIGURE 4-4

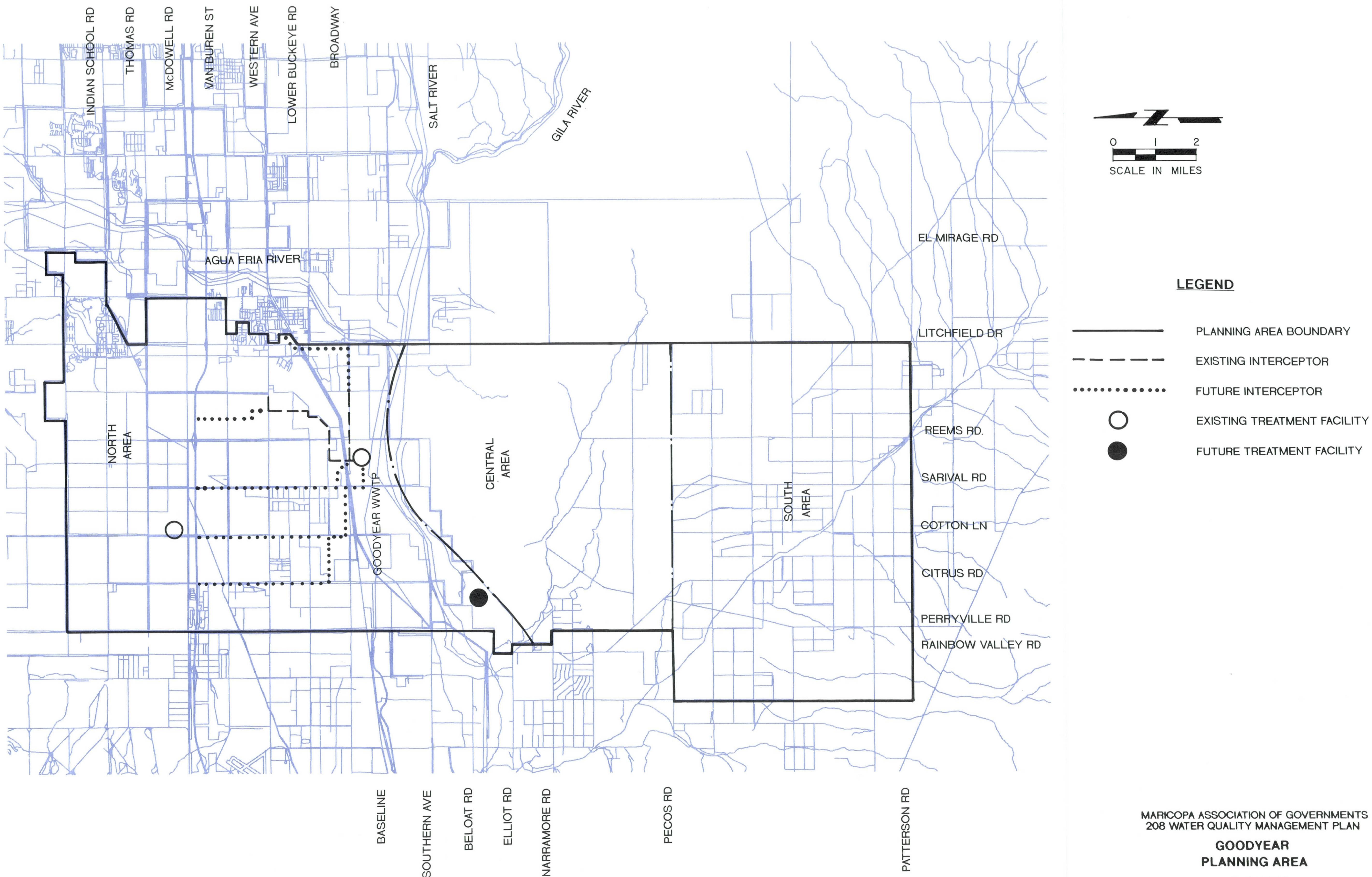

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FIGURE 4-4

Table 4-8 below describes the MAG projected population and the resulting wastewater flow rates for the period 1990 through 2010. An estimated 6.8 mgd of total treatment facility capacity will be needed to serve almost 75,000 people in the next 20 years. This is based upon the 1992 MAG-adopted population projections for the City of Goodyear, within each municipal planning area district, and the projected total City wastewater flow rates assuming a per capita flow rate of 100 gpcd. For the purposes of long-range planning, the City of Goodyear's in-house estimates are much higher than the MAG projections currently in use.

TABLE 4-8
GOODYEAR
POPULATION AND FLOW PROJECTIONS

	Population by District					Total	
Year	53	54[1]	67	84	101	Population	Flow, mgd
1990	36	3,599	7,582	467	159	11,843	1.18
1995	82	3,819	7,870	783	159	12,713	1.27
2000	666	5,647	13,658	791	159	20,921	2.09
2005	14,319	10,867	19,382	798	159	45,525	4.55
2010	24,982	11,380	43,919	806	159	81,246	8.12

[1]Litchfield Park service area.

The MAG population projections were adopted by the MAG Regional Council in January, 1992. In preparing these projections, MAG noted that the projections are interim and subject to various conditions, including the following:

1. The methodology for preparing these projections is based on a model developed in 1989 and does not reflect recent changes in economic conditions.

2. These projections should be used with caution. They are subject to fluctuation as a result of recent changes in economic conditions.

North Planning and Service Area. The north wastewater planning and service area, some 60 of the 115 square miles, is bounded by Perryville Road to the west, Camelback Road to the north, and Baseline Road (along the Gila River) to the south. MPA Districts 53, 54, and 67 are within these boundaries. The original townsites of the City of Goodyear and the City of Litchfield Park are within this area. Current population is approximately 10,000. This area is projected to reach 13,000 population in 1995; reach 20,000 in year 2000; and escalate to 80,000 by the year 2010.

The north planning area is served by the City of Goodyear 157th Avenue wastewater treatment plant, and by the "temporary" Litchfield Park Service Company plant located near the intersection of McDowell and Dysart Roads.

Immediate plans call for consolidation of all wastewater flows from Districts 53, 54, and 67 into the City of Goodyear owned and operated plant at 157th Avenue. This facility and future infrastructure are planned for handling 21.0 mgd.

The Goodyear treatment plant at 157th Avenue was built in 1983. It has an operating capacity of 0.75 million gallons per day (mgd). The facility consists of raw sewage pumps, static screens, an oxidation ditch, clarifiers, chlorination, contact chamber, sludge tank, and sludge drying beds.

The first phase of facility consolidation was accomplished in March 1991. The Arizona State Correctional Facility at Perryville discontinued its wastewater plant (average 300,000 gallons per day) with completion of the Sarival Avenue outfall sewer. The Goodyear 157th Avenue wastewater treatment plant flows increased from 0.30 to 0.60 mgd as a result of this consolidation. The 0.60 mgd flow is near the maximum permitted operating capacity, necessitating future plant expansion for future growth.

Currently, plant effluent is being discharged to the Buckeye Irrigation District (BID) Canal adjacent to the plant site. Effluent limitations are stipulated in the facility's NPDES discharge permit.

The "temporary" Litchfield Park Service Company's (LPSCo) treatment plant (0.75 mgd) serving the LPSCo certificated area north of Interstate 10, including the City of Litchfield Park, is scheduled to be consolidated with the 157th Avenue Plant by 1995. Due to the eventual abandonment of this "temporary" LPSCo facility and limitations placed upon the siting and construction of wastewater facilities, the inclusion of City of Litchfield Park in the North Planning and Service Area is appropriate for future planning considerations.

Expansion of the 157th Avenue plant from 0.75 mgd to 1.50 mgd is scheduled for 1992-93. Tertiary treatment and effluent reuse are also scheduled to begin in 1992-93. The City is planning to achieve full reuse of the treated effluent by 1995-96.

Loral Defense Systems of Arizona owns and operates a wastewater treatment facility at its Goodyear site. The treatment facility has a design capacity of 0.45 mgd. Currently, the plant is operating at much less than this rated capacity. Loral Defense Systems holds a NPDES permit for the treatment facility.

Future 157th Avenue wastewater facility plans include: tertiary treatment; with zero-discharge of treated effluent and reuse of same on landscaping, open spaces, and golf courses. It may become economically feasible to establish local reclaim and reuse facilities. This could reduce the ultimate plant size required at the 157th Avenue Plant.

The Goodyear collection system serves all of the original city. As new development occurs, connection to the wastewater system will be required. Septic tanks are still serving some of the existing residential areas west of the original town. The existing wastewater collection system that serves the City comprises approximately 29 miles of sewers. The interceptor conveying wastewater to the treatment facility has been in service for only eight years and is operating well below capacity. As development occurs, sewers will be extended in the planning area and the use of septic tanks will be gradually phased out.

The MAG small plant inventory indicates that a small, privately-owned wastewater treatment facility is located on Citrus Road north of Van Buren Street. The facility is owned by the Arizona Equestrian Center and receives an average flow of 115,000 gallons per day.

Several new sewers, such as the Sarival Avenue line, to serve the Perryville prison and adjacent residential development have been installed in the past year. This line has an 8.0-mgd peak flow capacity. More lines are planned, including the Bullard outfall and reuse lines to permit discontinuing the Litchfield Park Service Company Wastewater Treatment Plant. These major sewer lines will support significant residential and industrial development.

Central Planning and Service Area. The area south of the Gila River (MAG District 84), commonly referred to as Estrella, is served by a privately-owned, City-operated aerated-lagoon wastewater treatment plant, with sand filtration (tertiary treatment). Physical constraints, including mountains and the Gila River, make it impractical to serve Estrella with the existing Goodyear Wastewater Treatment Plant at 157th Avenue, north of the Gila River.

The Central Planning and Service Area, District 84, is divided into two phases. Estrella Phase I is 3,400 acres and is planned for over 7,000 dwelling units and 19,000 population during the next 10 to 20 years. This build out will require a 2.4-mgd facility.

The major wastewater collection infrastructure necessary to support this population has been constructed. Today, some 1,000 lots are fully improved. The present 40,000-gpd facility is able to serve the first 150 to 175 homes. The developer is expanding the facility to 0.20 mgd during 1992-93 to serve up to 750 to 1,000 homes. Upon completion of the 0.20 mgd expansion, the City anticipates receiving dedication of the facility. It will then be expanded to 0.80 mgd, anticipated by the City to occur in 1996-97, to serve up to 3,500 homes. Effluent reuse is planned for the ultimate 2.4 mgd plant. Reuse of 100 percent of the effluent is currently achieved at the 40,000 gpd plant and can be accomplished up to 57,000 gpd. Beyond this level it is estimated that a golf course would be needed to continue with full effluent reuse. Therefore, a NPDES discharge permit has been requested for the discharge of the quantities greater than 57,000 gpd to the Corgett Wash, which is a tributary of the Gila River. This permit will be retained to allow emergency discharges, including rainy periods when the turf irrigation requirements are less.

The developing area south of the Gila River may exceed current MAG-adopted population projections during the planning period. Present home construction rates in Estrella imply that the population projections should be higher than indicated. Based on City records, the adopted 1995 projection was exceeded as of January 1, 1991.

The areas south of Estrella Phase I are planned with District 101 requirements. The topography of Estrella Phase II of District 84 is physically such that it can be best served by a separate south planning and service area, described below.

South Planning and Service Area. Phase II of development planned for District 84 and all of District 101 comprise the south area. Phase II of District 84 consists of approximately 5,000 acres, lying generally west of Estrella Mountains, east of Rainbow Valley Road, and north of Pecos Road. This area is planned for an ultimate population of 85,000.

District 101 is that area commonly known as Hidden Valley and G.P. Farms. It also lies generally west of the Estrella Mountains, south of Pecos, north of Patterson, and east of Perryville Road.

The South area is projected to grow dramatically around year 2020, which is not included in the 20-year planning horizon for this study. The master development plans for the area of Phase II of District 84 and all of District 101 identify service for 200,000 persons. The south area can be served by a 6.0 mgd full-service treatment facility through 2010.

Rainbow Valley generally drains north and westerly toward the Gila River. A normally dry channel known as Waterman Wash is the drainage way for all of Rainbow Valley that presently lies within the Goodyear City limits. This wash intersects Patterson Road at Bullard Road near the southern boundary of the study area, and flows northwesterly to where it meets the Gila River near Airport Road at Elliot Road. Immediately south of and adjacent to Phase II is Rainbow Ranch planned for development on 1,593 acres. Projected ultimate population is 19,000.

For the remainder of Rainbow Valley, which for this study is defined as the area roughly west of Estrella Mountain Park, north of Patterson Road, east of Tuthill Road, and bounded on the north by the Gila River, it has been assumed that development will not be significant until after 2010.

Summary of Proposed Improvements

Northern Area (157th Avenue WWTP)	Estimated Cost[1]
Phase I WWTP Expansion to 1.5 mgd (1993)	$1,000,000
Phase I Tertiary Treatment (1993)	1,000,000
Phase II WWTP Expansion to 3.0 mgd (1994)	12,750,000
Phase III WWTP Expansion to 7.0 mgd (1998)	6,400,000
Phase IV WWTP Expansion to 15.0 mgd (2010)	15,000,000
Area Subtotal	$36,150,000
Central Area (Estrella Plant)	
Interim Plant, 0.04 mgd (1991)	$1,200,000
Interim Plant, 0.20 mgd (1993)	500,000
Phase I Expansion to 0.80 mgd (1996)	1,500,000
Phase II Expansion to 1.60 mgd (2000)	2,000,000

Summary of Proposed Improvements

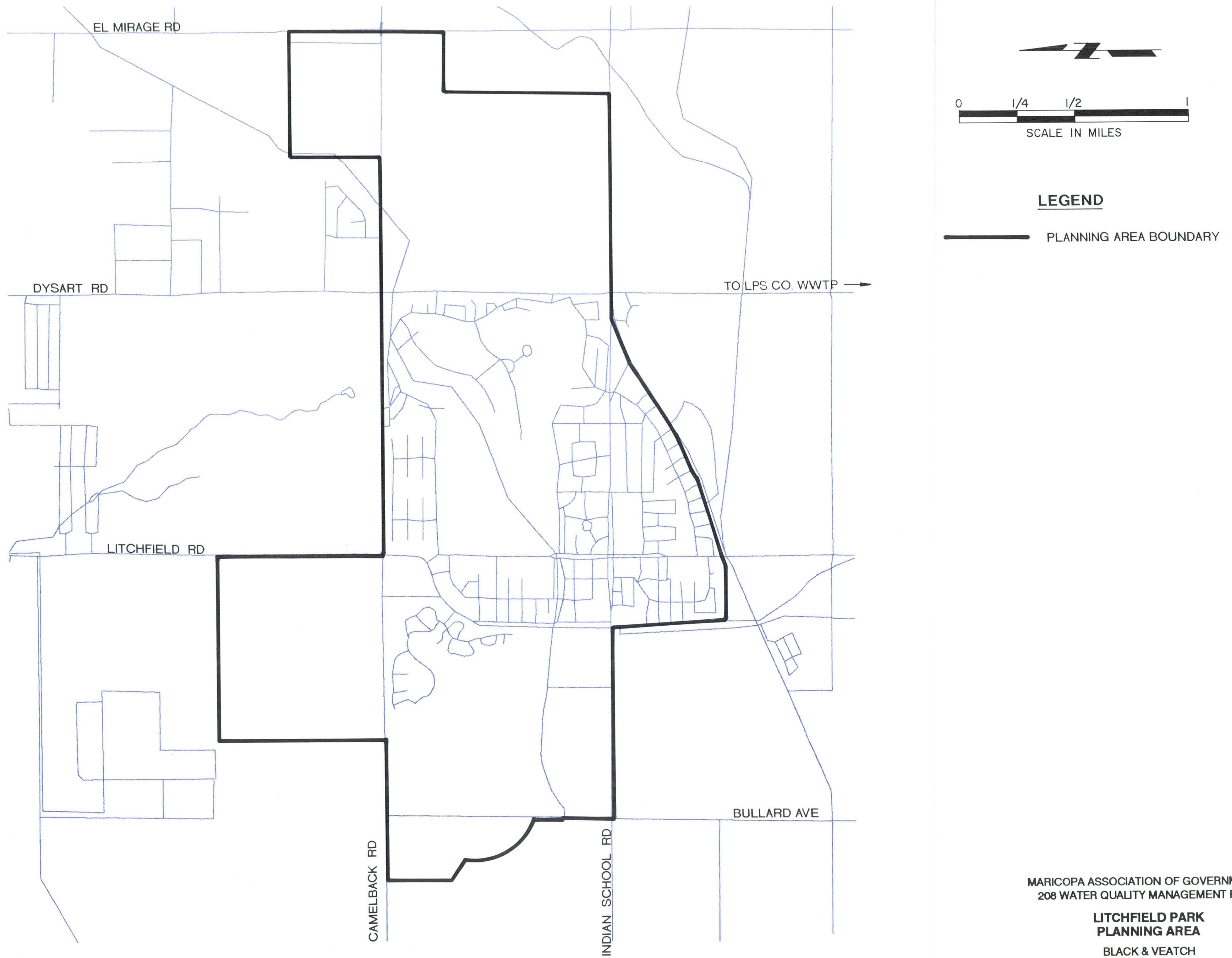
Phase III Expansion to 2.40 mgd (2010)	2,000,000
Area Subtotal	$7,200,000
Southern Area (Rainbow Valley WWTP)	
Phase I, 3.0 mgd (2000)	$12,000,000
Phase II Expansion to 6.0 mgd (2010)	9,000,000
Area Subtotal	$21,000,000
Grand Total:	$64,350,000

[1]All costs are in August 1990 dollars (ENR Construction Cost Index = 4,750).
Note: Costs of wastewater collection systems for each area are not included.

4.5.2.4 Litchfield Park

The planning area for Litchfield Park, depicted on Figure 4-5, consists of the existing incorporated limits of the Town of Litchfield Park MAG District 54. Wastewater service in this area, as well as some other areas in the vicinity, is provided by Litchfield Park Service Company, a privately-owned utility. The Town of Litchfield Park does not operate any wastewater facilities. Because the Town is completely bordered by other incorporated areas, it is not expected that this planning area will expand in the future.

Population and Flow Projections. The population of the incorporated Town of Litchfield Park is projected to increase by a significant percentage, although because of its small size, the Town's population will remain relatively small. Assuming a per capita wastewater flow rate of 100 gpcd, population and flow projections for the Town of Litchfield Park are presented in Table 4-9.



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LITCHFIELD PARK PLANNING AREA

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1993

FIGURE 4-5

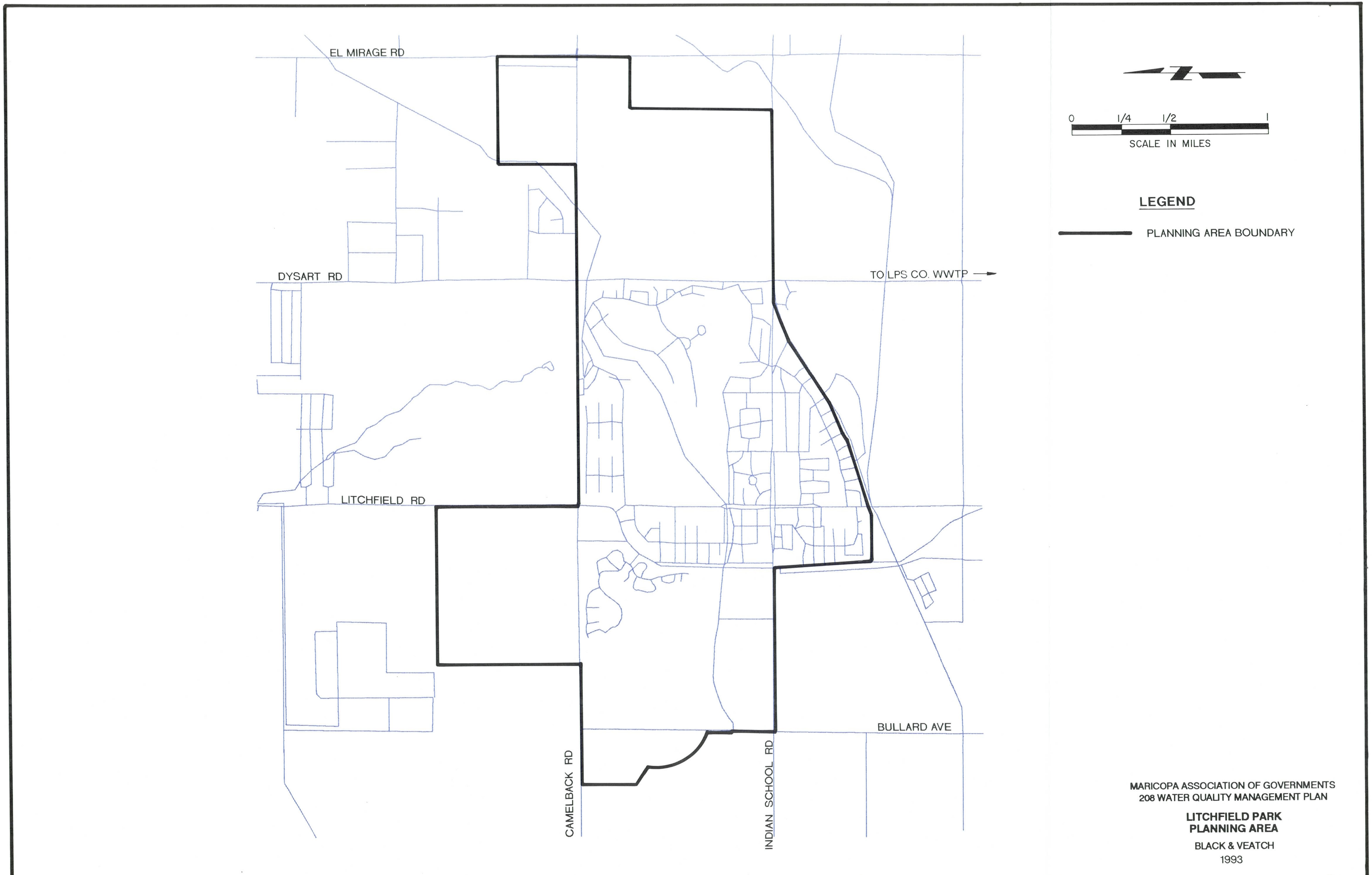

EL MIRAGE RD
DYSART RD
LITCHFIELD RD
TO LPS CO. WWTP
BULLARD AVE
CAMELBACK RD
INDIAN SCHOOL RD
0
1/4
1/2
1
SCALE IN MILES
LEGEND
PLANNING AREA BOUNDARY
MARICOPA ASSOCIATION OF GOVERNMENTS
208 WATER QUALITY MANAGEMENT PLAN
LITCHFIELD PARK
PLANNING AREA
BLACK & VEATCH
1993

FIGURE 4-5

TABLE 4-9
LITCHFIELD PARK
POPULATION AND FLOW PROJECTIONS

Year	Population	Flow (mgd)
1990	3,599	0.36
1995	3,819	0.38
2000	5,647	0.56
2005	10,867	1.09
2010	11,380	1.14

Existing Collection System. The existing collection system operated by Litchfield Park Service Company (LPSCo) serves all of Litchfield Park as well as adjoining areas which also are in LPSCo's certificated service area. Flows entering the LPSCo collection system are conveyed with wastewater from outside Litchfield Park to an existing treatment plant operated by LPSCo south of the community.

Existing Treatment Facilities. Litchfield Park's wastewater, as well as wastewater from some adjoining areas, is treated at an existing plant owned by LPSCo. This plant is not included as a permanent plant in the existing 208 Plan and amendments. According to LPSCo, the plant's design capacity is 0.75 mgd. It is a packaged facility and performs the contact-stabilization process. Effluent is reused for irrigation of nearby cotton farms. Sludge is also reused for land application on nearby agricultural land. Flows to the plant are reported to be approaching the plant's design capacity.

Future Wastewater System Development. Plans are under way for major development in Litchfield Park and vicinity. Wastewater flow from these developments would greatly exceed the capacity of the existing LPSCo treatment facility. After consideration of adding the LPSCo treatment plant to the 208 Plan and expanding its capacity, it was decided instead that wastewater from the Litchfield Park area will be conveyed to Goodyear for treatment at the City of Goodyear treatment plant. LPSCO plans to continue to provide wastewater collection service and will contract with the City of Goodyear for treatment.

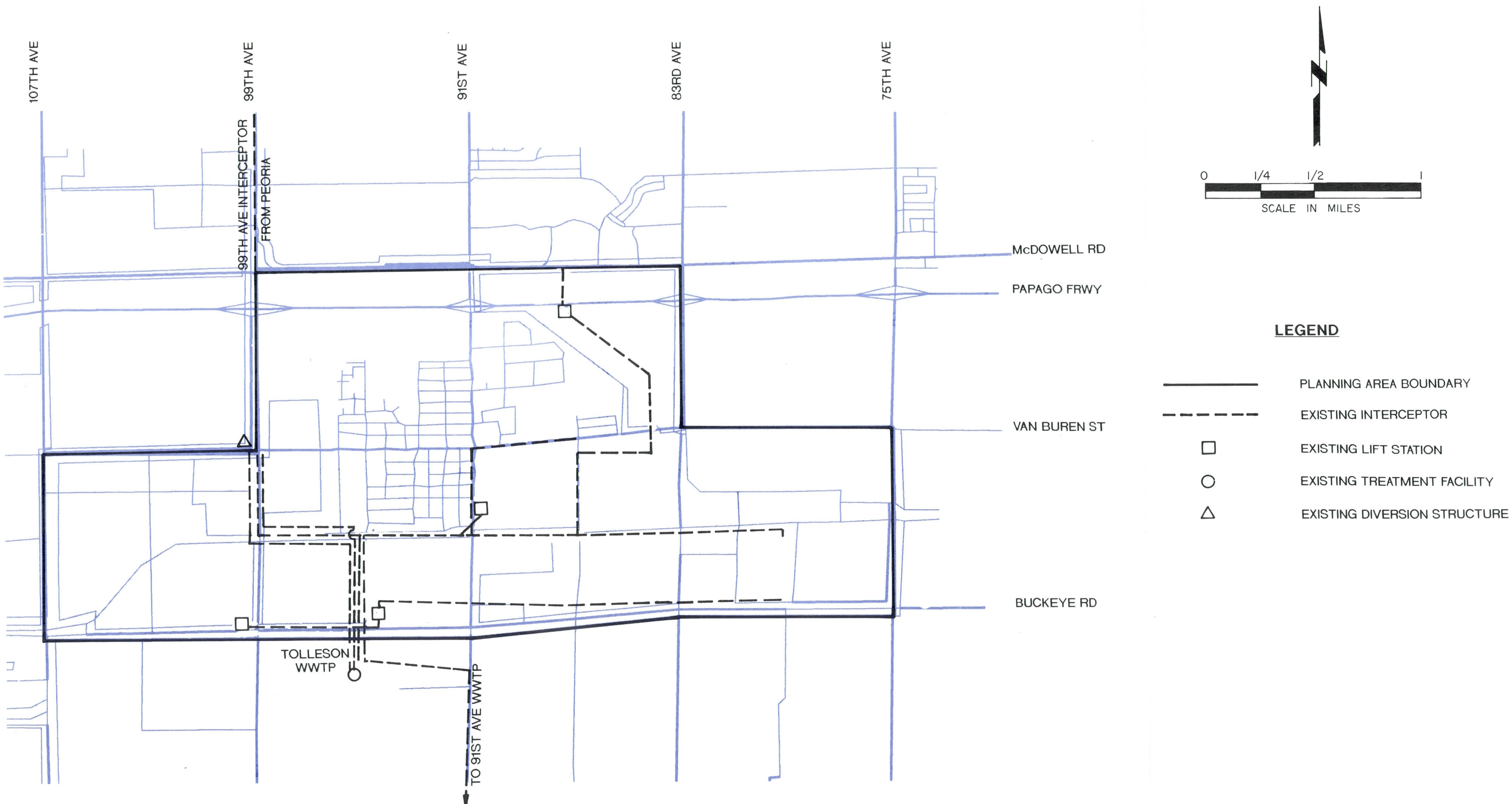
4.5.2.5 Tolleson

The City of Tolleson service area consists of the City's incorporated area (MAG District 62). The City of Tolleson is the designated wastewater management agency for this area. Tolleson provides collection and treatment for all wastewater generated in the City. The Tolleson planning area approximately covers 6 square miles, and is depicted on Figure 4-6.

Wastewater collected in Tolleson is treated at a wastewater treatment plant owned and operated by the City. This treatment plant also treats wastewater from Peoria and Sun City. Peoria and Tolleson form a Subregional Operating Group (SROG), the Peoria-Tolleson SROG. Service is also provided to Sun City by Tolleson under a 20 year contract signed in 1987. The City of Glendale also owns rights to treatment capacity at the plant, but at present the Glendale collection system is not connected to the plant.

Population and Flow Projections. The population of Tolleson is projected to increase significantly over the next 20 years. It is planned that all development in the City will continue to be served by the municipal wastewater system.

According to City records, Tolleson's annual average daily wastewater flow to the treatment plant was approximately 1.1 mgd during 1989. The MAG 1990 population estimate for Tolleson was 4,492. Based on these figures, wastewater flow in Tolleson is approximately 224 gallons per capita per day (gpcd). This is considerably higher than the 100 gpcd used for planning purposes by most other communities in the 208 Plan. Much of the flow received by the Tolleson wastewater system is discharged by two large industrial customers. This flow has a large effect on the per capita flow rate because of the City's relatively small population. In the future, if the industrial discharge volume remains constant and population increases as projected, per capita wastewater flow rates will decrease. Table 4-10 presents flow projections for Tolleson based on a per capita flow of 100 gpcd, plus a constant additional wastewater flow from the industrial customers.



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TOLLESON
PLANNING AREA

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FIGURE 4-6

TABLE 4-10
TOLLESON
POPULATION AND FLOW PROJECTIONS

Year	Population	Projected Flow at 100 gcd (mgd)	Flow from Industrial Discharger (mgd)	Tolleson Total Flow (mgd)
1990	4,492	0.44	0.61	1.05
1995	4,606	0.46	0.61	1.07
2000	5,916	0.59	0.61	1.20
2005	11,767	1.17	0.61	1.78
2010	16,015	1.60	0.61	2.21

Any future changes in industrial flows generated in Tolleson would have significant impact on these flow projections.

Existing Collection System. The major source of influent flow to the Tolleson WWTP is the 99th Avenue interceptor. The Tolleson - Peoria SROG owns 11.9 mgd capacity in the interceptor, and Sun City Sewer Company has capacity rights for average daily flow of 5.2 mgd. The interceptor is shared with the Multi City SROG, which uses it to convey flow to be treated at the 91st Avenue treatment plant. Flow is diverted to the Tolleson WWTP from the 99th Avenue interceptor by a splitter structure located at the intersection of 99th Avenue and Van Buren Street. Flow enters the Tolleson WWTP through a 42-inch and a 48-inch diameter line from the 99th Avenue Interceptor which begins at Van Buren Street. Tolleson then takes off its contracted amount from Sun City and Peoria and diverts the remainder to the Sub-Regional Operating Group's 91st Avenue WWTP. This is done at the Tolleson WWTP through a diversion structure.

The collection system includes four pumping stations. A collection system study performed for the City reported that the existing interceptors, sewers, and pump stations have adequate capacity for future flows. Major sewers have been partially lined with corrosion-resistant material to protect against deterioration.

Existing Treatment System. The Tolleson WWTP was expanded to 8.3 mgd capacity in 1982, and to 17.5 mgd capacity in 1988. Tolleson's share of the existing treatment capacity is 2.8 mgd. Table 4-11 summarizes the allocation of treatment capacity at the Tolleson WWTP among all current participants.

TABLE 4-11
TOLLESON WWTP
CAPACITY ALLOCATION

Community	Current Flow (mgd)	Additional Capacity Available (mgd)	Total Capacity Available (mgd)
Tolleson	1.1	1.7	2.9
Glendale	0.0	3.1	3.1
Peoria	4.9	1.2	6.3
Sun City Sewer Co.	3.3	2.2	5.2
Total	9.3	8.2	17.5

The treatment process includes the following:

- Headworks: bar screens and aerated grit removal basins.
- Primary clarifiers.
- Secondary treatment: first-stage trickling filters, intermediate clarifiers, second-stage trickling filters, solids contact channel, sludge reaeration basins, and secondary clarifiers.
- Sludge treatment: anaerobic digesters, belt thickener, sludge drying beds, and facultative sludge basin, and belt filter press.

The effluent from the treatment plant is reused by the Palo Verde Nuclear Generating Station (PVNGS). Tolleson has an agreement with PVNGS under which PVNGS pays for 8.3 mgd of effluent. PVNGS pays for 8.3 mgd of effluent daily, whether or not they use it. The only time it is not paid for is if the Tolleson WWTP is in noncompliance with its NPDES permit, or circumstances beyond the control of PVNGS cause a shut-down.

Future Wastewater System Development. The Tolleson planning area is not expected to expand in the future. Flows are, however, expected to increase significantly in the future due to increased populations within the existing service area. Flow projected for year 2010 is 2.2 mgd. Tolleson's treatment capacity at the WWTP is 2.9 mgd; therefore no increase in capacity will be needed to meet Tolleson's needs for the duration of the study period. The overall plan for the WWTP is to ultimately increase capacity to 24.9 mgd to meet future capacity requirements for other participating communities.

Tolleson's collection system is reported to be in good condition with adequate capacity in existing facilities to transport current and future flows. Development of the collection system will consist of extending branch and lateral sewers to serve areas as they develop.

Summary of Proposed Improvements

Item	Estimated Costs[1]
Collection System Improvements	$ 1,000,000
WWTP Expansion to 24.9 mgd[2]	$14,800,000
Total	$15,800,000

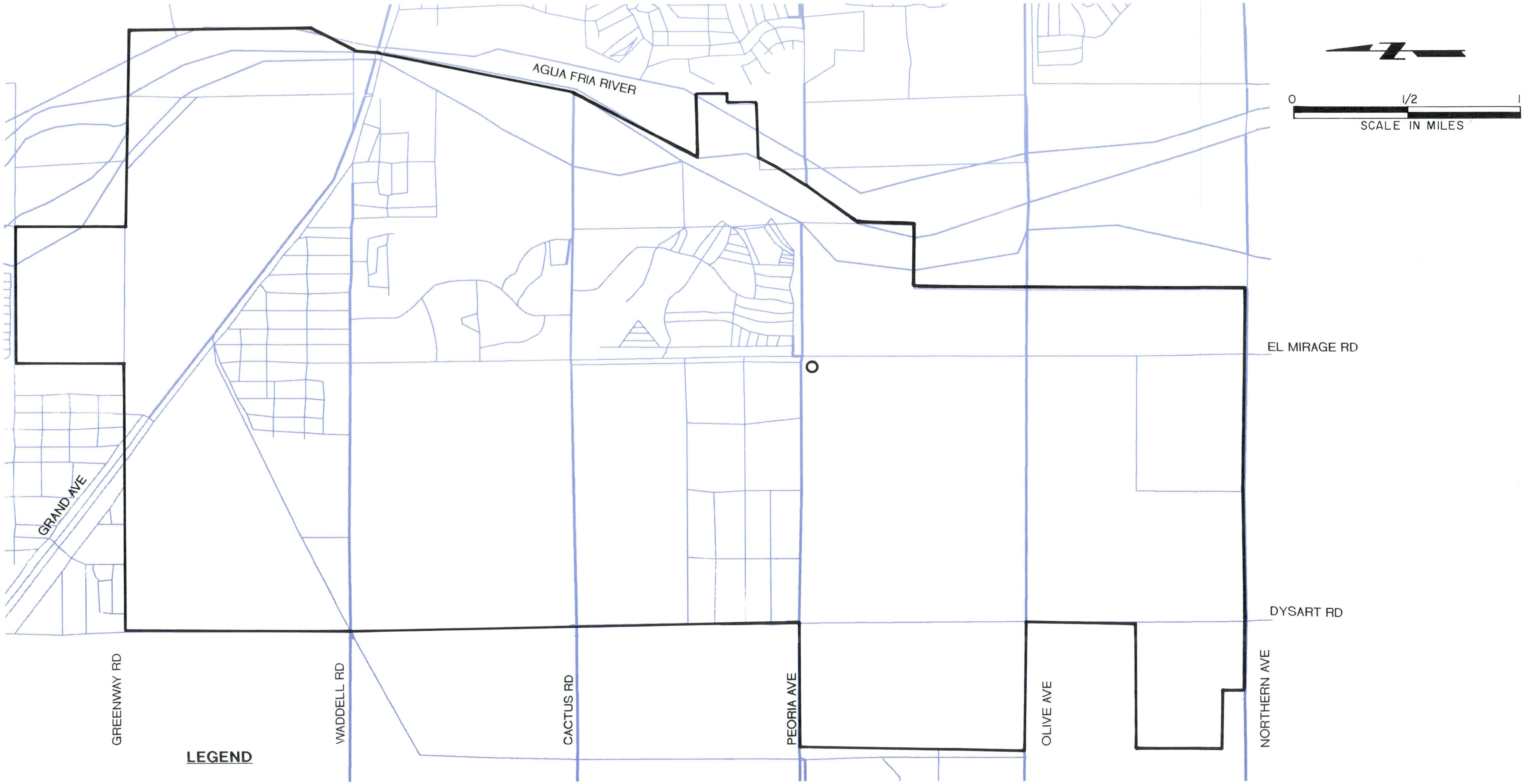
[1]Costs are in August 1990 Dollars (ENR Construction Cost Index = 4,750).
[2]To serve other communities using the WWTP.

4.5.3 Northwest Area

4.5.3.1 El Mirage

The City of El Mirage corresponds to MAG District 26. The planning area is approximately bounded by Dysart Road to the west, the west bank of the Agua Fria River to the east, Greenway Road on the north, and Northern Avenue on the south. Figure 4-7 depicts the planning area. El Mirage is the designated wastewater management agency for this area.

Population and Flow Projections. Table 4-12 presents MAG population projections for El Mirage and projected flow rates based on 100 gpcd.



LEGEND

PLANNING AREA BOUNDARY

EXISTING INTERCEPTOR

FUTURE INTERCEPTOR

EXISTING LIFT STATION

EXISTING TREATMENT FACILITY

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EL MIRAGE PLANNING AREA

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FIGURE 4-7

TABLE 4-12
EL MIRAGE
POPULATION AND FLOW PROJECTIONS

Year	Population	Flows (mgd)
1990	5,053	0.51
1995	5,972	0.60
2000	6,999	0.70
2005	8,608	0.86
2010	15,503	1.55

Existing Collection and Treatment. El Mirage obtained an amendment to the MAG 208 Plan in 1985. The amendment was for construction of a new collection system and a treatment plant with a 0.75-mgd initital capacity.

The treatment facility is located at Peoria Avenue and El Mirage Road. Unit processes include two oxidation ditches (parallel), clarifiers, chlorination, filtration, and aerobic gravity sludge thickening. Sludge is placed in drying beds, and effluent is stored in effluent ponds for reuse on golf courses, parks, and other irrigated lands. The facility also has applied for a NPDES permit.

Future Collection and Treatment. The City of El Mirage will expand the collection system as new development occurs. The 1985 MAG 208 Amendment states that all interceptors will be designed to meet flows through 2005. The treatment facility will attain an ultimate capacity of 1.1 mgd in the near future. This will be adequate at least until 2005.

The second phase will involve expansion of the treatment facility to 1.1 mgd. As the plan is implemented, the entire developed area will be sewered, replacing individual septic systems. Slightly greater than 1.5 mgd of treatment capacity will be needed to meet the City's needs for the duration of the study period, once all of the City is sewered.

Summary of Proposed Improvements

Collector Sewers	$5,133,000
Interceptor Sewers	2,068,000
0.8 mgd Wastewater Treatment Plant	3,331,000
Reclaimed Water Distribution System	1,811,000
Total	$12,343,000

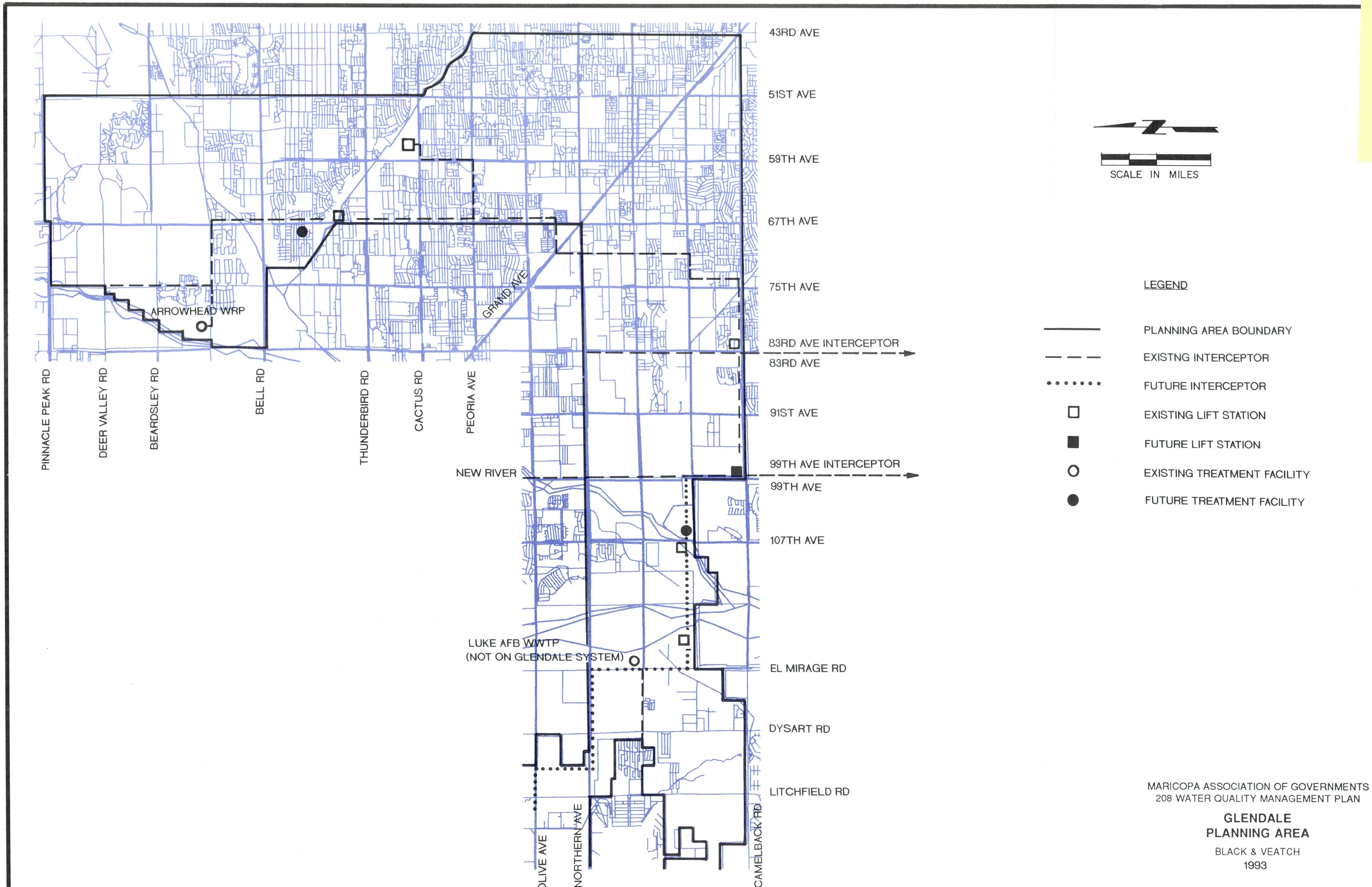
4.5.3.2 Glendale

The City of Glendale provides wastewater collection and treatment service within the incorporated limits of the City. In addition, the City has developed a facilities plan to provide wastewater service to what is referred to as the Western Area. The western area is bounded by Glendale's strip annexation. The approximate boundaries are 115th Avenue on the east, Perryville Road on the West, Peoria Avenue from Perryville Road to 1/2 mile east of Litchfield Road, and Northern Avenue from that point to the east. On the south the western area is bounded by Camelback Road, with the exception of the area from El Mirage Road to 115th Avenue, which is bounded by Bethany Home Road.

The Western Area includes Luke Air Force Base, which operates its own wastewater collection and treatment system, and Country Meadows Estates, which is served by a wastewater system operated by the City of Peoria.

The Glendale planning area, consisting of MAG Districts 17, 30, 43, 45, and 46, is depicted on Figure 4-8. The City of Glendale is the designated wastewater management agency for this area.

Population and Flow Projections. The MAG Municipal Planning Area (MPA) for Glendale includes the incorporated City and all areas within strip annexations, including Luke Air Force Base (AFB). Luke AFB is MAG District 44. Because Luke Air Force Base operates and intends to continue to operate its own wastewater system, population and flow projections for the Base are not considered in this discussion. The remainder of the western area approximately corresponds to MAG District 43. The 1992 MAG adopted population projections for these areas are presented in Table 4-13.


43RD AVE
51ST AVE
59TH AVE
67TH AVE
75TH AVE
83RD AVE INTERCEPTOR
83RD AVE
91ST AVE
99TH AVE INTERCEPTOR
99TH AVE
107TH AVE
EL MIRAGE RD
DYSART RD
LITCHFIELD RD
PINNACLE PEAK RD
DEER VALLEY RD
BEARDSLEY RD
BELL RD
THUNDERBIRD RD
CACTUS RD
PEORIA AVE
GRAND AVE
ARROWHEAD WRP
NEW RIVER
LUKE AFB WWTP
(NOT ON GLENDALE SYSTEM)
OLIVE AVE
NORTHERN AVE
CAMELBACK RD
N
SCALE IN MILES
LEGEND
PLANNING AREA BOUNDARY
EXISTNG INTERCEPTOR
FUTURE INTERCEPTOR
EXISTING LIFT STATION
FUTURE LIFT STATION
EXISTING TREATMENT FACILITY
FUTURE TREATMENT FACILITY
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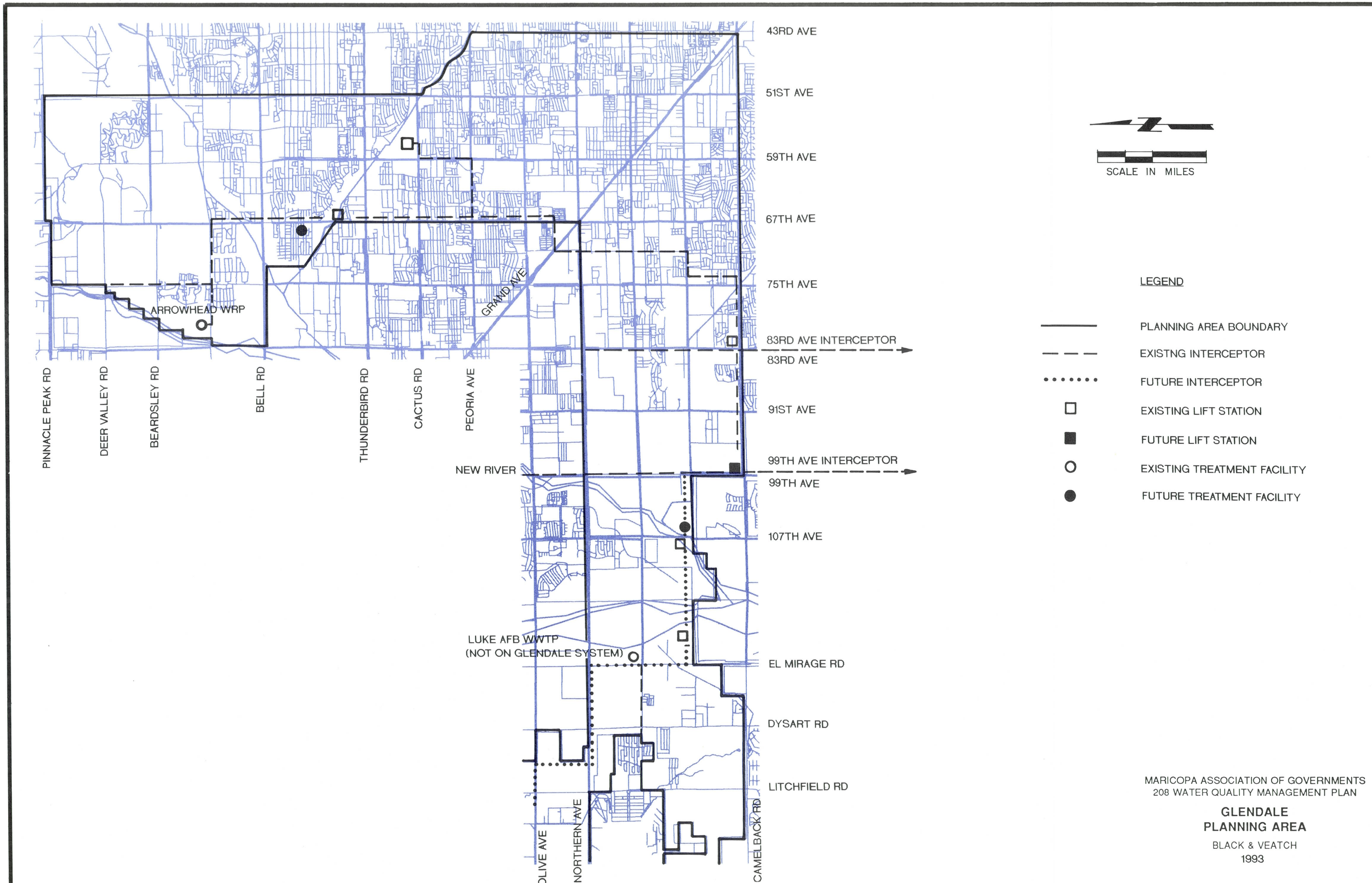
GLENDALE
PLANNING AREA
BLACK & VEATCH
1993

FIGURE 4-8


43RD AVE
51ST AVE
59TH AVE
67TH AVE
75TH AVE
83RD AVE INTERCEPTOR
83RD AVE
91ST AVE
99TH AVE INTERCEPTOR
99TH AVE
107TH AVE
EL MIRAGE RD
DYSART RD
LITCHFIELD RD
CAMELBACK RD
NORTHERN AVE
OLIVE AVE
PINNACLE PEAK RD
DEER VALLEY RD
BEARDSLEY RD
BELL RD
THUNDERBIRD RD
CACTUS RD
PEORIA AVE
GRAND AVE
ARROWHEAD WRP
NEW RIVER
LUKE AFB WWTP
(NOT ON GLENDALE SYSTEM)
SCALE IN MILES
LEGEND
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EXISTNG INTERCEPTOR
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EXISTING LIFT STATION
FUTURE LIFT STATION
EXISTING TREATMENT FACILITY
FUTURE TREATMENT FACILITY
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FIGURE 4-8

TABLE 4-13
GLENDALE
POPULATION PROJECTIONS

Year	Currently Incorporated Areas (Districts 17, 30, 45, 46)	Western Area (District 43)	Glendale Total
1990	150,670	4,722	155,392
1995	179,214	4,913	184,127
2000	217,401	5,024	222,425
2005	229,314	16,913	246,227
2010	235,091	30,935	266,026

Based on a per capita wastewater flow rate of 100 gpcd, flow projections for Glendale, exclusive of Luke AFB are presented in Table 4-14.

TABLE 4-14
GLENDALE
FLOW PROJECTIONS

Year	Currently Incorporated Areas (mgd)	Western Area (mgd)	Total (mgd)
1990	15.07	0.47	15.54
1995	17.92	0.49	18.41
2000	21.74	0.50	22.24
2005	22.93	1.69	24.62
2010	23.51	3.09	26.60

Existing Collection System. The City commissioned a master study of its sewerage system in 1985. The study reviewed the existing collection system and identified a program of improvements for implementation through year 2010.

The Glendale collection system serves the existing incorporated areas of the City. It currently is divided into two tributary areas, the North area (north of Skunk Creek) and the South area (the remainder of the existing system). A third area, the West area, may be added to the collection system to serve development as it occurs there if annexed.

The North area approximately corresponds to MAG District 17. The west area consists of MAG District 43. The South area comprises the remainder of the incorporated areas. Flow projections for each of these components of the collection system based on MAG population projections at 100 gpcd per capita flow are presented in Table 4-15.

TABLE 4-15
GLENDALE COLLECTION SYSTEM
TRIBUTARY AREA FLOW PROJECTIONS

Year	North Area (mgd)	South Area (mgd)	West Area (mgd)	Total (mgd)
1990	1.17	13.90	0.47	15.54
1995	2.38	15.54	0.49	18.41
2000	3.85	17.89	0.50	22.24
2005	4.45	18.48	1.69	24.62
2010	4.67	18.84	3.09	26.60

Flows collected in the North area are conveyed primarily by a gravity main to the Arrowhead Ranch Water Reclamation Plant (WRP). Flows from the South area are collected by interceptors in 67th Avenue, 71st Avenue, Camelback Road, 83rd Avenue, and 99th Avenue. They are then conveyed to the 91st Avenue WWTP through interceptors in 83rd and 99th Avenues. The North area has two existing pumping stations, and there are two lift stations in the South area.

Existing Treatment Facilities. Glendale is a member of the Multi-City Subregional Operating Group (SROG) which owns the 91st Avenue Wastewater Treatment Plant. Currently, all wastewater generated in the South area of Glendale is conveyed to and treated at the 91st Avenue WWTP. Glendale recently completed a transaction to sell 10 mgd of its capacity at 91st Avenue to the City of Phoenix. Glendale now owns 13.2 mgd of capacity at 91st Avenue. It is planned that this will not change in the near future. Glendale also owns 3.1 mgd of capacity at the Tolleson Wastewater

Treatment Plant (WWTP), but at present does not send any wastewater there for treatment.

The areas north of Union Hills Drive in Glendale are served by the Arrowhead Ranch Water Reclamation Plant (WRP). The Arrowhead Ranch WRP is a 2.2-mgd facility includes activated sludge treatment using the oxidation ditch process, secondary clarifiers, effluent filtration and chlorine disinfection. Screenings and sludge are returned to the collection system and transported to the 91st Avenue WTP. Effluent is reused for turf irrigation. The Sunnyboy Sewer Company (SSC) treatment facility has been closed. The former SSC service area is now served by the City of Peoria. Desert Eagle Apartment, located in the western area, has a treatment facility with a design capacity of 52,500 gpd. American Public Service operates a 50,000-gpd WWTP at Casitas Bonitas.

Future Wastewater System Development. A portion of the wastewater from the South area will continue to be discharged to the SROG system. A 25 mgd ultimate capacity water reclamation plant (WRP) is planned to treat that wastewater from the south area that is not obligated to the SROG system. Construction of the first phase of this plant is scheduled to begin in 1997-98. Effluent from the South WRP will be recharged to the underlying aquifer.

A 3 mgd water reclamation plant is planned to serve the western area. This capacity should be sufficient to meet the needs of that region for the duration of the planning period.

It will be necessary to double the capacity of the Arrowhead Ranch WRP to 4.4 mgd in approximately year 1997 to meet treatment capacity requirements in the North area.

The sewerage master study identified a number of collection system improvements to be constructed, principally relief sewers 12 or 15 inches in diameter. The Ocotillo Road relief sewer will be 2.75 miles of 30-inch diameter sewer, required before year 2005.

Summary of Proposed Improvements

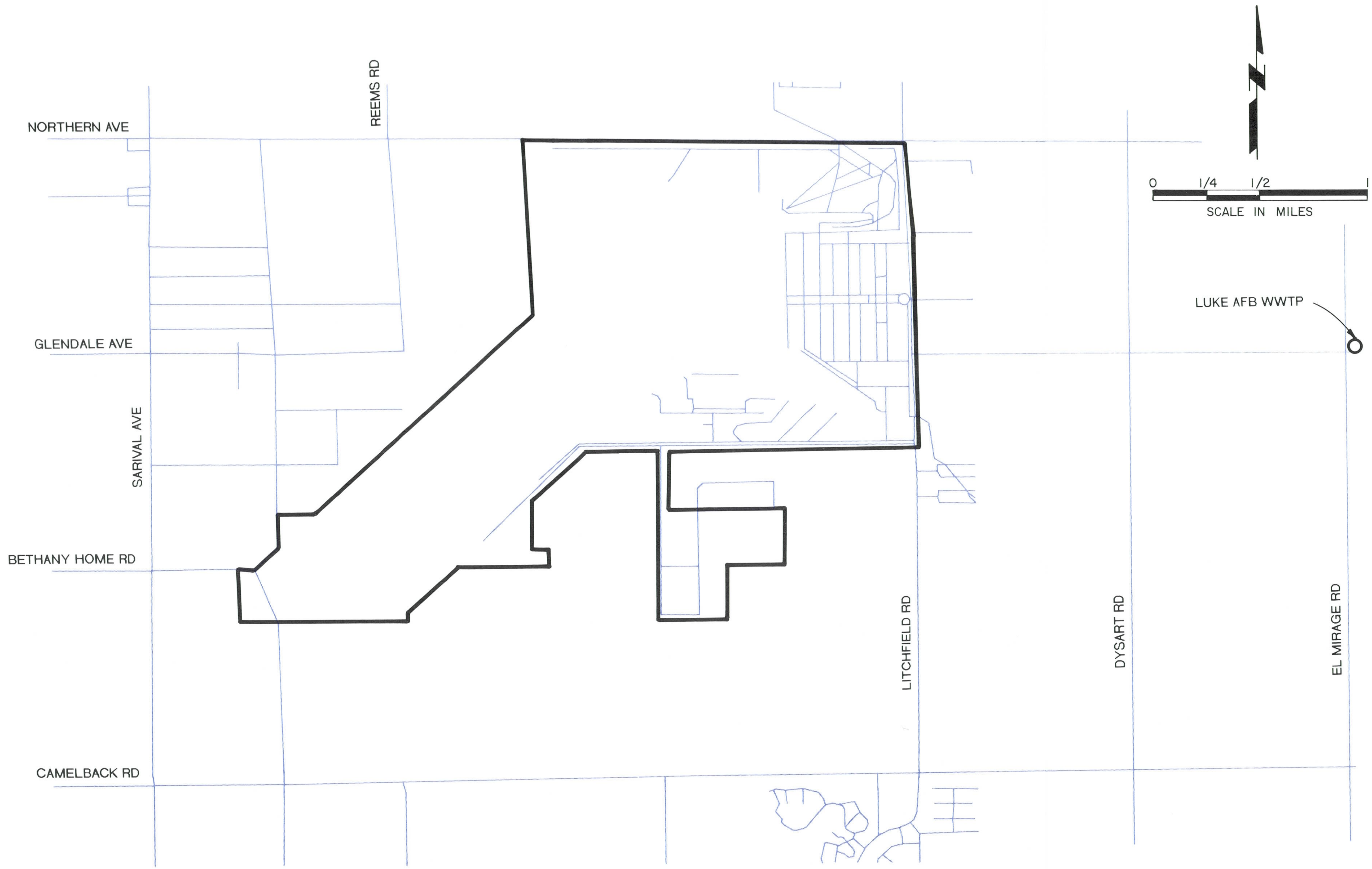
Item	Estimated Cost[1]
Treatment Facilities	
South WRP; 25 mgd (2000)	$50,000,000
Arrowhead WRP; expand to 4.4 mgd (1997)	5,000,000
West WRP; 3 mgd (2010)	12,000,000
Subtotal - Treatment Facilities	$67,000,000
Collection System	
Miscellaneous replacement and relief sewers (1990-95)	$1,230,000
Miscellaneous replacement and relief sewers (1995-2000)	380,000
Miscellaneous replacement and relief sewers (2001-2005)	1,850,000
Miscellaneous replacement and relief sewers (2006-2010)	240,000
Subtotal - Collection System	3,700,000
Total	$70,700,000

[1]Costs have been adjusted from previous Glendale planning studies to current (August 1990) dollars, ENR CCI = 4750.

4.5.3.3 Luke Air Force Base

Luke Air Force Base corresponds to MAG District (MPA) 44. Wastewater collection and treatment within this area is provided by the Luke Air Force Base (AFB) system which serves the entire base. The Luke AFB planning area is depicted on Figure 4-9. The City of Glendale planning area surrounds the base, but Luke AFB does its own wastewater treatment and planning.

Population and Flow Projections. The MAG population projection for MPA 44, which corresponds to Luke AFB, is 4,371 persons for the duration of the planning period through year 2010. This reflects the projection that the population of the base will remain as it is at present.



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208 WATER QUALITY MANAGEMENT PLAN

LUKE AFB PLANNING AREA

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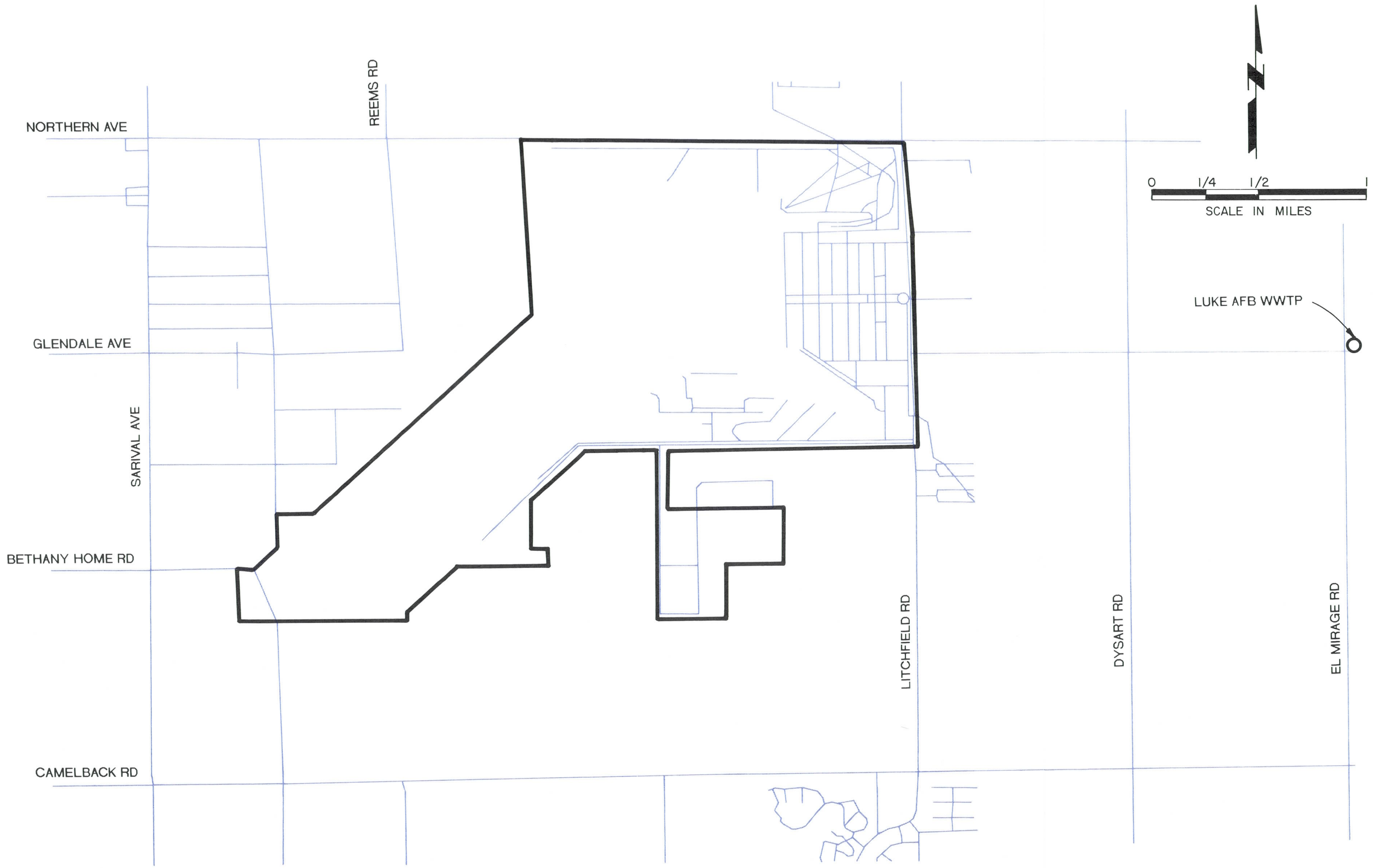
1993

FIGURE 4-9



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208 WATER QUALITY MANAGEMENT PLAN

LUKE AFB
PLANNING AREA

BLACK & VEATCH
1993

FIGURE 4-9

Wastewater Collection and Treatment. The collection system serving the base is already constructed. Future improvements to the collection system will primarily be repairs and replacements.

The wastewater treatment plant performs secondary treatment using trickling filters the extended aeration activated sludge process. Effluent is discharged to an unnamed wash tributary to the Agua Fria River. The base holds an NPDES permit for this discharge. Sludge is dewatered and landfilled. Improvements to the treatment plant have been considered to produce an effluent suitable for reuse for turf irrigation, and expand capacity to 1.0 mgd. The proposed treatment facilities include an oxidation ditch with a secondary clarifier.

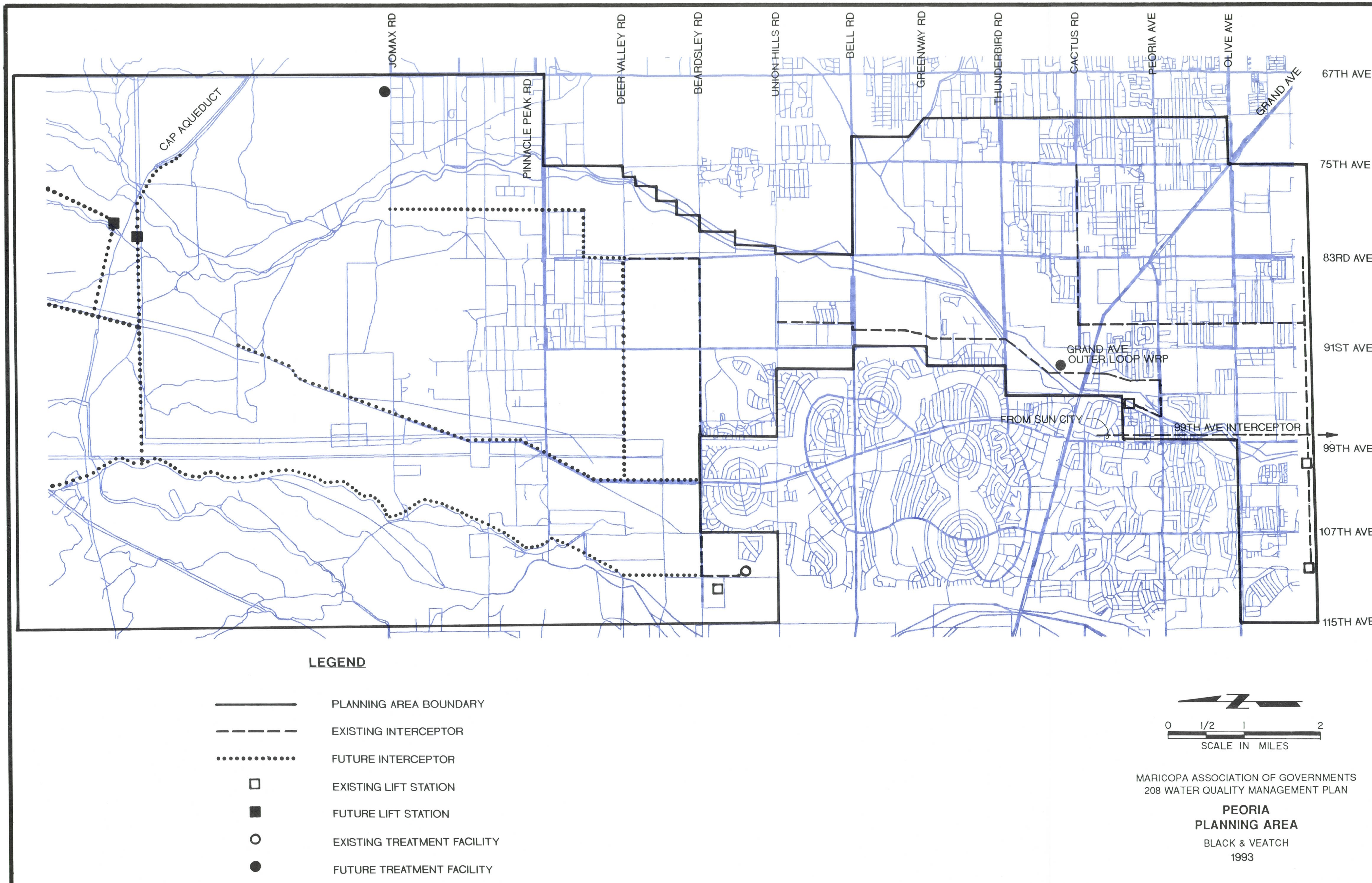
It is not planned that the capacity of the base's treatment plant will need expansion during the study period.

4.5.3.4 Peoria

The planning area for Peoria consists of two adjoining geographic areas, north and south. The north area generally is bounded by Beardsley Road on the south, 115th Avenue to the west, Lake Pleasant area to the north and 67th Avenue to the east. The south geographic area is generally bounded by Beardsley Road on the north, 67th Avenue on the east, Northern Avenue to the south and 115th Avenue to the west. The Peoria wastewater planning area, consisting of MAG Districts 13 and 29, is depicted on Figure 4-10. The City of Peoria is the designated wastewater management agency for this area.

The City has approved a water and wastewater agreement to serve a 6,000 acre development known as Lakeview. This development is located along Interstate 17 approximately three miles north of Carefree Highway. The City also is considering annexing Lake Pleasant Heights, a planned 6,500 acre development west of the Agua Fria River and south of State Route 74.

Wastewater collected in the northern area is treated at a wastewater treatment facility owned and operated by the City of Peoria, located at 111th Avenue and Beardsley Road. A wastewater master plan commissioned by the City of Peoria in 1989 reported that in addition, a water reclamation plant in this area may be necessary in the future. Expansion of the existing wastewater facility at Beardsley Road and 111th Avenue was also recommended to accommodate flows from this area. The master plan also suggested that other possible wastewater reclamation facilities, located near Lake Pleasant Road and Jomax Road, and 67th Avenue and


JOMAX RD
PINNACLE PEAK RD
DEER VALLEY RD
BEARDSLEY RD
UNION HILLS RD
BELL RD
GREENWAY RD
THUNDERBIRD RD
CACTUS RD
PEORIA AVE
OLIVE AVE
GRAND AVE
CAP AQUEDUCT
67TH AVE
75TH AVE
83RD AVE
91ST AVE
99TH AVE
107TH AVE
115TH AVE
GRAND AVE
OUTER LOOP WRP
FROM SUN CITY
99TH AVE INTERCEPTOR
LEGEND
PLANNING AREA BOUNDARY
EXISTING INTERCEPTOR
FUTURE INTERCEPTOR
EXISTING LIFT STATION
FUTURE LIFT STATION
EXISTING TREATMENT FACILITY
FUTURE TREATMENT FACILITY
N
0
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SCALE IN MILES
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FIGURE 4-10

Jomax Road, be considered in future planning as development occurs in the area. These reclamation facilities, if implemented, would relieve some of the treatment burden anticipated in the future at the 111th Avenue and Beardsley Road Treatment Plant.

Wastewater collected from the southern area is conveyed to the Tolleson Wastewater Treatment Plant through the 99th Avenue Interceptor. Peoria has joined with Tolleson in the Tolleson-Peoria Subregional Operating Group (SROG) for its use of the Tolleson WWTP. Current wastewater flows from Peoria to the Tolleson Wastewater Treatment Plant (WWTP) are exceeding 75 percent of Peoria's 6.3 mgd share of the treatment plant capacity. Additional capacity will have to be secured by Peoria. Peoria has communicated its desire to secure part or all of Glendale's excess 3.1 mgd capacity in the Tolleson WWTP. A proposed wastewater reclamation facility could be built to provide treatment capacity. A proposed reclamation facility was analyzed in the 1989 Wastewater Master Plan.

Population and Flow Projections. The MAG Districts corresponding to the incorporated City of Peoria are District 13 and District 29 for the northern and southern geographic areas respectively. The 1992 MAG adopted population projections for these areas are presented in Table 4-16. At present these areas include some flows not treated by Peoria, including some unincorporated areas, and small areas served by the Sun City Sewer Company.

TABLE 4-16
PEORIA
POPULATION PROJECTIONS

Year	Northern Area (District 13)	Southern Area (District 29)	Peoria Total
1990	7,951	46,649	54,600
1995	17,538	69,420	86,958
2000	34,722	79,002	113,724
2005	59,140	82,858	141,998
2010	78,566	85,045	163,611

Based upon a per capita wastewater flow of 100 gpcd, established in the 1989 Peoria Wastewater Master Plan, flow projections for Peoria are presented in Table 4-17.

TABLE 4-17
PEORIA
FLOW PROJECTIONS

Year	Northern Area (District 13) (mgd)	Southern Area (District 29) (mgd)	Peoria Total (mgd)
1990	0.80	4.66	5.46
1995	1.75	6.94	8.70
2000	3.47	7.90	11.37
2005	5.91	8.29	14.20
2010	7.86	8.50	16.36

Existing Collection System. The wastewater master plan prepared in 1989 evaluated the existing collection system, comprised of collector sewers, trunk sewers and the 99th Avenue Interceptor Sewer from Olive Avenue to the Tolleson Wastewater Treatment Plant.

The existing interceptors are located in the south half of the northern area and the entire southern area. The primary interceptor in the lower northern area conveys wastewater along the alignment of Beardsley Road to the Beardsley Road treatment facility. The interceptors in the southern area convey wastewater to the 99th Avenue interceptor for subsequent treatment at the Tolleson Wastewater Treatment Facility.

Virtually all wastewater flow in the northern area of Peoria is conveyed by gravity. There are four sewage pump stations in the southern area, which convey wastewater to the Tolleson Wastewater Treatment Facility.

The wastewater master plan identified five improvement projects for the collection system to be implemented by the year 2000.

Existing Treatment Facilities. Wastewater collected in the northern area of Peoria is currently treated at the Beardsley WWTP, a 0.3 mgd facility located at 111th

Avenue and Beardsley Road. The facility produces effluent for groundwater recharge using the oxidation ditch process. The facility holds a groundwater protection permit. It is projected by the City that ultimate development of northern area, expected to occur by 2045, will generate wastewater flows of approximately 16.6 mgd.

The northern region has the potential for re-use of all of the 16.6 mgd of treated effluent for recreation, irrigation, or recharge purposes. Even more effluent could be used if consideration is given to approximately 14,000 acres of irrigable land in the upper portion of the northern region.

Sludge generated at the Beardsley WWTP will be disposed of by on-site dewatering or contracting with another entity for sludge disposal. An alternative possibility is to convey the solids from the Beardsley WWTP to the Tolleson WWTP.

Currently, all wastewater generated in the southern region of Peoria is treated at the Tolleson WWTP. Peoria's currently allocated treatment capacity is 6.3 mgd. Flow currently conveyed to the Tolleson WWTP from Peoria is approximately 5 mgd. It is anticipated by the City that ultimate buildout of the southern region of Peoria will produce flows of 23.4 mgd.

The City of Glendale currently retains a capacity of 3.1 mgd at the Tolleson Wastewater Treatment Facility. Based on discussions with City of Peoria staff, it is anticipated that this 3.1 mgd of treatment capacity, which is unused, can be obtained by Peoria from Glendale to meet Peoria's capacity needs as they increase. In exchange for this treatment capacity, Peoria may participate with Glendale in a new water reclamation facility as discussed below.

Future Wastewater System Development. As wastewater flows increase in the northern region and exceed the existing 0.3 mgd treatment capacity at the Beardsley WWTP, more treatment capacity will be necessary. The Beardsley WWTP is projected to reach a capacity of 16 mgd. Since the northern region of Peoria has potential demands for reclaimed water in excess of the ultimate wastewater flows, the 1989 wastewater master plan recommends a new water reclamation facility in the area and expansion and upgrading of the existing Beardsley WWTP to provide wastewater reclamation for all of the projected flows in the area. Development of the northern region may require a treatment facility in the vicinity of Jomax Road and 67th Avenue. Land use plans have been developed for the northern region of Peoria, but very little actual development has as yet occurred. It may be necessary to reevaluate collection and treatment facilities as development proceeds.

The ultimate development of the southern region of Peoria, expected to occur by 2035, is projected to produce an average daily wastewater flow of 23.4 mgd. Analysis in the 1989 Master Plan suggests that minor additions will be required to the collection system to accommodate this flow. There are five such collection system improvement projects scheduled to be implemented by 2010.

Several of the proposed relief sewers would not be necessary, if a water reclamation facility were placed into operation. This reclamation facility could range in capacity from 6.0 mgd to 17.0 mgd, depending on contractual agreements for the 99th Avenue Interceptor capacity and treatment of the Tolleson plant. By acquiring the excess capacity of other interceptor participants, Peoria could reduce the reclamation plant capacity to 6.0 mgd, provided that an additional 11.0 mgd capacity were then obtained at the Tolleson plant. The 11.0 mgd capacity requirement could include the 3.1 mgd of unused capacity currently retained by the City of Glendale at the Tolleson WWTP.

Effluent from the proposed reclamation facility could be used for groundwater recharge, irrigation, recreation, or sold to other entities. The planning area has enough park and open space to utilize the effluent but a distribution system would be required to deliver the effluent.

A method for disposal of solids from the reclamation facility has not been selected. Conveying the solids to the Tolleson plant for disposal would result in greater treatment plant operations costs because of the greater suspended solids.

Summary of Proposed Improvements

Item	Estimated Costs[1]
Southern Region	
Collection System	$ 3,413,000
WRP Phase I(4 mgd)	8,295,000
WRP Phase II (10 mgd)	24,885,000
Purchase 11 mgd capacity at Tolleson WWTP at $1.68/gal	18,480,000
Central Region	
Collection System	6,130,000
Beardsley Road Treatment Plant Expansion to 16 mgd	56,620,000
Northern Region	
Collection System	14,800,000

Jomax Road and 67th Ave WRP (1.0 mgd)[2]	4,000,000
Total	$136,623,000

[1]Costs have been adjusted to August 1990 levels (ENR Construction Cost Index= 4750).
[2]Projected capacity of 1.0 mgd may not be cost-effective.

4.5.3.5 Surprise

The planning Area for the City of Surprise is comprised of MAG Districts 10, 11, 24 and 25. It is depicted on Figure 4-11. The City of Surprise is the Designated Management Agency for this area.

Population and Flow Projections. Upon implementation of the wastewater treatment facility for the City of Surprise, the majority of wastewater flow will be from residential sources.

Projected populations and wastewater flows for Surprise are presented in Table 4-18. The population projections are based on the adopted MAG populations. Sewage flows are projected based on 100 gpcd. Within Surprise are a few private wastewater treatment facilities that are projected to remain in service, but with minimal expansion. These facilities treat small quantities of sewage, and therefore Table 4-18 presents the population projections and corresponding wastewater flows for all of Surprise.

TABLE 4-18
SURPRISE
POPULATION AND FLOW PROJECTIONS

Year	Population	Flow, mgd
1990	9,224	0.92
1995	10,435	1.04
2000	13,914	1.39
2005	19,248	1.92
2010	24,024	2.40

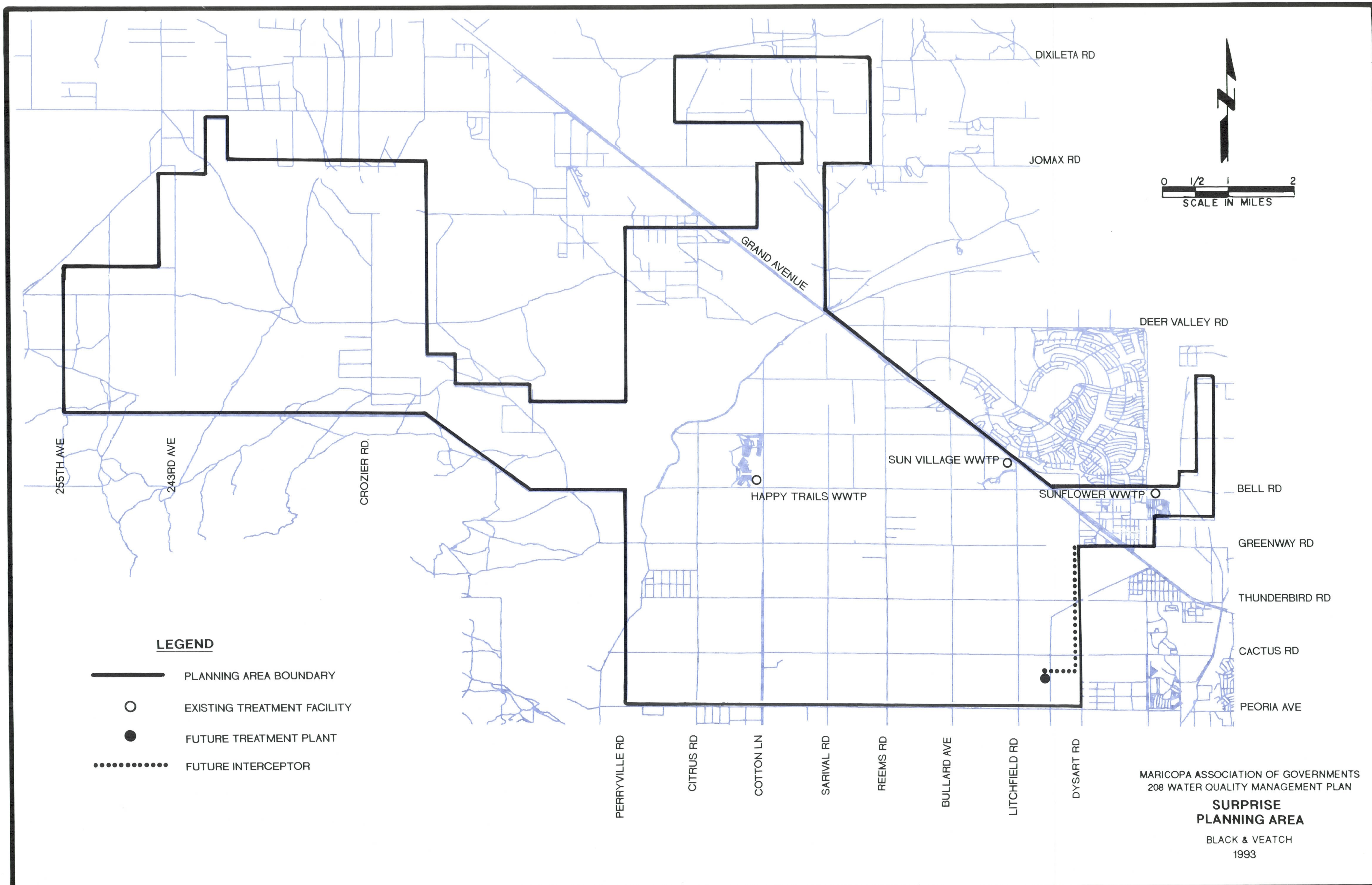

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FIGURE 4-11

Future Wastewater System Development

Wastewater disposal in the City of Surprise is principally provided by septic tanks and cesspools. The City of Surprise has no collection system in the original one square-mile area of the City. To provide wastewater treatment, it will be necessary to construct a collection system covering the entire area to be served. It is recommended by the 1987 Facility Plan that the collection system be a conventional sewer system. A minimum pipe diameter of 8 inches is recommended.

The 1987 Facility Plan recommended the construction of a Dysart Road Interceptor System to convey wastewater from the town collection system to the proposed South Surprise Wastewater Facility. The proposed interceptor would be approximately 3-miles of 18-inch diameter PVC pipe following the alignment of Dysart Road from Greenway Road to Peoria Avenue.

If any of the privately operated wastewater treatment facilities terminate operation, it would be possible to convey those sewage flows to the Surprise wastewater treatment plant through additionally constructed interceptors from those plants.

The City owns and operates the Litchfield Road wastewater treatment plant (WWTP) serving the Radnor Sun Village, Kingswood Parke, and Happy Trails developments. This plant has 0.43 mgd current treatment capacity, and a 1.32 mgd ultimate capacity. Effluent is used for landscape and golf course irrigation.

In the 1987 Facility Plan it was reported that numerous dwellings did not have septic tank information recorded with Maricopa County Department of Health Services. A number of reports to the Department of Health Service documented septic tank and cesspool failures. The hazards cited above have been identified by the Arizona Department of Health Services.

The Surprise Sun Flower Wastewater Treatment Plant is a privately owned facility and accepts wastewater flows generated at the Village of Surprise, Sun Ridge, and Sun Flower resort areas. The Sun Flower WWTP is a tertiary treatment facility designed for effluent reuse. The Sun Flower WWTP will be decommissioned when the South Surprise WWTP begins operation. The Sun Flower WWTP owner, with the cooperation of the City is seeking to obtain a reuse permit, an NPDES permit, and an aquifer protection permit. Effluent will be used for irrigation and for construction purposes until the plant closes. The WWTP owner is working with ADEQ and the Maricopa County Health Department on a plan to accomodate excess winter flows by modifying the plant for denitrification and operating rapid infiltration basins on leased land.

The City of Surprise commissioned a wastewater management plan, prepared in 1987. The study recommended the implementation of a local collection system and a treatment facility in South Surprise. A 208 Plan Amendment concerning implementation of the plan was approved in 1988.

To date, the planned South Surprise wastewater treatment facility has not been constructed. It is estimated by representatives of the City that construction will begin in Spring 1993, with construction completed and operation commencing by Summer 1994.

The Facility Plan recommended a conventional wastewater treatment plant that would perform the following unit processes:

- Influent lift station
- Screening
- Phased isolation ditch - dual oxidation ditch and sedimentation basin
- Filtration
- Chlorination
- Reclaimed water storage pond
- Sludge thickening
- Sludge dewatering and disposal

The initial stage of the wastewater treatment facility will have 0.8 mgd treatment capacity, with ultimate capacity for be 3.2 mgd as recommended by the 1987 Facility Plan. The ultimate capacity is adequate for all flows projected for the duration of the planning period. Initial wastewater flow is expected to be 400,000 gpd. Any new development would be served by the municipal sewerage system. No additional septic tanks or cesspools would be constructed.

The City is currently negotiating an Aquifer Protection Permit with ADEQ for the South Surprise WWTP, which would include agricultural reuse of effluent and aquifer storage and recovery. The WWTP will be located two miles west of the Agua Fria River. In the future, the City may apply for a NPDES permit to discharge to the Agua Fria River.

Sludge disposal will be by application to agricultural land used to cultivate non-edible crops, as recommended by the 1987 Facility Plan.

Summary of Proposed Improvements

Item	Estimated Cost[1]
Collector Sewers	$5,133,000
Interceptor Sewers	2,068,000
0.8 mgd Wastewater Treatment Plant (WWTP)	3,331,000
Reclaimed Water Distribution System	1,811,000
Expand WWTP to 1.8 mgd	3,000,000
	$15,343,000

[1]August 1990 Dollars (ENR Construction Cost Index = 4750).

4.5.3.6 Youngtown

The planning area for Youngtown consists of the incorporated limits of the Town, corresponding to MAG District 27, and is depicted on Figure 4-12. The approximate boundaries of Youngtown are Peoria Avenue on the north, 115th Avenue to the east, Olive Avenue on the south and 111th Avenue on the west.

Because the Town is completely bordered by other incorporated areas, it is not expected that this planning area will expand in the future.

Population and Flow Projections. The population of the incorporated Town of Youngtown is projected to increase minimally over the duration of the study period. Based on information provided by the Town, a per capita wastewater flow rate of 90 gpcd is used for projecting future wastewater flows. Using the adopted MAG population projections for Youngtown, Table 4-19 presents projected wastewater flows.

TABLE 4-19
YOUNGTOWN
POPULATION AND FLOW PROJECTIONS

Year	Population	Flow, mgd
1990	2,795	0.25
1995	2,843	0.26
2000	2,883	0.26
2005	3,019	0.27
2010	3,046	0.27

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FIGURE 4-12

Existing Collection System. The existing collection system serving the incorporated area of Youngtown is operated by the town. Wastewater from this collection system is conveyed through the 99th Avenue interceptor sewer to the 91st Avenue WWTP.

Existing Treatment Facilities. Youngtown is a member of the Multi-City Subregional Operating Group (SROG) and the Town's wastewater is treated at the SROG's existing 91st Avenue WWTP. Currently, Youngtown has capacity for 0.26 mgd. This should approximately be sufficient to meet the needs of the Town for the duration of the planning period.

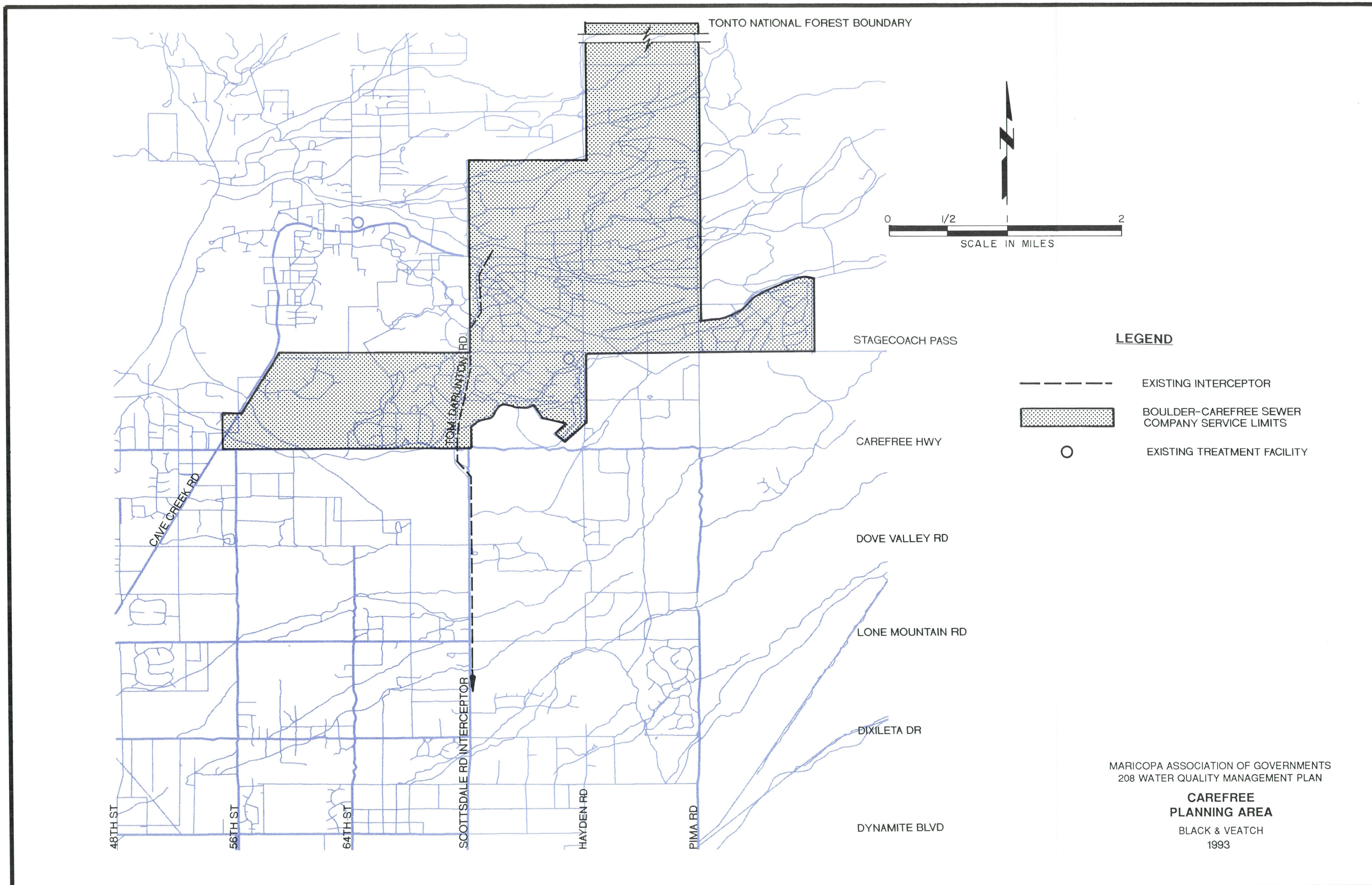
Future Wastewater System Development. The existing facilities have adequate rated capacity for the population increases expected for Youngtown over the next twenty years, and therefore no major system developments are expected. The current capacity of 0.26 mgd at 91st Avenue WWTP for Youngtown is expected to provide adequate capacity for the duration of the planning period.

4.5.4 Northeast Area

4.5.4.1 Carefree

The Town of Carefree corresponds to MAG District 8. Approximately 75 percent of the Carefree area's population is served by the Boulders Carefree Sewer Corporation (BCSC), a private wastewater utility. The remaining 25 percent is served by on-site septic tanks. The BCSC certificated service area covers approximately 5 square miles, including a portion of northern Scottsdale. The Town of Carefree intends to continue with this arrangement and does not plan to provide wastewater collection and treatment service. It is anticipated that Boulders Carefree Sewer Corp. will continue to serve approximately 75 percent of the area as development proceeds. Figure 4-13 depicts the Carefree planning area.

Population and Flow Projections. Wastewater generated in Carefree is from residential and light commercial sources, as well as the Boulders Resort. It is likely that this will remain the case in the future. The population is projected to increase by approximately 20 percent over the 20 year planning period, with larger increases currently projected to occur after year 2010. Discussions with representatives of the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CAREFREE HWY
DOVE VALLEY RD
LONE MOUNTAIN RD
DIXILETA DR
DYNAMITE BLVD
CAVE CREEK RD
TOM DARLINGTON RD
SCOTTSDALE RD INTERCEPTOR
48TH ST
56TH ST
64TH ST
SCOTTSDALE RD
HAYDEN RD
PIMA RD
LEGEND
EXISTING INTERCEPTOR
BOULDER-CAREFREE SEWER COMPANY SERVICE LIMITS
EXISTING TREATMENT FACILITY
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FIGURE 4-13

wastewater utility indicate that the average day per capita wastewater flow during 1989 was 117 gpcd. For planning purposes, this study will assume an annual average daily per capita flow of 120 gpcd. Seasonal peak flows are approximately 50 percent greater due to the influx of visitors during winter months. The peak flows, presented in Table 4-20, are used by the utility to size its facilities. Projected populations and wastewater flows are based on the current MAG population projections adopted in 1992.

TABLE 4-20
CAREFREE
POPULATION AND FLOW PROJECTIONS

Year	Planning Area Population	Population Served[1]	Flow Projections, mgd: Average Day	Seasonal Peak
1990	1,917	1,438	.171	.259
1995	2,168	1,626	.195	.293
2000	2,253	1,690	.203	.304
2005	2,313	1,735	.208	.312
2010	2,355	1,766	.212	.318

[1]Population served is estimated to be 75 percent of the planning area population.

Existing Collection System. The collection system serving Carefree has been substantially developed. Approximately 75 percent of the population is served. The more sparsely-populated areas are served by septic tanks and are likely to remain outside the collection system. Because population is projected to increase slowly, further expansion of the collection system during the study period is expected to be minimal.

One major project under way is the construction of a 12-inch diameter trunk sewer along Scottsdale Road to connect the Carefree system to Scottsdale's. This line will be used to convey flows exceeding the capacity of the Boulders treatment plant, plus residual solids from the Boulders plant.

Existing Treatment System. Treatment capacity requirements for Carefree are dictated by the sustained seasonal peak flows. The Boulders wastewater treatment plant is a package facility which performs the activated sludge process, and currently is rated at 0.12 mgd. Effluent from the plant is reused for turf irrigation. Sludge is discharged into the Scottsdale municipal collection system and ultimately treated at the 91st Avenue WWTP.

Flows exceeding the capacity of the plant will be bypassed and discharged to the Scottsdale system using the new 12-inch trunk sewer. At some point in the future, the utility will evaluate whether the Boulder's plant should be expanded to 0.16 mgd or whether those flows should be sent to Scottsdale.

Future Wastewater System Development. After the connection to Scottsdale is completed, no major expansions of the collection system are anticipated. The treatment plant will either remain at 0.12 mgd or be expanded to an ultimate capacity of 0.16 mgd. It is planned that effluent will continue to be reused for golf course irrigation. Sludge will continue to be discharged to the Scottsdale collection system and treated at the 91st Avenue WWTP.

Summary of Proposed Improvements

Item	Estimated Cost[1]
WWTP Improvements; 0.25 mgd expansion	$750,000
12-inch Trunk Sewer	380,000
Total	$1,130,000

[1]August 1990 costs (ENR Construction Cost Index = 4,750).

4.5.4.2 Cave Creek

The Town of Cave Creek, corresponding to MAG District 7, does not currently operate a wastewater system. In 1988 a wastewater master plan was prepared for the area by a consultant under contract with the owners of Spur Cross Ranch, and in 1990 a wastewater management facilities plan was prepared by the Town. Approximately one half square mile within Cave Creek is already served by the Cave Creek Sewer Company, a private utility which operates a treatment plant with 25,000 gpd capacity. The rest of the Town is served by septic tanks.

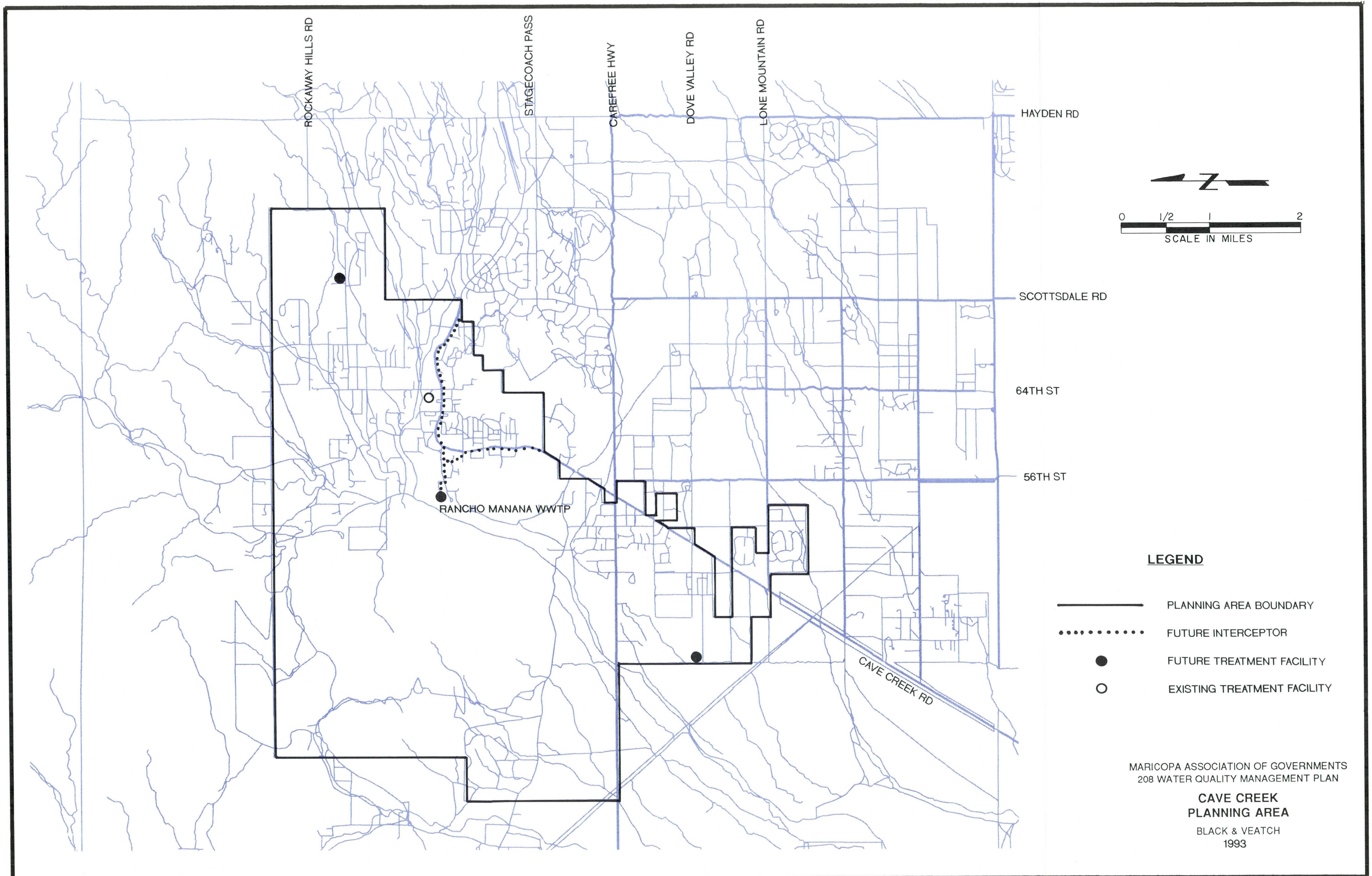
The 208 Plan prepared in 1979 envisioned a Cave Creek-Carefree subregional operating group and a joint effort by the two communities to provide wastewater treatment. That has not developed.

Percolation rates through the area's soil typically are slow, and the water table is fairly shallow in some areas. This has prompted concern by the Maricopa County Health Department that the use of septic tanks poses a potential risk to the area's drinking water. In 1980 severe restrictions were imposed on building permits for commercial and multifamily developments in the area until a wastewater management plan could be developed.

The 1988 Wastewater Management Plan and 1990 Facility Plan contained recommendations for a preferred plan of implementation. The planning area depicted on Figure 4-14 consists of the incorporated Town plus county land to the north. The total area includes approximately 25 square miles, bounded by a line approximately 1/2 mile north of Rockaway Hills Road, and on the east of the Town of Carefree. The western boundary extends along the 28th Street alignment from Carefree Highway to Joy Ranch Road, then along 32nd Street alignment to the northern boundary. To the south of Carefree Highway, an irregular area exists bounded approximately by the 40th Street alignment to the west, Montgomery Road to the south, and 56th Street to the east.

Population and Flow Projections. Existing development in Cave Creek consists of low density residential areas, and a more densely developed commercial center in the downtown area. Several significant developments are in various stages of planning, but it is expected that most densities will remain lower than typical densities in the Phoenix area.

The 1988 master plan developed population and flow projections through the year 2010, plus a projection for complete development of the Study Area, at whatever time that is achieved. The master plan's projections were based in part on existing land use plans for several planned developments in the area. Table 4-21 presents the current MAG population projections (adopted 1992), and flow projections based on 100 gpcd per capita flow using the MAG projections.


ROCKAWAY HILLS RD
STAGECOACH PASS
CAREFREE HWY
DOVE VALLEY RD
LONE MOUNTAIN RD
HAYDEN RD
SCOTTSDALE RD
64TH ST
56TH ST
CAVE CREEK RD
RANCHO MANANA WWTP
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SCALE IN MILES
LEGEND
PLANNING AREA BOUNDARY
FUTURE INTERCEPTOR
FUTURE TREATMENT FACILITY
EXISTING TREATMENT FACILITY
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FIGURE 4-14

TABLE 4-21
CAVE CREEK
POPULATION AND FLOW PROJECTIONS

Year	Population	Wastewater Flow[1] (mgd)
1990	2,808	0.28
1995	3,075	0.31
2000	3,368	0.34
2005	3,766	0.38
2010	4,022	0.40

[1]For entire service area.

It is likely that some of the more remote, lower density areas will continue to be served by septic tanks due to the high cost of extending wastewater collection facilities to these areas.

Existing Wastewater Collection and Treatment. The Town of Cave Creek has no collection or treatment facilities. The Town recently completed the design of a collector sewer system to serve the primarily commercial development in the downtown area on both sides of Cave Creek Road from Rancho Manana Road to the eastern town limits.

The Cave Creek Sewer Company operates a small collection system and treatment facility in its service area. This treatment facility serves the Rancho Mañana development and has a design capacity of 25,000 gallons per day. The plant uses the activated sludge process to produce effluent for reuse as irrigation water. Sludge is currently hauled to a landfill or to the Phoenix 23rd Avenue WWTP as nonhazardous liquid waste.

Village Apartments at Cave Creek and School House Roads also owns and operates a 14,000-gpd tertiary WWTP with effluent disposal to percolation pits.

Future Wastewater System Development. Wastewater service will first be provided to the area along Cave Creek Road to serve the commercial and multi-family development in the downtown area. The collector sewer recently designed for the downtown area will extend to the west in Rancho Manana Road to a new wastewater treatment plant site, located in the Rancho Manana Golf Course. Construction of these sewers is planned to be complete by November 1993.

The Town also recently entered into an agreement with the owners of the Rancho Manana Golf Course for the acquisition of the new treatment plant site, re-use of the effluent, future sewer service, future treatment plant capacity, and transfer of the ownership of the Cave Creek Sewer Company facilities to the Town of Cave Creek. The sewer company was owned by the same entities that own the Rancho Manana Golf Course. However, the decommissioning of the existing Cave Creek Sewer Company wastewater treatment facility remains the responsibility of the owners of the Rancho Manana Golf Course.

The intent is to shut down and demolish the existing treatment facilities when the new facilities, currently being designed, are completed in 1994. At that time, the customers currently being served by the Cave Creek Sewer Company will be switched over to the Town's system. Interim treatment for both the existing customers and the new downtown customers will be provided by the existing facility.

The new treatment plant will have a capacity of 300,000 gpd, including some excess capacity to serve the Rancho Manana area's future development. This approach to serving the downtown area and building a new treatment facility in the Rancho Manana area is essentially in conformance with the 1990 Facility Plan.

For the phase I treatment facility, unit processes include bar screen, aeration basin, secondary sedimentation, filtration, ultraviolet disinfection, and gravity sludge thickening.

It is intended that the operator of the wastewater treatment facility would apply for effluent reuse, aquifer protection, and NPDES permits so that effluent may be discharged to Cave Creek Wash if necessary. Rancho Manana Golf Course plans to use the treated effluent for irrigation. The operator of the treatment facility may be disposing of sludge through an agreement with agricultural operations in the western area of the Valley.

Summary of Proposed Improvements

Item	Estimated Cost[1]
Town of Cave Creek collection system and 0.3 mgd wastewater treatment plant	$2,000,000

[1] August 1990 costs (ENR Construction Cost Index = 4,750).

4.5.4.3 Fountain Hills

The Town of Fountain Hills corresponds to MAG District 39. Wastewater collection and treatment service is provided in Fountain Hills by the Fountain Hills Sanitary District. The entire community is sewered. The Sanitary District is a local government agency whose Board of Directors is elected by the public. The Town of Fountain Hills itself does not operate any wastewater facilities. The Fountain Hills Sanitary District serves the incorporated Town, the 342 acre unincorporated area known as Crestview, and 405 acres known as Eagle Ridge which was previously annexed by the City of Scottsdale. The Sanitary District service area is depicted on Figure 4-15.

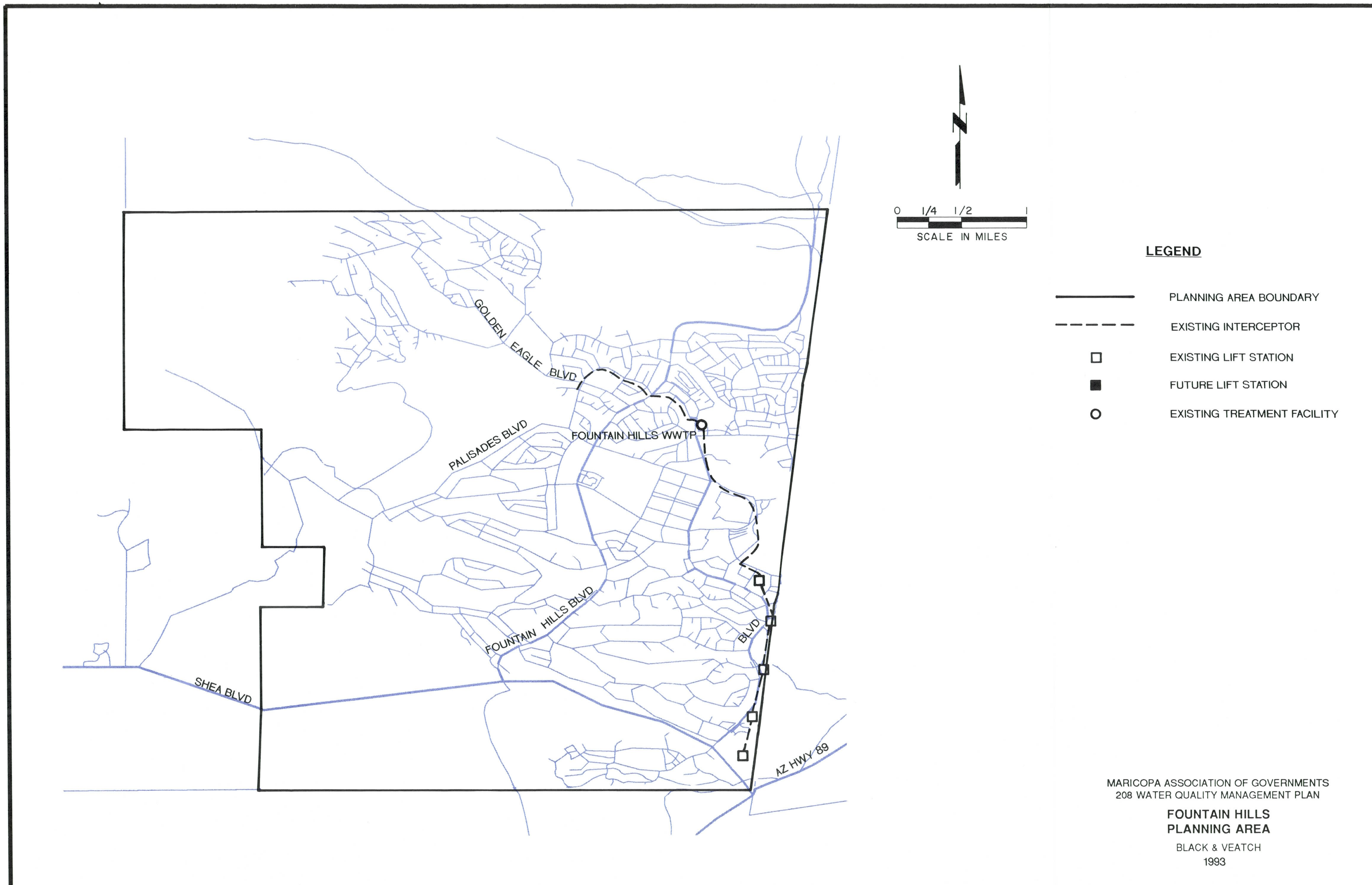
Population and Flow Projections. Table 4-22 presents projected populations based on current MAG-adopted figures, and projected wastewater flows based on per capita flow of 100 gpcd.

TABLE 4-22
FOUNTAIN HILLS
POPULATION AND FLOW PROJECTIONS

Year	Population	Wastewater Flow, mgd
1990	10,624	1.06
1995	16,819	1.68
2000	17,926	1.79
2005	18,534	1.85
2010	18,556	1.86

Existing Collection System. All wastewater generated in Fountain Hills is collected and conveyed to the Sanitary District treatment plant. Because of the hilly terrain, most of the wastewater is pumped at least once, and often several times, before reaching the treatment plant. The collection system includes 16 lift stations with force mains.

In recent years, the Sanitary District has constructed improvements to sewers, force mains, and lift stations as needed; it recently constructed a new trunk sewer, the Ashbrook Wash Interceptor, to convey most of the flow from the northwest portions of the service area. One of the District's larger lift stations (Lift Station 7) was recently replaced.



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SCALE IN MILES
LEGEND
PLANNING AREA BOUNDARY
EXISTING INTERCEPTOR
EXISTING LIFT STATION
FUTURE LIFT STATION
EXISTING TREATMENT FACILITY
GOLDEN EAGLE BLVD
PALISADES BLVD
FOUNTAIN HILLS WWTP
FOUNTAIN HILLS BLVD
BLVD
SHEA BLVD
AZ HWY 89
MARICOPA ASSOCIATION OF GOVERNMENTS
208 WATER QUALITY MANAGEMENT PLAN
FOUNTAIN HILLS
PLANNING AREA
BLACK & VEATCH
1993

FIGURE 4-15

Existing Treatment Facility. The Sanitary District operates a wastewater treatment plant which currently is rated at 1.2 mgd nominal capacity. The plant performs the activated sludge process and includes the following:

- Influent pump station.
- Parshall flume and flow metering.
- Mechanically-cleaned bar screen (plus manual standby screen).
- Aerated grit removal chamber.
- Aeration basins with diffused aeration.
- Clarifiers.
- Filters.
- Chlorine disinfection.
- Aerobic sludge digester, with mechanical surface aeration.
- Odor controls.

A major improvement project has recently been completed at the treatment plant to enhance the aeration of the wastewater and to control odors. These improvements will enable nitrification/denitrification of the wastewater. Effluent from the treatment plant is reused to irrigate parks and other turf areas, and to fill Fountain Lake. The aerobically-digested sludge is thickened and then hauled and discharged into the Scottsdale wastewater system.

Future Wastewater System Development. The Sanitary District will continue to replace or provide relief for existing collection system components as the need arises in the future. A number of lift stations, force mains and relief sewer projects are planned.

The Sanitary District treatment plant will be expanded at its current location to provide for flows as they increase in the future. Expansion to firm capacity for 2.6 mgd is planned. The Sanitary District is in the process of negotiating a new effluent reuse permit. It also plans to apply for an NPDES permit for a possible discharge, and an aquifer protection permit for a possible aquifer recharge project as methods of effluent disposal.

The Sanitary District has undertaken a study of sludge disposal alternatives to identify the ultimate disposal method. Disposal methods which may be implemented include continued discharge to the Scottsdale system, as well as landfilling, composting or land application once suitable sites have been found.

Summary of Proposed Improvements

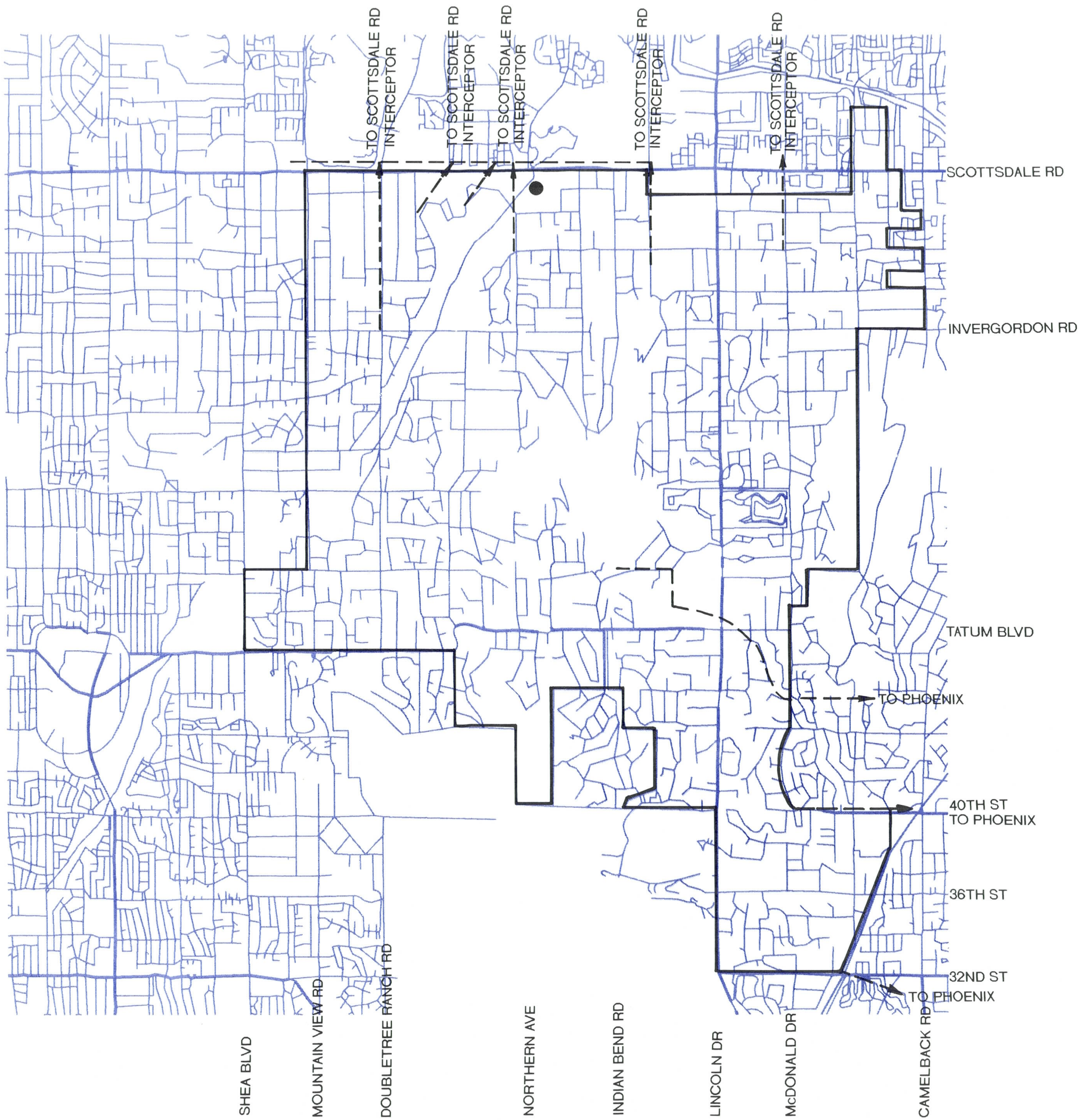
Item	Estimated Costs[1]
Relief sewers	$840,000
Lift station improvements	730,000
Force main improvements	440,000
WWTP expansion to 2.6 mgd	5,200,000
Total	$7,210,000

[1]All costs are in August 1990 dollars (ENR Construction Cost Index = 4750).

4.5.4.4 Paradise Valley

The planning area for the Town of Paradise Valley consists of MAG District 50, and is depicted on Figure 4-16.

Both the City of Phoenix and Scottsdale provide collection and treatment of wastewater flows from portions of Paradise Valley, for a combined total of about 50 percent of the population of the Town. In general, the area west of 54th Street and south of Road Runner Road is served by the City of Phoenix, along with that part of TAZ 325 west of Indian Bend Wash. Most of TAZ 325 east of Indian Bend Wash is served by the City of Scottsdale with discharge to the Scottsdale Road Interceptor. Customers served by Phoenix are billed directly by the City of Phoenix, and the Town of Paradise Valley is not involved. The remainder of the sewered areas are served by a Town owned sewer system which is operated and maintained by the City of Scottsdale. The Town of Paradise Valley bills these customers and discharges to the Scottsdale system as a contract customer. The City of Phoenix serves about 20



LEGEND

———	PLANNING AREA BOUNDARY
— — —	EXISTING INTERCEPTOR
●	FUTURE TREATMENT FACILITY (APPROXIMATE LOCATION)

MARICOPA ASSOCIATION OF GOVERNMENTS
208 WATER QUALITY MANAGEMENT PLAN

PARADISE VALLEY PLANNING AREA

BLACK & VEATCH
1993

FIGURE 4-16

percent of the total population, and Scottsdale serves another 30 percent. The remaining 50 percent of the population is currently unsewered and relies on on-site waste disposal systems.

Population and Flow Projections. The population of Paradise Valley has a wide range of seasonal variation. For the purposes of this study, the 1992 MAG-adopted population will be applied as an annual average.

Past wastewater reports show a high degree of variability of per capita wastewater flows. The MAG 208 Plan of 1979 estimated 100 gallons per capita per day (gpcd). The April 1982 MAG 208 Point Source Plan Update specified a wastewater flow of 155 gpcd. This report assumes a per capita flow of 116 gpcd, which was used in a 1985 Water Resources Evaluation prepared for the Town and adopted in subsequent studies. In making flow projections, it is assumed that all future development will be sewered and 50 percent of existing unsewered developments will gradually receive sewer service over the duration of the planning period. Table 4-23 presents population and flow projections and allocates expected wastewater flows for both the Phoenix-served system and the Scottsdale-served system assuming that these expand to provide the new sewerage service as it is added.

TABLE 4-23
PARADISE VALLEY
POPULATION AND FLOW PROJECTIONS

				Wastewater Flows (mgd)		
Year	Total Population	Sewered Population	Unsewered Population	Phoenix System	Scottsdale System	Total
1990	14,626	7,313	7,313	0.34	0.51	0.85
1995	16,255	9,856	6,399	0.46	0.69	1.15
2000	16,582	11,097	5,485	0.51	0.77	1.28
2005	16,785	12,214	4,571	0.57	0.85	1.42
2010	16,958	13,301	3,657	0.62	0.93	1.55

Existing Collection and Treatment System. Flows from the southwest area served by the City of Phoenix enter the Phoenix system on McDonald Drive between 44th Street and Tatum, off 40th Street and McDonald, and at 32nd Street and Stanford Drive. This flow is conveyed to the 23rd Avenue WWTP for treatment. Flows from TAZ 325 west of Indian Bend Wash (IBW) are discharged to the Shea Boulevard Interceptor and delivered to the 91st Avenue WWTP. The remainder of the City of Phoenix flows from TAZ 325 are discharged to the Scottsdale Road Interceptor at Doubletree Ranch Road.

The Scottsdale system has several points of connection to the Scottsdale Road Interceptor (SRI). Portions of TAZ 386 and 325 are collected at Doubletree Ranch Road and discharged to the SRI at Doubletree Ranch Road. Two small connections to the SRI serve a small area north of IBW and south of Doubletree Ranch Road. TAZ 387 south of IBW discharges to the SRI just south of the wash. An interceptor at Indian Bend Road collects flows from 59th Street, the north slopes of Camelback Mountain, and the Judson School neighborhood. The Kiva School neighborhood also discharges to the Scottsdale system. All flows collected by the Scottsdale Road Interceptor are conveyed to the 91st Avenue WWTP for treatment.

Future Wastewater System. The Town of Paradise Valley intends to provide wastewater service to all currently unsewered lots. The cost of sewer connections will limit the rate at which lots are sewered, especially where septic tanks are functioning adequately. All new developments will be sewered. The Town of Paradise Valley is planning to construct a water reclamation plant (WRP). Because of the topography of Paradise Valley, it is most practical for the reclamation plant to treat those flows currently discharged to the City of Scottsdale system. That drainage area also could include most of the future growth areas of the Town of Paradise Valley. To meet the needs of the planning area, 0.75 mgd capacity will be required. Several studies have been conducted to for a WRP in the vicinity of Indian Bend Wash at Scottsdale Road. Resorts and golf courses in the area will use some of the effluent for irrigation, and the Town would distribute the remainder for turf irrigation elsewhere in the Town.

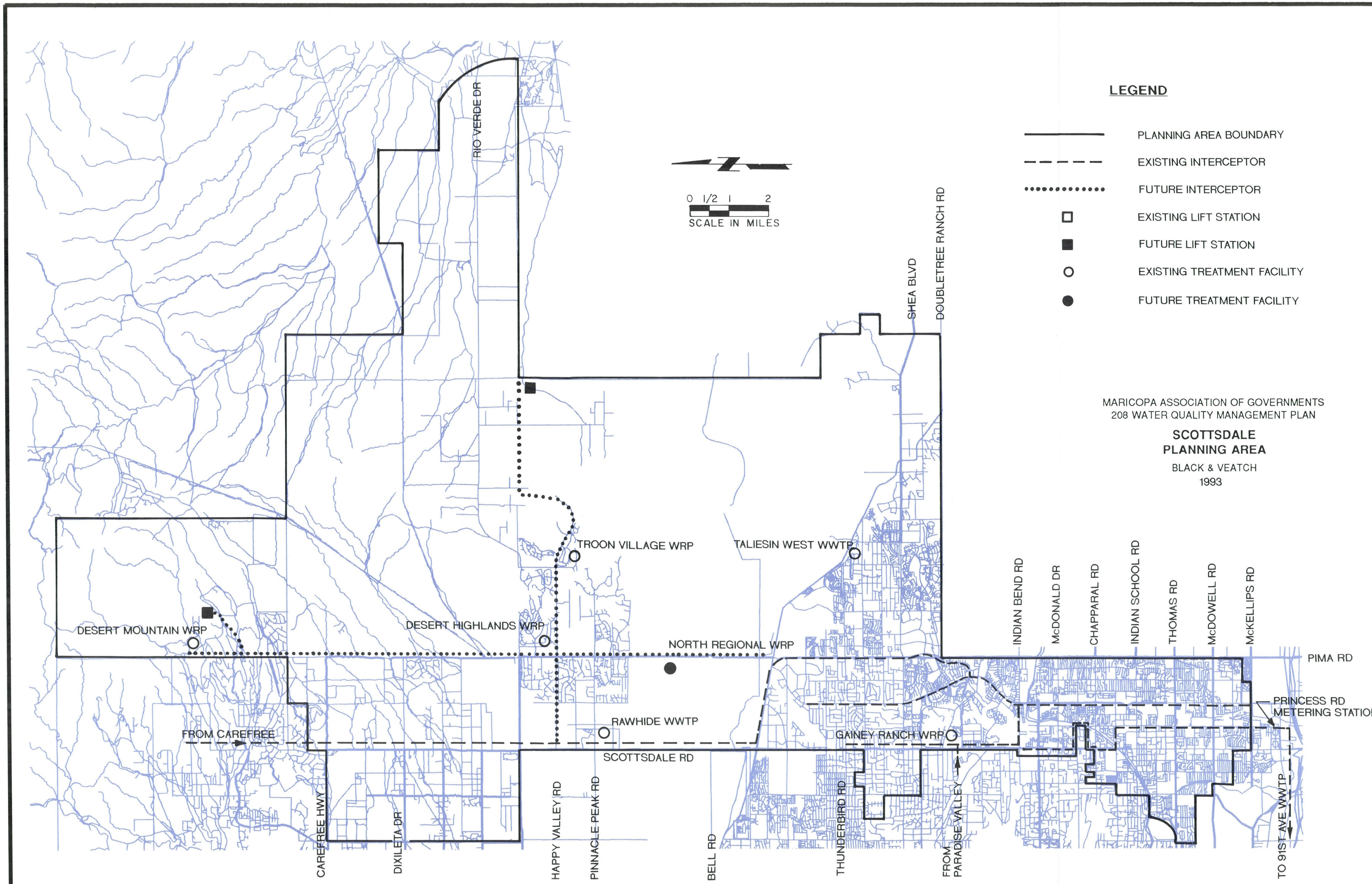
Summary of Proposed Improvements

Item	Estimated Cost[1]
Sewer Connections	$2,819,000
Wastewater Reclamation Plant, 0.75 mgd	5,319,000
Total	$8,138,000

[1]Costs have been adjusted to August 1990 levels (ENR Cost Construction Index = 4750).

4.5.4.5 Scottsdale

Wastewater collection and treatment service is provided by the City of Scottsdale. For this 208 Plan, the Scottsdale planning area consists of MAG Districts 9, 21, 22, 37, 38, 51, and 60. The Scottsdale planning area is depicted on Figure 4-17. In 1987, as a component of its Water Resources Master Plan, the City of Scottsdale completed a Wastewater Collection and Water Reclamation Master Plan element. A Master Plan Update of this element was completed in 1988 which expanded wastewater planning to include the area south of the CAP aqueduct. These documents presented Scottsdale's needs for wastewater collection and treatment and provided a plan for distribution of reclaimed effluent. The Scottsdale planning area covers approximately 190 square miles. The planning area is generally divided into two parts: north of the Central Arizona Project (CAP) canal and south of the CAP canal. The 1987 study addressed the area north of the CAP canal which is bounded by Scottsdale Road and 56th Street on the west, Cave Creek Road on the north, 136th Street on the east, and Doubletree Ranch Road and the CAP Canal on the south. In addition, the Desert



LEGEND
PLANNING AREA BOUNDARY
EXISTING INTERCEPTOR
FUTURE INTERCEPTOR
EXISTING LIFT STATION
FUTURE LIFT STATION
EXISTING TREATMENT FACILITY
FUTURE TREATMENT FACILITY
0 1/2 1 2
SCALE IN MILES
MARICOPA ASSOCIATION OF GOVERNMENTS
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SCOTTSDALE
PLANNING AREA
BLACK & VEATCH
1993
RIO VERDE DR
SHEA BLVD
DOUBLETREE RANCH RD
TROON VILLAGE WRP
TALIESIN WEST WWTP
DESERT MOUNTAIN WRP
DESERT HIGHLANDS WRP
NORTH REGIONAL WRP
RAWHIDE WWTP
FROM CAREFREE
SCOTTSDALE RD
GAINEY RANCH WRP
INDIAN BEND RD
McDONALD DR
CHAPPARAL RD
INDIAN SCHOOL RD
THOMAS RD
McDOWELL RD
McKELLIPS RD
PIMA RD
PRINCESS RD
METERING STATION
CAREFREE HWY
DIXILETA DR
HAPPY VALLEY RD
PINNACLE PEAK RD
BELL RD
THUNDERBIRD RD
FROM PARADISE VALLEY
TO 91ST AVE WWTP

FIGURE 4-17

Mountain area which was included as an option is bounded by Cave Creek Road on the south, Pima Road on the west, the Tonto National Forest on the north, and 112th Street on the east. The Rio Verde area is also included as a master planning option which is located east of 136th Street between Jomax Road and Stagecoach Road.

The 1988 study updated the 1987 study and addressed the planning area south of the CAP canal which is bounded by the City of Phoenix and the Town of Paradise Valley on the west, the City of Tempe on the south, the Salt River Maricopa Pima Indian Reservation on the east and the CAP canal on the north.

The City of Scottsdale is the designated wastewater management agency for this area. There are, however, three small wastewater treatment plants located in this area which operate beyond the control of the City.

Population and Flow Projections. Significant growth is projected to occur in the portion of Scottsdale north and east of the CAP canal. It is expected that all development within the boundaries of the municipal planning area will receive sewerage service provided by the City. Scottsdale also provides wastewater service to a portion of the Town of Paradise Valley. Table 4-24 presents the population and flow projections. Population projections are based on current MAG population projections adopted in 1992. Unit flow is 90 gpcd for population existing as of 1990; for population increases after that time, a unit flow of 75 gpcd has been used to adjust for water conservation impacts.

TABLE 4-24
SCOTTSDALE
POPULATION AND FLOW PROJECTIONS

Year	Scottsdale Population	Scottsdale Flow, mgd	Town of Paradise Valley Flow, mgd[1]	Total Flow, mgd
1990	142,408	--	--	12.1 (actual)
1995	173,831	15.17	0.69	15.86
2000	185,114	16.02	0.77	16.79
2005	216,479	18.37	0.85	19.22
2010	250,749	20.94	0.93	21.87

[1]Source: 208 Plan element, Town of Paradise Valley.

Existing Collection System. The bulk of the existing wastewater collection system is located south of the CAP canal in developed Scottsdale. The wastewater is conveyed through the Miller Road and Hayden Road trunk sewers to the multi-city Salt River Outfall interceptor sewer which conveys flows through the Princess Road metering station to the 91st Avenue WWTP. Flows from the City of Phoenix and the Town of Paradise Valley are also conveyed through the Hayden Road system. These flows are metered prior to entering the Scottsdale collection system in Scottsdale Road.

The collection system north of the CAP canal is limited. A sewer is located in Scottsdale Road from north of Westland Road south to Bell Road. At Bell Road the sewer parallels the CAP canal to Pima Road. A lift station at Pima Road pumps wastewater over the canal into the existing Pima Road sewer. An interceptor in Shea Boulevard serves the northeast area of the City along Shea Boulevard east of the CAP canal.

Existing Treatment System. As a member of the Multi-City SROG, Scottsdale owns 12.27 mgd of treatment capacity at the 91st Avenue WWTP. In addition to capacity at the 91st Avenue WWTP, three water reclamation plants (WRP's) are located in Scottsdale. These plants are the Gainey Ranch, Troon Village and Desert Highlands WRP. The City of Scottsdale does not own nor operate the Desert Highlands WRP. Effluent from each of the reclamation plants is used for turf irrigation. The City has reuse permits covering turf irrigation with effluent from each of those facilities it owns and operates.

Gainey Ranch WRP. The Gainey Ranch WRP is located on Scottsdale Road between Doubletree Ranch Road and Shea Boulevard and supplies reclaimed water for irrigation of Gainey Ranch golf course. The Gainey Ranch WRP has a capacity of 1.7 mgd and includes the following treatment units:

- Preliminary treatment.
- Extended aeration.
- Final sedimentation.
- Filtration.
- Chlorine disinfection.

Residuals from the Gainey Ranch WRP are returned to the Scottsdale sewer system and conveyed to the 91st Avenue WWTP for processing. The City of Scottsdale owns and operates the Gainey Ranch WRP and holds an effluent reuse permit for the facility.

Troon Village WRP. The Troon Village WRP supplies reclaimed water for irrigation of the Troon Village Golf Course. The package treatment plant has a capacity of 0.40 mgd and includes the following processes:

- Bar screens and comminutors.
- Oxidation ditch extended aeration.
- Final sedimentation.
- Filtration.
- Ultraviolet light disinfection.
- Sludge holding tank.
- Effluent storage basin.

Residuals are trucked to the Scottsdale sewer system and conveyed to the 91st Avenue WWTP. The City of Scottsdale owns and operates the Troon Village WRP, and holds an effluent reuse permit for the facility.

Desert Highlands WRP. The Desert Highlands WRP supplies reclaimed water for irrigation of Desert Highlands Golf Course. The package plant has a capacity of 0.06 mgd and includes the following treatment units:

- Extended aeration.
- Final sedimentation.
- Chlorine disinfection.
- Sludge holding tank.
- Effluent storage basin.

Residuals from the plant are trucked to the Scottsdale sewer system and conveyed to the 91st Avenue WWTP. The Desert Highlands development owns and operates the facility and holds an effluent reuse permit.

Additional small wastewater treatment plants not owned or operated by the City of Scottsdale are listed in Table 4-25.

TABLE 4-25
SCOTTSDALE
SMALL WASTEWATER TREATMENT PLANTS

Facility Name	Design Capacity (gpd)	Process
Desert Mountain WRP	60,000	Activated sludge-extended aeration
Rawhide Western Town Operating Company, Inc.	30,000	--
Taliesin West - Frank Lloyd Wright Foundation	15,000	--

Future Wastewater System Development. Scottsdale is proceeding with implementation of the recommendations as outlined in the 1987 master plan and updated in the 1988 master plan including development of regional wastewater reclamation and advanced water treatment plants to be located north of the CAP aqueduct.

Wastewater Treatment Future wastewater flow for ultimate build out of Scottsdale is estimated at 51.5 mgd based on City studies referenced above. Future treatment capacity will be provided at the 91st Avenue WWTP and satellite water reclamation plants. The existing Troon Village and Desert Highlands water reclamation plants will be taken out of service after their useful lives have expired and the City collection system has been extended to their service areas. The Gainey Ranch WRP will be maintained as a permanent facility.

A new north area Regional Wastewater Reclamation Plant and Advanced Water Treatment Plant are planned north of the CAP aqueduct near Pima Road. An ultimate capacity of 43 mgd is planned for the wastewater reclamation plant and advanced water treatment plant. The initial capacity of both plants is planned to be between 4.5 mgd and 6 mgd. Effluent from the new plants will be used for direct turf irrigation and aquifer storage and recovery, respectively. Residual solids will be conveyed through the existing collection system to the 91st Avenue WWTP for processing. Permits for reuse, aquifer protection and aquifer storage and recovery will be required for the new facility. Major plant components may include the following:

Wastewater Reclamation/Advanced Water Treatment Plant.

- Preliminary treatment.
- Primary sedimentation and/or screening.
- Activated sludge with and without nitrification and denitrification.
- Secondary sedimentation and/or ultrafiltration.
- Lime clarification and/or polymer flocculation.
- Filtration and/or ultrafiltration.
- Reverse osmosis and/or electrodialysis and/or activated carbon.
- Effluent disinfection.

Reclaimed Water Distribution System. The 1987 and 1988 Master Plans present recommendations for implementing a reclaimed water distribution system. The major components of the system include a transmission main and pump stations along Pima Road north of the CAP aqueduct to convey reclaimed effluent to golf courses and large turf facilities. This system is scheduled for completion in early 1993 and will initially be used to transport untreated CAP water supplies until effluent is available from the proposed regional wastewater reclamation plant.

Summary of Proposed Improvements

Item	Estimated Cost[1]
Regional Wastewater Reclamation Plant (WRP) (Initial 6.0 mgd capacity)	$28,931,000
Advanced Water Treatment Plant (AWT) (Initial 6.0 mgd capacity)	32,545,000
Associated Collection/Pumpback System	16,214,500
Initial Recharge Recovery System	2,154,100
Reclaimed Water Distribution System	11,750,000
WRP/AWT Expansion to 12.0 mgd (2000)	51,960,300
WRP/AWT Expansion to 18.0 mgd (2010)	51,960,300
Total	$195,515,200

[1]All costs are in August 1990 dollars (ENR Construction Cost Index = 4750).

4.5.5 Southeast Area

4.5.5.1 Guadalupe

The planning area for the Town of Guadalupe is entirely within MAG District 88. The Area is bounded on the west by Interstate 10 except from Mineral Road to Carmen Street where the boundary is 56th Street. The City of Tempe's incorporated area forms the rest of the boundaries. Figure 4-18 depicts the Guadalupe planning area. No expansion of the Guadalupe planning area is predicted since the town is surrounded by incorporated areas. The Town provides collection of wastewater which is then discharged to the City of Tempe collection system for treatment at the 91st Avenue WWTP. The Town of Guadalupe plans to continue this arrangement with Tempe through the planning period.

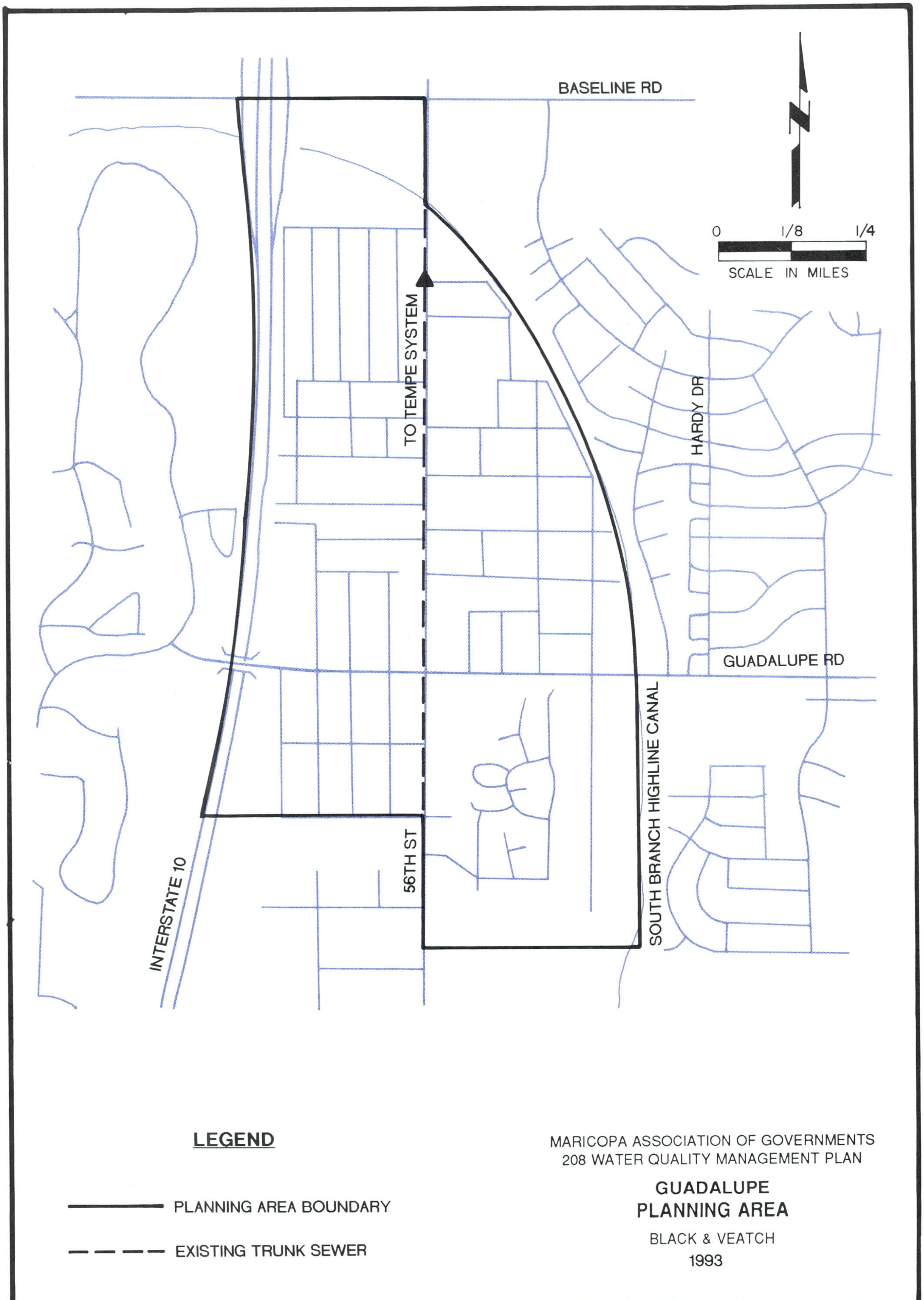
Population and Flow Projections. Table 4-26 depicts the 1992 MAG-adopted population projections for the Town of Guadalupe and wastewater flow projections based on 100 gpcd.

TABLE 4-26
GUADALUPE
POPULATION AND FLOW PROJECTIONS

Year	Population	Flows (mgd)
1990	5,663	0.56
1995	5,751	0.58
2000	5,921	0.59
2005	6,080	0.61
2010	6,099	0.61

4.5.5.2 Chandler

The Planning Area for the City of Chandler is comprised of MAG Districts 91, 95, 96, 97, 103 and 105. The City of Chandler provides wastewater collection and treatment for this area. The area is bounded by Pecos Road from I-10 to Price Road and by Hunt Highway from Arizona Avenue to Val Vista Drive on the south. The Sun Lakes development bounds the southwest corner of Chandler. The western boundary is defined as Price Road from Chandler Heights Road to Pecos Road and


BASELINE RD
0
1/8
1/4
SCALE IN MILES
TO TEMPE SYSTEM
HARDY DR
GUADALUPE RD
SOUTH BRANCH HIGHLINE CANAL
56TH ST
INTERSTATE 10
LEGEND
PLANNING AREA BOUNDARY
EXISTING TRUNK SEWER
MARICOPA ASSOCIATION OF GOVERNMENTS
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GUADALUPE
PLANNING AREA
BLACK & VEATCH
1993

FIGURE 4-18

I-10 from Pecos Road to Knox Road. Tempe and Mesa bound Chandler on the north while Gilbert forms portions of the eastern boundary.

Figure 4-19 depicts the Chandler planning area. The City of Chandler is the designated wastewater management agency for this area.

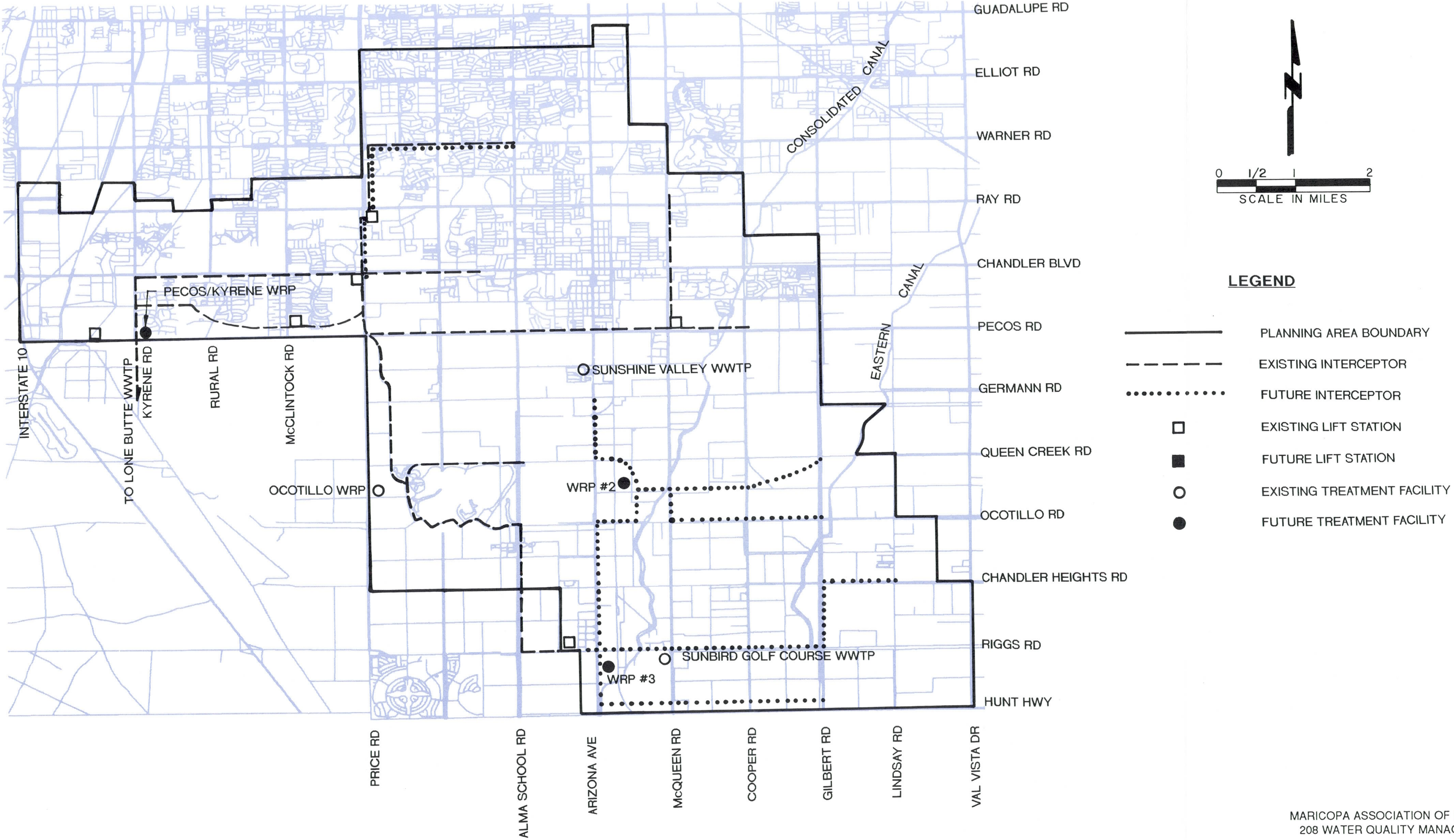
Population and Flow Projections. Table 4-27 depicts population and wastewater flow projections over the planning period. Wastewater flow has historically been approximately 90 gpcd. The 1992 MAG adopted population projections are used to determine total wastewater flow projections through the planning period.

TABLE 4-27
CHANDLER
POPULATION AND FLOW PROJECTIONS

Year	Population	Wastewater Flow, mgd
1990	97,290	8.76
1995	132,163	11.89
2000	166,476	14.98
2005	219,181	19.73
2010	264,653	23.82

Existing Collection System. As of 1988, the City of Chandler wastewater system included approximately 300 miles of sanitary sewers with 25,000 connections. There are currently three lift stations. Several others have been recently abandoned due to improvements in the collection system. Flows are generally to the west toward the Ocotillo Water Reclamation Plant (WRP) at Price Road and Appleby Road and to a 30-inch interceptor at Pecos Road and Kyrene Road which delivers flow to the Lone Butte Wastewater Treatment Plant (WWTP).

There are several major interceptors that serve the currently developed areas. The Pecos-McQueen Interceptor along Pecos Road collects flow east of McQueen Road and some of the flow north of Pecos Road. This sewer discharges to a 66-inch sewer serving the Ocotillo WRP. Trunk sewers along Price Road serve the rest of the area north of Pecos Road and east of Price Road. Trunk sewers serve the more densely populated center of town and discharge to diversion gates at Price Road and Pecos Road. Flows from the diversion gates travels south to the Ocotillo WRP, and



MARICOPA ASSOCIATION OF GOVERNMENTS
208 WATER QUALITY MANAGEMENT PLAN

CHANDLER PLANNING AREA

BLACK & VEATCH
1993

FIGURE 4-19

west to Kyrene Road, then southwest to the Lone Butte WWTP. The Lone Butte WWTP, located on the Gila River Indian Community, also receives flow from the westernmost portion of Chandler.

As mentioned previously, some of the lift stations have been abandoned due to recent collector/interceptor improvements. Most of these are associated with improvements to the Pecos-McQueen Interceptor. A lift station at Frye Road and the Gila drain has been abandoned for a lift station at Pecos Road and the Gila Drain which serves a larger area. A lift station on Riggs Road between Alma School Road and Arizona Avenue conveys flows to the Ocotillo WRP via a 12-inch force main discharging to a 27-inch sewer. A lift station at Ray Road serves the northeast portion of the City and discharges to the Price Road Interceptor.

Planned for future construction is a diversion structure at Pecos Road and McQueen Road. This structure will ultimately divert flows to a new water reclamation facility located in the vicinity of Chandler Airport.

Existing Treatment System. Two treatment plants currently serve all of the wastewater flows from the Chandler wastewater service area. The Ocotillo WRP has a capacity of 5 mgd and is located south of Queen Creek and Price Roads. The Lone Butte WWTP is located on the Gila River Indian reservation 3 miles southwest of Interstate 10 and Pecos Road; it can treat 10 mgd.

The Ocotillo WRP, a tertiary treatment plant performing the activated sludge process, is operated by Parsons Municipal Services, Inc. for the City of Chandler. Under an agreement made in 1985, Chandler is required to deliver most of the effluent to the Ocotillo Group. Chandler receives 10 percent of the effluent until 1995 and 20 percent thereafter. Sludge produced at the Ocotillo WRP is landfilled at the municipal landfill. The City of Chandler plans to enter an agreement for sludge removal.

The other wastewater treatment facility, the Lone Butte WWTP, is located on the Gila River Indian Community (GRIC). Unit processes include bar screening, aeration lagoons, rapid sand filtration and chlorination. Sludge is collected in lagoons. Effluent is used for irrigation at the Lone Butte Ranch.

There is one small privately-owned treatment facility in Chandler. The Sunshine Mobile Home Park operates a 100,000 gpd facility.

Future Wastewater Collection. Projected populations and wastewater flows dictate a need for expansion of the current wastewater system through the year 2010. Expansions include new interceptors, force mains, diversion structures, and reclamation plants.

The first phase of interceptor expansion and modification from 1990 to 1995 involves south central Chandler: the area from Pecos Road to Ocotillo Road. A diversion structure, scheduled for future construction, will divert flows from the northeast portion of Chandler south to a new WRP in the vicinity of Chandler Airport (WRP #2). This new interceptor will require an inverted siphon under the Santan Freeway. Other inverted siphons will be constructed under the Santan Freeway alignment for the Pecos-McQueen Interceptor, the Price Road interceptor and the Pecos-Kyrene interceptor.

Expansion of the collection system to the south and east is expected from 1995 to the end of the planning period with major interceptors along Riggs Road and Ocotillo Road.

In addition to development of new interceptors and inverted siphons, some of the lift stations will be upgraded. The lift station at Pecos Road and the Gila Drain and at Price and Ray Roads will be expanded to accommodate parallel sewers. The increase in flows in the west Chandler area are projected to exceed the capacity of the Lone Butte outfall by year 2005.

Several options have been presented to accommodate the excess flow. The Wastewater Master Plan update of July 1988 recommends an equalization facility to handle peak flows. The Task 10 Memorandum prepared as part of Chandler's 1989 Water Resources Plan recommended either a reclamation plant at Pecos and Kyrene Roads, a pump station and diversion structure to redirect flows to the Ocotillo WRP, or a relief sewer to the Lone Butte plant. According to the memorandum, the pump station and diversion structure is the least-cost alternative.

Future Wastewater Treatment. Current projections predict wastewater flows beyond the capacities of the Lone Butte WWTP and the Ocotillo WRP. To accommodate these flows, Chandler plans to build two new WRP's and expand the Ocotillo Plant. The Lone Butte WWTP is not planned for expansion beyond the current 10 mgd capacity.

Previous studies have described preliminary plans for a WRP at Pecos Road and Kyrene Road. The plant would be sized for 11 mgd which should handle flows for the duration of the planning period. Unit processes include screening and grit removal, primary clarification, aeration, secondary clarification, filtration and disinfection. Effluent would be used for irrigation of golf courses and parks.

The Ocotillo WRP is planned for expansion to an ultimate capacity of 35 mgd. The first phase expansion is planned to increase the plant's capacity to 10 mgd. The second phase expansion will increase the capacity to 20 mgd.

Two new reclamation plants are to be constructed in the southern portion of Chandler. The first new plant, referred to as WRP #2, will be located in the vicinity of Chandler Airport. The initial phase calls for a 5 mgd capacity with ultimate expansion to 20 mgd. Until this WRP is on-line, flows will be pumped back to the Ocotillo WRP. The second new plant would be located about 3 miles south of WRP #2 along the Southern Pacific Railroad. This plant is not expected to be built until 2010. Unit processes have not been identified, but is should be noted that Chandler plans for zero discharge, which may require advanced treatment.

Summary of Wastewater System Improvements

Item	Estimated Cost[1]
1990-1995	
Collection System Improvements	
Water Reclamation Plant No. 2, pump-back system	
	$ 6,700,000
1996-2000	
Collection System Improvements	
Ocotillo WRP Expansion to 10 mgd	
Reclamation Plant No. 2, Phase I, (5 mgd)	
	43,200,000
2000-2010	
Collection System Improvements	
Ocotillo WRP Expansion to 20 mgd	
Kyrene and Pecos WRP (11 mgd)	
	77,000,000
Total	$126,900,000

[1]All costs are in August 1990 dollars (ENR Construction Cost Index = 4,750).

4.5.5.3 Gilbert

The planning area for the Town of Gilbert consists of MAG Districts 92, 93, and 98. It is depicted in Figure 4-20. The Town of Gilbert is the designated wastewater management agency for this area. The area is approximately bounded by Baseline Road to the north, Power Road to the east and the City of Chandler on the west and south.

Population and Flow Projections. The Town of Gilbert expects rapid growth over the duration of the planning period. Currently, the majority of the population resides in the northwestern half of the town. Most of the Town is sewered but a portion is served by septic tanks. Also, a small portion of northwestern Gilbert is served by the City of Mesa. This study applies the 1992 MAG-adopted population projections and a unit wastewater flow of 100 gpcd. Table 4-28 depicts population and wastewater flow projections through the planning period.

TABLE 4-28
GILBERT
POPULATION AND FLOW PROJECTIONS

Year	Population	Flows (mgd)
1990	36,289	3.63
1995	52,634	5.26
2000	99,995	10.00
2005	126,868	12.69
2010	158,499	15.85

Existing Collection System. The existing collection system provides service to all areas north of Ray Road and west of Greenfield Road. The majority of flows are collected in an interceptor mid-section line between Guadalupe and Elliott Roads. A lift station on the east side of the Southern Pacific Railroad spur pumps flow east via an 18-inch force main to the existing facility at Neely Street. Flows from the east are conveyed by gravity. A second lift station on Cooper Road north of Warner Road assists flows from the southern reaches of the service area and discharges to a 42-inch interceptor along Cooper Road. Flows to the north are collected east of the Consolidated Canal, and along Houston Avenue and Neely Road.

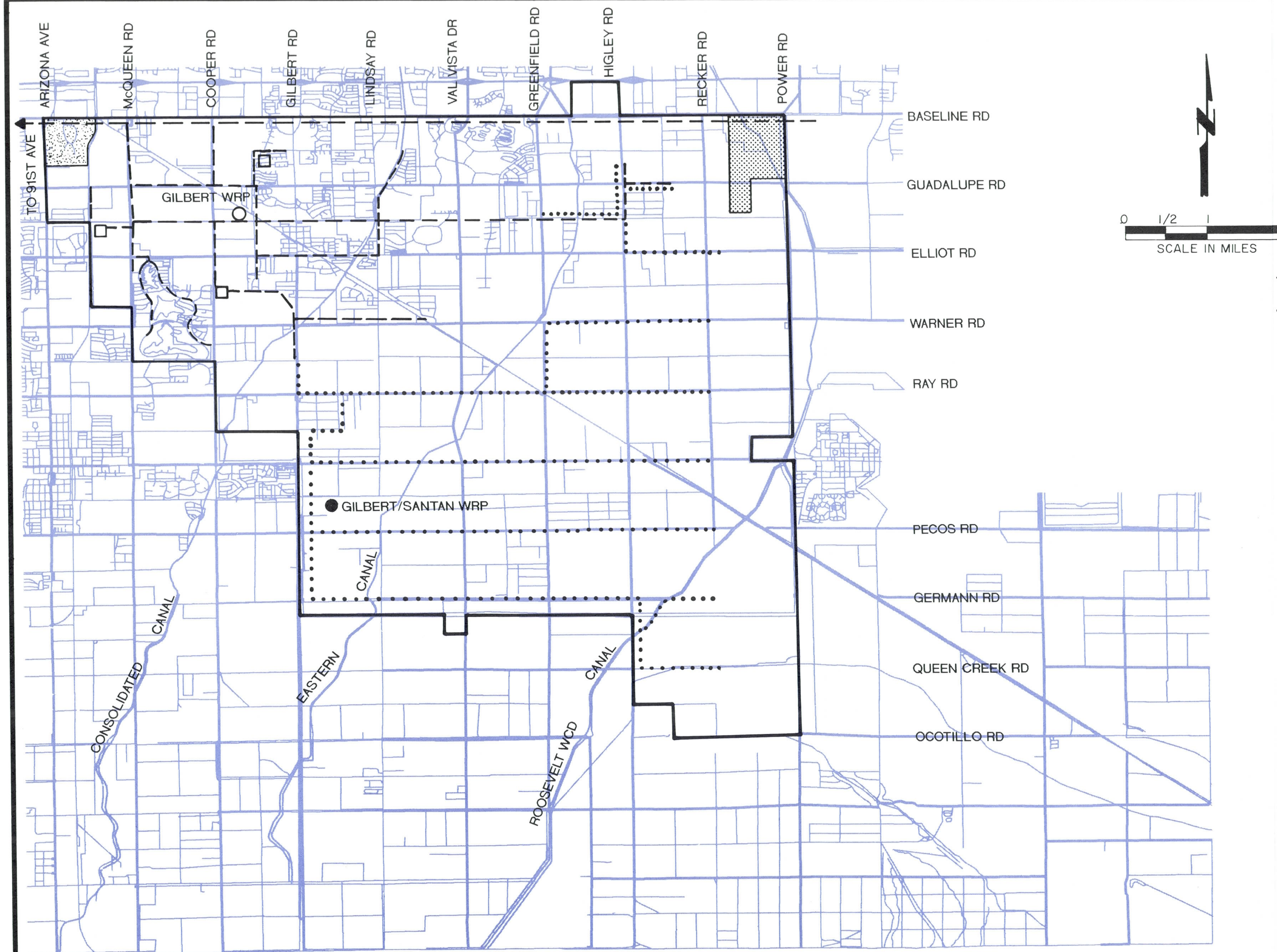


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FIGURE 4-20

Existing Treatment System. The existing wastewater treatment facility is a 5.5-mgd water reclamation plant located on Neely Road. It has a peak capacity of 7.0 mgd. Unit processes include: oxidation ditches, secondary clarifiers, filtration, and chlorination. Effluent is reused for irrigation of landscaping at Freestone Park. Reclaimed water that cannot be reused directly at Freestone Park is recharged in percolation ponds next to the WRP as an underground storage and recovery project. Sludge is pumped along Cooper Road and discharged in Mesa to the Baseline Road Interceptor (BRI) for treatment at the 91st Avenue WWTP.

Future Wastewater System Development. The Town of Gilbert plans to extend the existing collection system to meet expected growth patterns. Most of the near future expansion will be toward the east while expansion of the southern region of the wastewater planning area is not expected until the latter part of the planning period.

The first expansion of the collection system includes extension of the major interceptor along the Western Canal alignment to branches along Guadalupe and Elliott Roads. The next phase is primarily the construction of interceptors along Warner and Ray Roads, with a temporary lift station at Ray Road about a 1/2 mile east of Gilbert Road. This lift station will deliver to the existing WRP location until a new WRP is on line. The last phase in the planning period includes constructing interceptors along Williams Field, Pecos, and Germann Roads discharging to a north-south interceptor along Gilbert Road.

The capacity of the existing WRP should be adequate until 1995. There is room for expansion to 11 mgd at the site, which would accommodate flows through the year 2000. The Town will most likely obtain reuse permits and continue to develop its effluent distribution system. Approximately nine miles of reclaimed water mains are now installed or planned for the near future. The Town will likely be expanding its sludge handling capacity at 91st Avenue.

In the later stages of the planning period, flows will exceed the available 11 mgd capacity. A second WRP is planned to be built at Gilbert Road north of the Santan Freeway. This plant will have an initial capacity of 6 mgd with facilities for another 6 mgd expansion when needed. At this time the temporary lift station would be abandoned. Effluent will be reused and sludge could be landfilled or reused for agriculture.

Summary of Proposed Improvements

Item	Estimated Cost[1]
New Interceptors	$19,720,000
Gilbert WRP Expansion to 11 mgd	6,060,000
New WRP (6 mgd)	18,380,000
Temporary Lift Station	1,050,000
Solids Handling at 91st Avenue WWTP	11,290,000
Effluent Distribution System	1,880,000
	$58,380,000

[1]All costs are in August 1990 dollars (ENR Construction Cost Index=4750).

4.5.5.4 Mesa

Wastewater collection and treatment service is provided by the City of Mesa. In 1987, Mesa completed a Wastewater Master Plan Update. The document updated Mesa's needs for wastewater collection and treatment and provided a plan for distribution of reclaimed effluent. The Mesa planning area covers approximately 164 square miles, and is depicted on Figure 4-21. It is generally bounded by the Salt River Indian Reservation on the north; the Maricopa County line on the east; the Western Canal (from Price Road to Country Club Drive), Baseline Road (from Country Club Drive to Power Road) and Germann Road (from Power Road to the Maricopa County line) on the south; and by the City of Tempe (from the Western Canal to the Salt River) and Power Road (from Germann Road to Baseline Road for the southeastern section of the Planning Area) on the west. The Planning Area includes all the incorporated City of Mesa (including Williams AFB), corresponding to MAG Districts 74, 75, 76, 77, 80, 81, 82, 90, 99, and 100. The City of Mesa is the designated wastewater management agency for this area. In addition, there are two sources of flow from outside the Planning Area; the Gilbert sludge line connected to the Baseline Road Interceptor (BRI) at Stapley Road and an approximate half square mile light industrial/commercial area east of Country Club Drive and south of Baseline Road in Gilbert.

Population and Flow Projections. Significant growth is projected to continue in Mesa. It is expected that all development within the boundaries of the service area

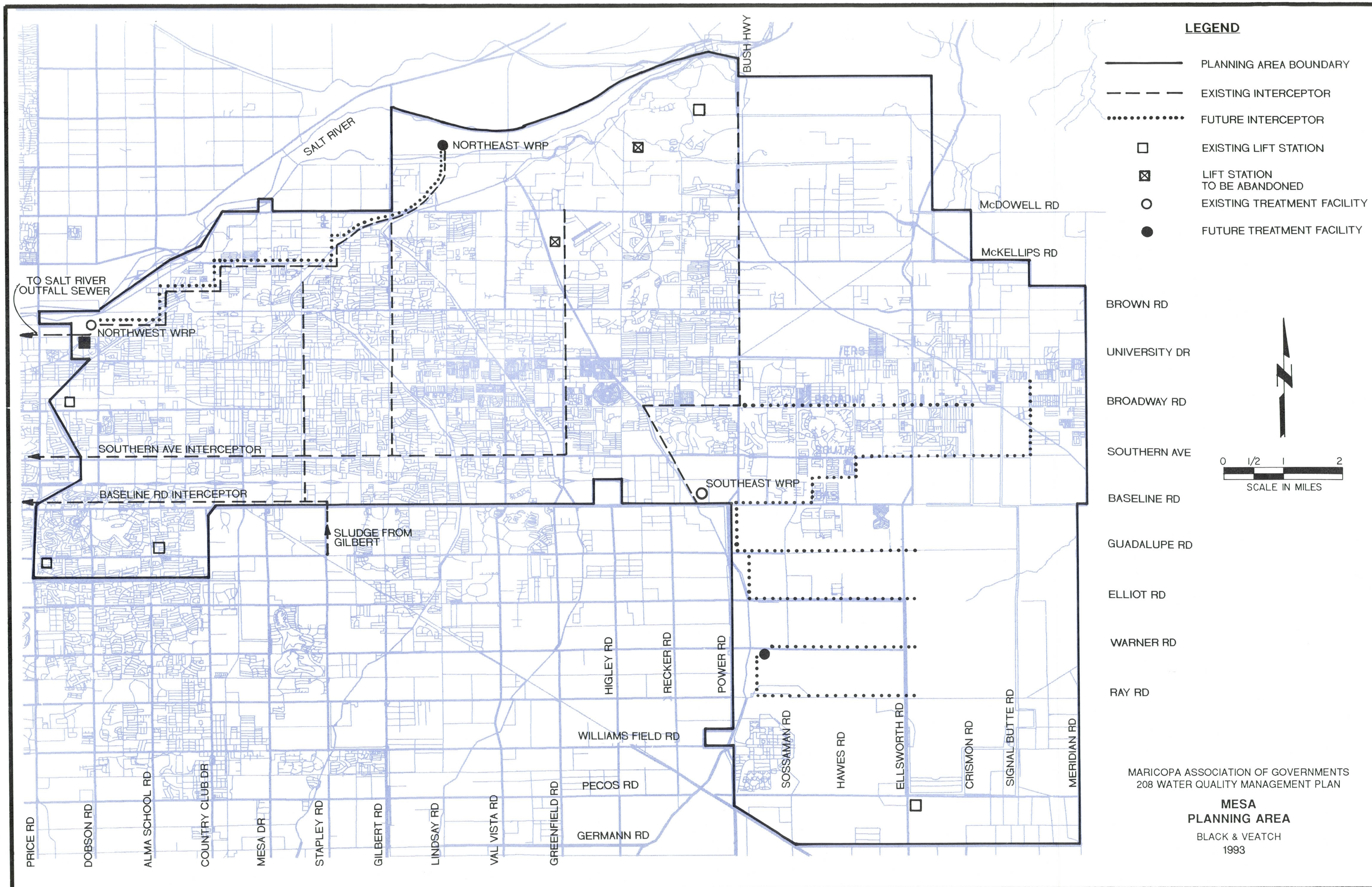
LEGEND
PLANNING AREA BOUNDARY
EXISTING INTERCEPTOR
FUTURE INTERCEPTOR
EXISTING LIFT STATION
LIFT STATION TO BE ABANDONED
EXISTING TREATMENT FACILITY
FUTURE TREATMENT FACILITY
SALT RIVER
BUSH HWY
NORTHEAST WRP
NORTHWEST WRP
SOUTHEAST WRP
TO SALT RIVER OUTFALL SEWER
SOUTHERN AVE INTERCEPTOR
BASELINE RD INTERCEPTOR
SLUDGE FROM GILBERT
McDOWELL RD
McKELLIPS RD
BROWN RD
UNIVERSITY DR
BROADWAY RD
SOUTHERN AVE
BASELINE RD
GUADALUPE RD
ELLIOT RD
WARNER RD
RAY RD
WILLIAMS FIELD RD
PECOS RD
GERMANN RD
PRICE RD
DOBSON RD
ALMA SCHOOL RD
COUNTRY CLUB DR
MESA DR
STAPLEY RD
GILBERT RD
LINDSAY RD
VAL VISTA RD
GREENFIELD RD
HIGLEY RD
RECKER RD
POWER RD
SOSSAMAN RD
HAWES RD
ELLSWORTH RD
CRISMON RD
SIGNAL BUTTE RD
MERIDIAN RD
0 1/2 1 2
SCALE IN MILES
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FIGURE 4-21

will receive sewerage service provided by the City. Table 4-29 presents the population and flow projections based on current MAG population projections adopted in 1992 and a 90-gpcd unit flow.

TABLE 4-29
MESA
POPULATION AND FLOW PROJECTIONS

Year	Population	Flow, mgd
1990	353,491	31.81
1995	385,334	34.68
2000	447,073	40.24
2005	483,346	43.50
2010	506,800	45.61

Existing Collection System. The Planning Area is presently served by the City of Mesa municipal wastewater collection system which consists of more than 980 miles of collection and interceptor sewers.

The major interceptors serving Mesa include the multi-city Subregional Operating Group (SROG) Southern Avenue Interceptor (SAI), Baseline Road Interceptor (BRI), and Baseline Road Relief Interceptor (BRRI), and a bypass of the Northwest Water Reclamation Plant (WRP). These interceptors convey wastewater from Mesa through Tempe to the Salt River Outfall (SRO), the SAI and eventually to the 91st Avenue WWTP. The Cities of Tempe, Scottsdale and Phoenix also own capacity in the SRO and SAI. A total of 40 mgd average conveyance capacity is owned by the City of Mesa in the SRO and SAI upstream of the 91st Avenue WWTP, except for a segment of those interceptors between the intersection of 59th Avenue and Broadway Road and the intersection of 47th Avenue and Lower Buckeye Road, where the City-owned capacity is 24.8 mgd.

Portions of the collection system include three private sewer systems which have been purchased by the City of Mesa. These three systems are:

- Raecrest Water and Sewer Company
- Apache Sanitation

- Turner Ranches Water and Sanitation Company

A separate sewer system and WWTP serves the four square mile Williams Air Force Base. The design capacity of the WWTP is 1.0 mgd. The facility has a NPDES permit. Effluent is presently used for irrigation of the Williams Golf Course. The City may acquire these facilities in the future.

Existing Treatment System. The City of Mesa owns and operates the Southeast Water Reclamation Plant (WRP) which has a capacity of 4.0 mgd, and the 8 mgd Northwest WRP. Mesa also owns 26.97 mgd capacity of the current 153.75 mgd wastewater treatment capacity at the Multi-City Subregional Operating Group (SROG) 91st Avenue WWTP located in west Phoenix.

Effluent from the Southeast WRP is used for turf irrigation while effluent from the Northwest WRP is used for aquifer storage and recovery. The City of Mesa has individual effluent reuse permits for each reclamation plant. Residuals from each plant are conveyed through the existing collection system to the 91st Avenue WWTP for processing. Capacities and facilities at each reclamation plant are summarized below:

<u>Northwest WRP</u>

- Capacity: 8 mgd.
- Bar screens.
- Primary sedimentation.
- Activated sludge with nitrification and denitrification.
- Secondary sedimentation.
- Chlorine disinfection.
- Dual media filtration.
- Groundwater recharge basins.

<u>Southeast WRP</u>

- Capacity: 4 mgd.
- Communitors.
- Primary sedimentation.

- Biotowers.
- Solids contact basins.
- Secondary sedimentation.
- Chlorine disinfection.
- Dual media filtration.

Future Wastewater System Development. The City of Mesa is implementing the improvements recommended in the 1987 Master Plan Update.

Future collection system improvements will include various sewers in currently undeveloped areas and relief sewers in developed areas. The new lines will extend service and increase existing capacities. The Master Plan Update presents recommended sewer construction in five phases between 1987 and 2035.

Based on the 1987 Master Plan Update and current population projections, future wastewater treatment capacity will be provided by the existing multi-city 91st Avenue WWTP, the Southeast WRP, and the Northwest WRP, and the new Northeast and South WRP's. Recommended capacities through the planning period are summarized below:

Treatment Plant	Capacity, mgd
91st Avenue WWTP capacity	26.97
Northwest WRP	16.0
Southeast WRP	12.0
Northeast WRP	8.0
South WRP	8.0

Effluent from the Northwest WRP, and new Northeast and South WRP's will primarily be used for aquifer storage and recovery. Effluent may also be used directly for turf irrigation. The Southeast WRP may also be upgraded for aquifer storage and recovery in the future. Mesa will need to obtain effluent reuse permits for each new facility. Residuals from each plant will be returned to the collection system and processed at the 91st Avenue WWTP.

Reclaimed Water Distribution System. Effluent from Mesa's water reclamation plants will be reused for turf irrigation at golf courses and parks throughout Mesa. In addition, aquifer storage and recovery projects will be located at the Northwest WRP, Northeast WRP, and at a site in the Queen Creek area. The

1987 Master Plan Update presents recommendations for implementing a reclaimed water distribution system in five phases between 1987 and 2035.

Currently, the City of Mesa is reevaluating the need for a reclaimed water distribution system, and has postponed construction of the system while the evaluation is performed. By demonstrating a sufficiently large hydrogeologic impact area, the City could rely totally on the aquifer storage and recovery projects with recovery of the reclaimed water being made through existing groundwater wells.

Summary of Proposed Wastewater System Improvements

Item	Estimated Costs[1]
1996-2000	
Southeast WRP expansion from 4 mgd to 8 mgd	8,540,000
Northeast WRP (4 mgd initial capacity)	17,080,000
2000-2010	
South WRP (8 mgd initial capacity)	24,550,000
Northeast WRP expansion from 4 mgd to 8 mgd	10,670,000
Northwest WRP expansion from 8 mgd to 16 mgd	17,080,000
Southeast WRP expansion from 8 mgd to 12 mgd	8,540,000
Total	$86,460,000

[1]Costs have been adjusted to August 1990 levels (ENR Construction Cost Index = 4750)

Contract Customer Service. In addition to wastewater collection and treatment for the Mesa service area, the City may provide service to contract customers. Mesa has an agreement with the Town of Gilbert to convey residual solids from Gilbert's wastewater treatment facilities to the 91st Avenue WWTP, through the Baseline Road Interceptor and Southern Avenue Interceptor. At this time, there are two potential contract customers: the City of Apache Junction and the Town of Queen Creek may convey flow to the Southeast and South WRP's, respectively. Queen Creek is currently seeking an Intergovernmental Agreement with Mesa specifically for the purpose of wastewater treatment.

4.5.5.5 Queen Creek

The planning area for Queen Creek is composed of the incorporated limits of the Town, corresponding to MAG District 116 as depicted on Figure 4-22.

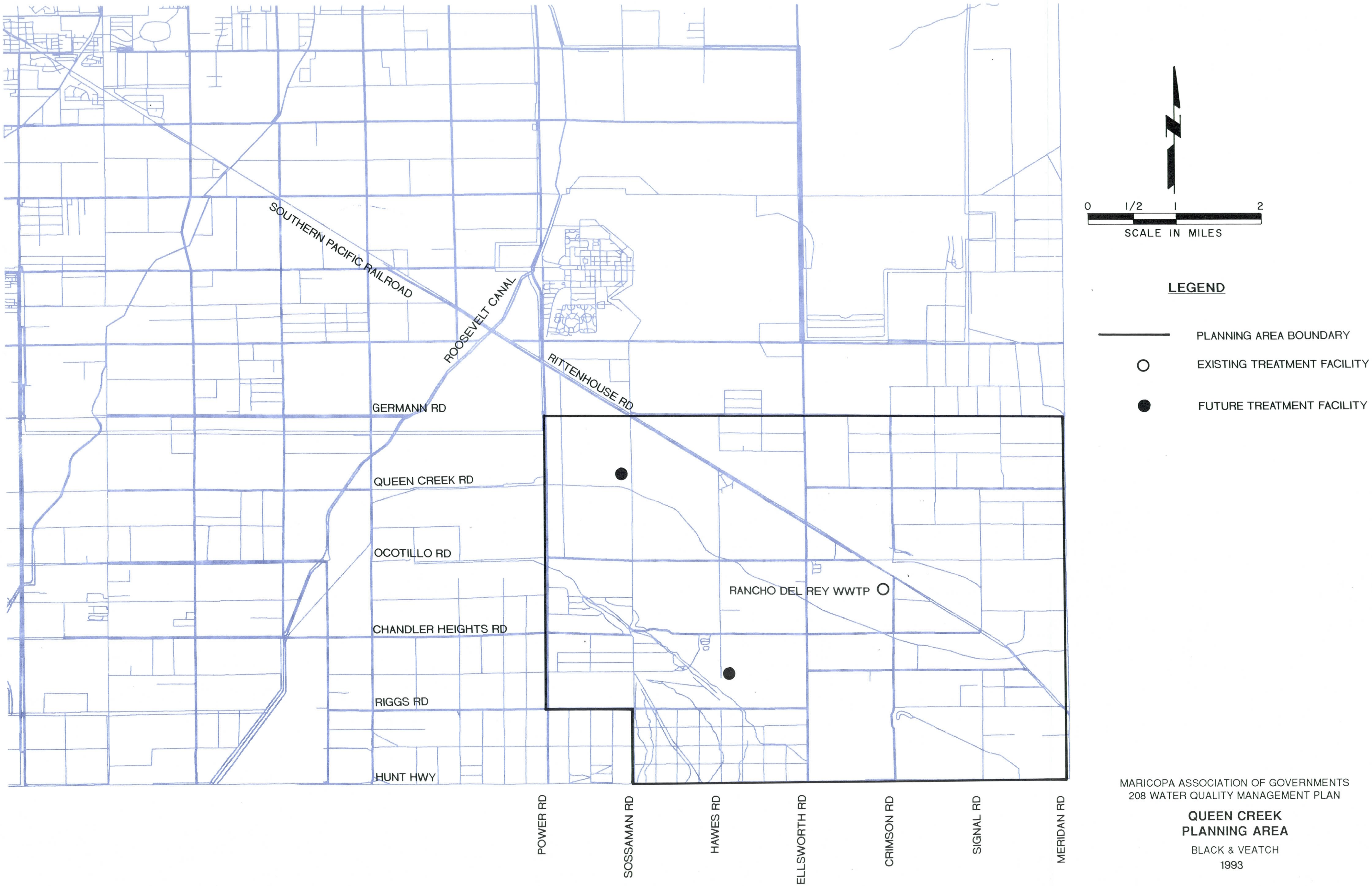

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FIGURE 4-22

At present, there is no wastewater collection system nor any treatment facilities in Queen Creek with exception of a privately-owned 20,000 gpd treatment facility serving the Rancho Del Rey subdivision and the 20,000 gpd treatment facility at the Arizona Boys' Ranch. The Town plans to ultimately develop a wastewater system.

Population and Flow Projections. The Town of Queen Creek has not yet experienced significant urban development, although several large developments have been proposed at the planning level. The 1992 MAG-adopted population projections for Queen Creek, as well as wastewater flow projections, are presented in Table 4-30. Flow projections are based on a per capita flow of 100 gpcd.

TABLE 4-30
QUEEN CREEK
POPULATION AND FLOW PROJECTIONS

Year	Population	Flow mgd
1990	3,236	0.32
1995	3,385	0.34
2000	3,546	0.35
2005	3,728	0.37
2010	3,924	0.39

Future Wastewater System Development. As urban development of Queen Creek occurs, the development will be served by wastewater collection systems. The configuration of the collection system will be determined by the size and location of the developments.

It is planned that the collection system will developed in three separate zones, each with a network of sewers and a treatment facility or provisions for treatment elsewhere. Collector sewers will be constructed along one mile section line roads with laterals extending into developments in the individual sections. Zone 1 will be located in the western part of the Town and includes the Town Center and portions of Queen Creek located southwest of the Southern Pacific Railroad. The wastewater treatment plant site is planned to be near the intersection of Sossaman and Queen Creek Roads, because it is the low elevation area in Queen Creek and lends itself best to a gravity sewer system.

Zone 2 will consist of the southwestern section of Queen Creek. Sewers will be constructed to convey wastewater generally south and west to a planned treatment plant site located on the east side of Hawes Road approximately one-half mile south of Chandler Heights Road.

Zone 3 will be located in the northeast section of Queen Creek, east of Ellsworth Road and northeast of the Southern Pacific Railroad. It is tentatively planned that the sewage generated by Zone 3 will be collected at Ellsworth and Germann Roads and pumped north to Mesa for treatment if this is feasible to both cities. This approach is dependent upon the City of Mesa having capacity in its existing 10-inch force main and construction of an additional force main as Zone 3 develops. In the event an Intergovernmental Agreement (IGA) cannot be initiated with the City of Mesa, a satellite wastewater treatment plant will be constructed for wastewater generated by the area.

Depending on the time of development and collection system construction, individual developers may want to connect to the Town system or install a temporary treatment facility and connect to the Town system at a later date. Individual sewer mains or treatment facilities have not been sized.

Effluent generated from the zone treatment plants could be utilized by the Town in the following manner:

- Sell to developers or homeowners' associations for irrigation of golf course or park areas.
- Irrigate public park and/or greenbelt areas.
- Construction of injection wells to recharge groundwater.
- Sell effluent to surrounding communities.
- Apply for an NPDES permit and discharge to Queen Creek and Samokai Washes.

Summary of Wastewater System Improvements. Costs presented below are based on the assumption that Queen Creek's wastewater will be treated at a new treatment plant. The cost of increased capacity within a Mesa treatment plant cannot be determined until the proposed idea is developed in further detail.

Item	Estimated Cost[1]
WRP Phase I (0.75 mgd)	$5,320,000
WRP Phase II (1.50 mgd)	2,250,000
	$7,570,000

[1]August 1990 Dollars (ENR Construction cost Index = 4750).

4.5.5.6 Tempe

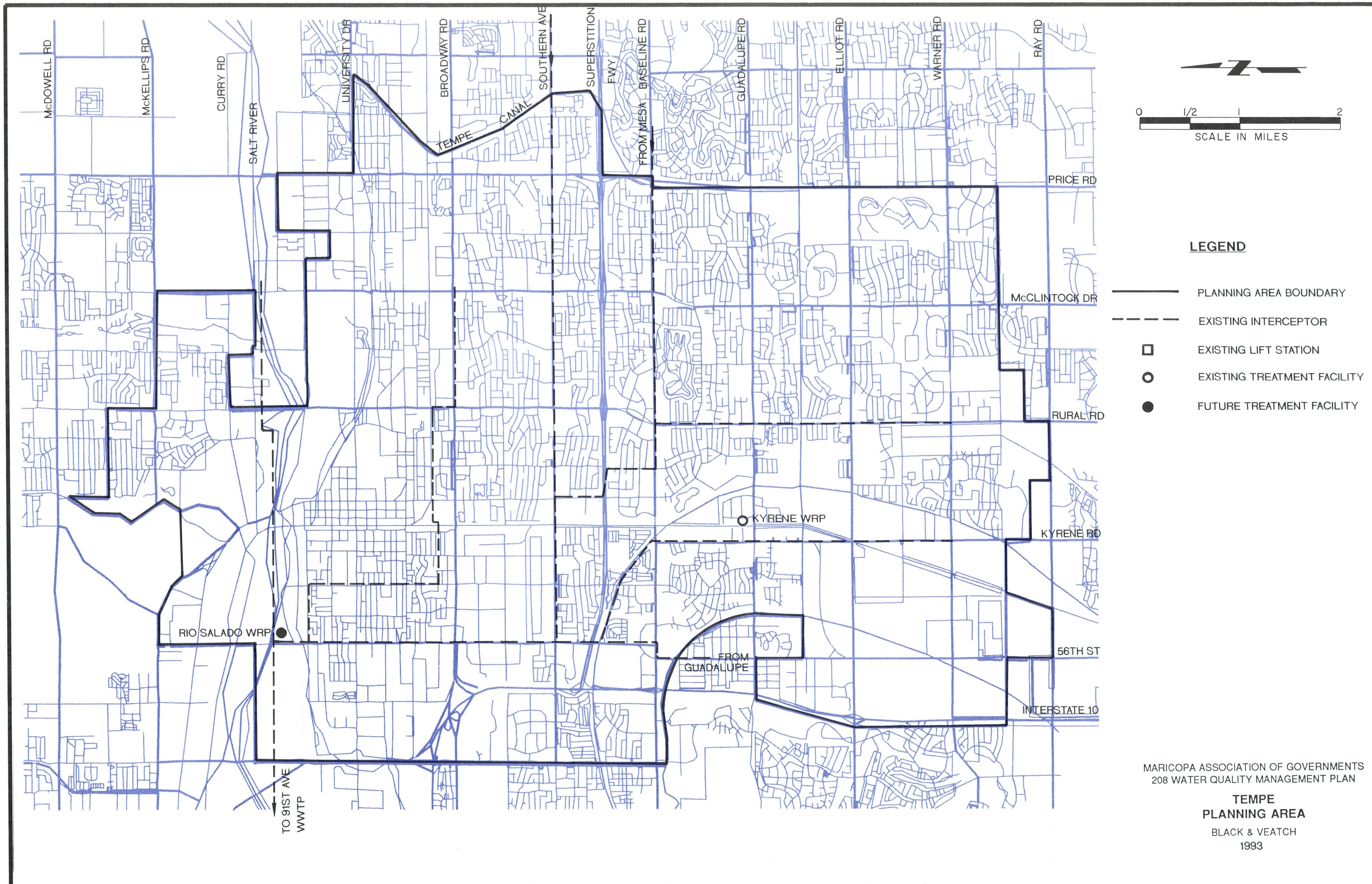
The planning area for Tempe consists of the incorporated City. The City of Tempe is the designated wastewater management agency for this area. Tempe provides wastewater collection and treatment service to all development in the City. Because Tempe is completely surrounded by other incorporated cities, the service area will not increase in size in the future. Tempe also provides wastewater treatment to the Town of Guadalupe on a contract basis. Figure 4-23 depicts the Tempe planning area.

Population and Flow Projections. Table 4-31 presents the current MAG population projections (adopted 1992) for Tempe and Guadalupe.

TABLE 4-31
TEMPE AND GUADALUPE
POPULATION PROJECTIONS

Year	Tempe	Guadalupe	Total
1990	149,692	5,663	155,355
1995	167,477	5,751	173,228
2000	175,703	5,921	181,624
2005	180,961	6,080	187,041
2010	185,199	6,099	191,298

In addition, the City of Tempe system serves Arizona State University (ASU). Based on discussions with the University, ASU has approximately 5,000 resident students, with total enrollment in 1990 of approximately 43,000. Wastewater flow contributed by ASU has been estimated by an ASU metering study at 304 million gallons per year, or 0.832 mgd.



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TEMPE PLANNING AREA

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FIGURE 4-23

Table 4-32 presents flow projections developed by the City for the Tempe wastewater system, including flows from ASU and Guadalupe.

TABLE 4-32
TEMPE WASTEWATER SYSTEM
FLOW PROJECTIONS

Year	Total Projected Flow mgd
1990	21.9
1995	24.1
2000	25.1
2005	25.7
2010	26.2

Existing Collection System. Tempe, Guadalupe, and ASU each operate individual wastewater collection systems. The major components of the Tempe system are complete. No new interceptors are planned. Future development of the Tempe collection system will mostly consist of constructing local sewers to serve new developments as they are built. Some changes will be necessary to divert flows to the new water reclamation plants (discussed below). There are four pumping stations in the Tempe system all of which have adequate capacity for ultimate flows.

Existing Wastewater Treatment. Tempe is a member of the Multi-City Subregional Operating Group (SROG) and currently obtains a substantial portion of its wastewater treatment at the SROG's 91st Avenue wastewater treatment plant (WWTP). Tempe owns 17.28 mgd of treatment capacity at the 91st Avenue WWTP. Tempe's Kyrene Water Reclamation Plant (WRP) is located near the intersection of Kyrene and Guadalupe Roads. The Kyrene WRP treats wastewater generated in southern Tempe. The initial 3 mgd treatment plant entered service in 1991.

Future Wastewater System Development. To treat wastewater in excess of its flows to SROG facilities, Tempe will construct local water reclamation plants as set forth in the City's approved 1986 208 Plan Amendment. Projections of flows to be treated at the various treatment plants are presented in Table 4-33.

TABLE 4-33
TEMPE WASTEWATER SYSTEM
PROJECTED FLOW ALLOCATIONS TO WWTPs

Year	SROG Facilities, mgd[1]	New WRPs, mgd[1]	Total
1990	21.9	-0-	21.9
1995	21.1	3	24.1
2000	16.1	9	25.1
2005	16.7	9	25.7
2010	15.2	9	26.2

[1]Annual average daily flows. Peak irrigation season demands may necessitate additional WRP capacity.

The Kyrene WRP will be expanded to an ultimate capacity of 6 mgd as flows increase in the future. A second WRP, the Rio Salado WRP, is currently under design study. The initial 6 mgd treatment facility is planned to enter service in 1998. The Rio Salado WRP will receives wastewater diverted from the Priest Road and First Street sewers. The Rio Salado WRP will be expanded to 15 mgd ultimate capacity in the future as demands for reclaimed water increase. For both WRP's treatment capacity will be significantly influenced by seasonal peak demands for reclaimed water.

Both the Kyrene and Rio Salado WRP's will perform similar unit processes: screening and grit removal, activated sludge, nitrification/denitrification, chemical coagulation, secondary clarification, filtration, and ultraviolet disinfection.

The Kyrene WRP has obtained an effluent reuse permit and an NPDES permit. Tempe plans to apply for NPDES, effluent reuse, and aquifer protection permits for the Rio Salado WRP.

Reclaimed water produced by both plants will be used for turf irrigation and aquifer storage and recovery. Potential reuse sites are parks, recreational facilities, golf courses, freeway greenbelts, school grounds, and possibly in a reclaimed water distribution system which may be constructed in currently undeveloped portions of Tempe.

Residual solids and sludge from the WRPs will be discharged into the SROG system and conveyed to the 91st Avenue WWTP. Future improvements of the collection system will consist of extending branch lines to newly developing areas within the City limits, and modifications to divert flow to the new WRPs.

Summary of Proposed Wastewater System Improvements

Item	Estimated Cost[1]
Kyrene WRP expansion to 6 mgd	$8,000,000
Rio Salado WRP; first phase, 6 mgd	25,000,000
Total	$33,000,000

[1]August 1990 costs (ENR Construction Cost Index = 4750).

4.5.6 Multi-City SROG Summary

The Sub-Regional Operating Group (SROG) was formed by a joint exercise of powers agreement in 1979 (Agreement No. 22699). The SROG is operated by six member communities: the Cities of Glendale, Mesa, Phoenix, Scottsdale, Tempe, and the Town of Youngtown. The SROG provides wastewater treatment for its member communities at the 91st Avenue wastewater treatment plant (WWTP). In addition, some communities which are not SROG members discharge various flows into the SROG system. The Town of Gilbert sold its purchased SROG capacity to Mesa in 1981; but continues to discharge sludge to the SROG facilities through the Mesa collection system. The Town of Paradise Valley is not a SROG member, but is served by the cities of Phoenix and Scottsdale and ultimately by SROG facilities. Similarly, the Town of Guadalupe is served by the City of Tempe and ultimately by SROG facilities. The City of Phoenix acts as the lead agency, and acting as permittee or applicant, is responsible for compliance with all environmental permits and federal controls. The City of Phoenix is also responsible as lead agency for the construction, operation, maintenance, and replacement of the 91st Avenue wastewater treatment plant and appurtenant facilities. The City of Phoenix also operates the 23rd Avenue WWTP, but this serves only the City of Phoenix and is not a SROG facility.

The service area includes all of the wastewater service areas of the six member communities. The SROG provides service for most of these areas except for the 23rd Avenue WWTP service area, a few areas served by septic tanks, and flows treated by the member cities' local water reclamation plants (WRP's). In the past, flows received at the 23rd Avenue WWTP exceeding the plant's capacity were bypassed through the Salt River outfall sewer to the 91st Avenue WWTP. This is not expected to continue after the current expansion project at 23rd Avenue is completed. Table 4-34 depicts populations served by the 91st Ave SROG facility and expected annual average flows, adjusted for planned local WRP's.

TABLE 4-34
PROJECTED SROG SERVICE POPULATIONS AND FLOW, mgd

Community	1990	1995	2000	2005	2010
Mesa					
Population	353,491	385,334	447,073	483,346	506,800
Total Flow, mgd	31.81	34.68	40.24	43.50	45.61
Local WRP/WWTP Flow	(4.00)	(12.00)	(16.00)	(20.00)	(44.00)
91st Ave. WWTP Flow, mgd	27.81	22.68	24.24	23.50	1.61
Glendale					
Population[1]	155,392	184,127	222,425	246,227	266,026
Total Flow, mgd	15.54	18.41	22.24	24.62	26.60
Local WRP/WWTP Flow	(2.20)	(4.90)	(11.65)	(12.90)	(16.65)
91st Ave. WWTP Flow, mgd	13.34	13.51	10.59	11.72	9.95
Phoenix					
Population[2]	1,023,084	1,112,020	1,201,353	1,297,922	1,410,732
Total Flow, mgd	102.65	111.66	120.65	130.36	141.69
Local WRP/WWTP Flow	(38.04)	(58.14)	(61.27)	(64.61)	(68.43)
91st Ave. WWTP Flow, mgd	64.61	53.52	59.38	65.75	73.26
Scottsdale					
Population[3]	142,408	178,831	185,114	216,479	250,749
Total Flow, mgd	12.10	15.86	16.79	19.22	21.87
Local WRP/WWTP Flow	(2.16)	(6.66)	(11.16)	(11.16)	(15.66)
91st Ave. WWTP Flow, mgd	9.94	9.20	5.63	8.06	6.21
Tempe					
Population[4]	149,692	167,477	175,703	180,961	185,199
Total Flow, mgd	21.90	24.10	25.10	25.70	26.20
Local WRP/WWTP Flow	0	(3.00)	(9.00)	(12.00)	(12.00)
91st Ave. WWTP Flow, mgd	21.9	21.10	16.10	13.70	14.20

TABLE 4-34
PROJECTED SROG SERVICE POPULATIONS AND FLOW, mgd

Community	1990	1995	2000	2005	2010
Youngtown					
Population	2,795	2,843	2,883	3,019	3,046
Total Flow, mgd	0.25	0.26	0.26	0.27	0.27
Local WRP/WWTP Flow	0	0	0	0	0
91st Ave. WWTP Flow, mgd	0.25	0.26	0.26	0.27	0.27
TOTALS					
Total Population	1,819,854	2,021,177	2,224,486	2,417,155	2,611,111
91st Ave. WWTP Flow	137.85	120.27	116.20	123.00	105.50

1. Population and flow projection for Glendale/SROG excludes Luke Air Force Base.
2. Population projection for Phoenix only, excluding Town of Paradise Valley service area. Wastewater flow projections include a portion of Paradise Valley.
3. Population projection for Scottsdale only, excluding Town of Paradise Valley service area. Wastewater flow projections include a portion of Paradise Valley.
4. Population projection for Tempe/SROG excludes Guadalupe. Wastewater flow projections include Guadalupe.

Existing Treatment Facilities. The current capacity of the 91st Avenue facility is 153.75 mgd. This capacity is allocated among SROG members as shown in Table 4-35.

TABLE 4-35
SUBREGIONAL OPERATING GROUP (SROG)
CURRENT TREATMENT CAPACITY ALLOCATIONS

Community	Treatment Capacity, mgd
Phoenix	83.77
Glendale	13.20
Mesa	26.97
Scottsdale	12.27
Tempe	17.28
Youngtown	0.26
Total	153.75

Unit processes at the 91st Avenue WWTP include: screening, grit removal, primary sedimentation, fine-bubble aeration, secondary clarification, and chlorination.

The 91st Avenue WWTP at present also receives sludge from some non-SROG treatment facilities. The sludge is transported through the interceptor system to the treatment plant and is therefore mixed in the influent wastewater.

The EPA renewed the NPDES permit for the 91st Avenue WWTP in 1988. The new permit required biomonitoring of the plant's effluent. The City of Phoenix appealed the permit on behalf of the SROG, and the permit was revised by the EPA after the appeal. The EPA re-issued the NPDES permit for the 91st Avenue WWTP on December 29, 1991.

There are two contracts which provide for reuse of effluent generated at the 91st Avenue WWTP. The Palo Verde Nuclear Generating Station (PVNGS) has contract options for 140,000 acre-ft per year of effluent but has not exercised all of its options to the full extent. The PVNGS diverts flow at highly variable rates, and at times zero flow is diverted. During 1989, the PVNGS took 57,000 ac-ft of effluent. The second contract includes the Buckeye Irrigation District (BID) which may purchase 30,000 acre-ft per year under a contract that expires in year 2011. Effluent purchased by BID currently is discharged to the Salt River and diverted by BID. The capability exists, however, to divert the effluent to BID by pipeline. The 91st Avenue WWTP discharges all remaining flows to the Salt River that are not taken by the PVNGS and the Buckeye Irrigation District.

Residual solids from the 91st Avenue WWTP are dried and removed for agricultural re-use by a privately owned company.

Future Treatment Facilities. New and pending regulations may significantly impact the 91st Avenue treatment plant. New Navigable Water Quality Standards may require upgrading of the 91st Avenue WWTP in order to meet limitations on chlorine and toxicity. Future permits based on the 1992 update to the Navigable Water Quality Standards will also affect operations at the 91st Avenue WWTP. The SROG is considering the possibility of complete reuse of the effluent to eliminate discharge to the river.

Current expansion and upgrade of the 23rd Avenue WWTP necessitates bypass of some wastewater flows to the 91st Avenue WWTP. Bypass of wastewater flow to the 91st Avenue WWTP will be discontinued except for emergencies after the 23rd Avenue WWTP upgrade is finished. Waste activated sludge from the 23rd Avenue WWTP will continue to be discharged to the 91st Avenue WWTP. Nonhazardous Liquid Waste (NHLW) will continue to be bypassed from the 23rd Avenue WWTP to the 91st Avenue WWTP.

The SROG members other than Phoenix are planning to construct small local treatment facilities, primarily water reclamation plants, to meet future wastewater flows in excess of their current SROG capacity allocation. These facilities will not be owned and operated by SROG.

Studies of residual solids management were recently completed. Preliminary indications are that the current practices for sludge treatment and disposal will remain in place. Solids from individual SROG community treatment facilities will continue to be accepted at the 91st Avenue WWTP for the foreseeable future.

The SROG member cities are discussing the possibility of creating a regional wastewater management agency. Such an agency must be established by legislation and would assume responsibility for operation and maintenance of SROG wastewater treatment and reclamation facilities.

Potential Costs. The NPDES permit issued on December 29, 1991, contains requirements that are more stringent than those included in the former permit. Such requirements will require modifications to the treatment process, including installing a nitrification/denitrification system. Costs for these upgrades could be as high as $30 million.

4.5.7 Outlying Areas

4.5.7.1 Gila Bend

Wastewater collection and treatment service is provided by the Town of Gila Bend. The Town of Gila Bend corresponds to MAG District 108. The Facility Plan prepared for the Town in 1977 proposed a planning area comprising the incorporated areas as well as an approximately one-mile wide unincorporated area around the

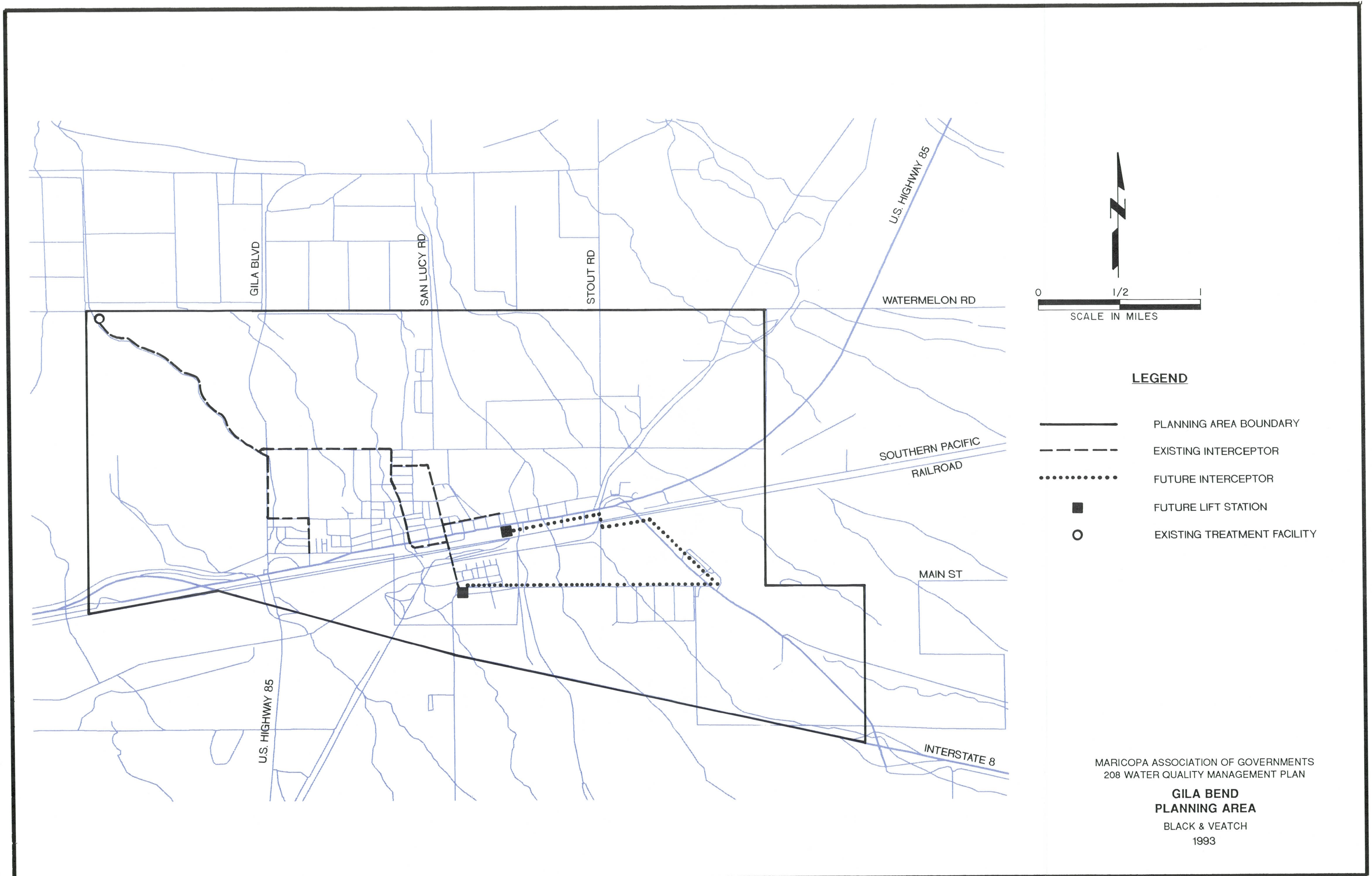
Town's periphery, which at present is sparsely inhabited. The planning area included the San Lucy Village on the Gila River Indian Reservation. However, San Lucy Village and Gila Bend have since decided to develop independent wastewater systems.

Also in the vicinity of Gila Bend is the Luke Air Force Base Auxiliary Field which is served by its own wastewater system and will remain independent of the Gila Bend municipal system.

The 1977 Facility Plan estimated that 90 percent of the municipal population is served by the collection system. The remaining population, located in outlying areas, is served by onsite septic tanks. It is expected that this will remain the case in the future. The Gila Bend wastewater planning area is depicted on Figure 4-24. The Town of Gila Bend is the designated wastewater management agency for this area.

Population and Flow Projections. Gila Bend has not experienced the rapid growth that has occurred in the Phoenix area. Because there is a limited amount of commercial/industrial development, the large majority of the flow received at the treatment plant is from residential sources. Infiltration and inflow were found to be insignificant in the 1977 Facility Plan.

Total and sewered populations as well as wastewater flows are projected in Table 4-36. The table assumes that 90 percent of the community as a whole is sewered. A unit flow of 100 gpcd is used for flow projections.


GILA BLVD
SAN LUCY RD
STOUT RD
U.S. HIGHWAY 85
WATERMELON RD
SOUTHERN PACIFIC
RAILROAD
MAIN ST
INTERSTATE 8
U.S. HIGHWAY 85
0
1/2
1
SCALE IN MILES
LEGEND
PLANNING AREA BOUNDARY
EXISTING INTERCEPTOR
FUTURE INTERCEPTOR
FUTURE LIFT STATION
EXISTING TREATMENT FACILITY
MARICOPA ASSOCIATION OF GOVERNMENTS
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GILA BEND
PLANNING AREA
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1993

FIGURE 4-24

TABLE 4-36
GILA BEND
POPULATION AND FLOW PROJECTIONS

Year	Planning Area Population	Sewered Population	Project Flow
1990	2,103	1,893	0.19
1995	2,443	2,199	0.22
2000	2,828	2,545	0.25
2005	3,217	2,895	0.29
2010	3,635	3,271	0.33

Average daily flow to the treatment plant during 1989 was metered at approximately 120,000 gpd according to Town staff.

The projected populations are considerably less than those in the 1977 Facility Plan, meaning that some improvements projected therein may not be necessary. It should also be noted that the Town is actively seeking a number of industries and facilities that could bring jobs and a more rapid population increase to Gila Bend. Some industries may also be water-intensive operations with the potential to discharge in excess of 100,000 gpd of wastewater. This would have a major impact on Gila Bend's wastewater system.

Existing Collection System. The Gila Bend collection system consists of gravity sewers of 10-inch and 8-inch diameter, plus one 12-inch trunk sewer conveying collected sewage 1-1/2 miles to the treatment plant. There is no pumping required in the collection system.

The adequacy of the collection system was reviewed in the 1977 Facility Plan. It was found that approximately 3 blocks of the "Southern Pacific Railroad" sewer were in need of replacement. Also, it was projected that a parallel relief sewer would be necessary to supplement the flow carrying capacity of the 12-inch trunk sewer for peak flows exceeding 1.35 mgd. Because projected flows have decreased, the need for this project during the next 20 years should be reevaluated. Other collection system projects planned for the future consist of extensions to serve previously unsewered areas. A pump station will be necessary for a portion of the area south of the Gila Bend Canal.

Existing Treatment System. The Gila Bend wastewater treatment plant consists of three contiguous stabilization lagoons constructed circa 1962, two of which are rectangular, operated in parallel with the third triangular lagoon acting as a final pond. Surface area of the lagoons totals approximately 11 acres. Although detailed drawings depicting the ponds' construction have not been available, it appears based on information received from the Town's files that one of the ponds is lined with bentonite. The other two ponds apparently are unlined. Although the Facility Plan found that the ponds met ADEQ process design criteria set forth in Bulletin 11, the Facility Plan identified that the ponds were producing effluent that did not meet the requirements of the NPDES permit in force at that time. In general, the ponds were producing effluent ranging from approximately 20 to 65 mg/l of BOD and widely varying concentrations of suspended solids. It is believed that the settled solids have never been removed from the ponds.

Effluent is taken by a local farmer for irrigation of cotton and alfalfa. Overflows of effluent to the unnamed wash adjoining the plant have occurred at times in the past. The Town holds an NPDES permit for this discharge.

The Facility Plan recommended a number of treatment plant improvements intended to produce effluent meeting the then-applicable surface discharge standards. The recommended improvements included addition of surface aerators to the largest pond, as well as piping and structural modifications to improve treatment performance. In addition, effluent metering and disinfection were recommended, along with miscellaneous site improvements. The recommended improvements were never constructed. These recommendations should be reevaluated in light of the current effluent reuse and applicable regulatory requirements.

The Luke AFB Auxiliary Facility has a 100,000 gpd facility. This facility holds a NPDES permit. Effluent is discharged to evaporation ponds.

Future Wastewater System Development. Expanded and improved treatment facilities will be necessary to treat flows as they increase in the future. Based on the projected populations presented herein, 0.26 mgd of treatment capacity would meet the needs of Gila Bend through year 2010. Gila Bend may wish to consider an initial treatment capacity of 0.26 mgd in two parallel treatment trains with a third 0.12 train added in year 2000. The treatment process required will depend upon the intended reuse or means of disposal of the effluent. Significant improvements to the existing treatment plant will be necessary to keep it in service. At a minimum, the improvements recommended in the 1977 Facility Plan should be reconsidered. These consisted of: deepening the existing ponds and installing surface aeration; adding new "polishing" ponds for further treatment; and providing new chlorination facilities. In addition, it will be necessary to line all ponds and to provide dechlorination.

Based on the information in the Facility Plan, it appears that the collection system design is adequate for flows expected to be received, with the exception of the 3-block reach of sewer along the Santa Fe Railroad.

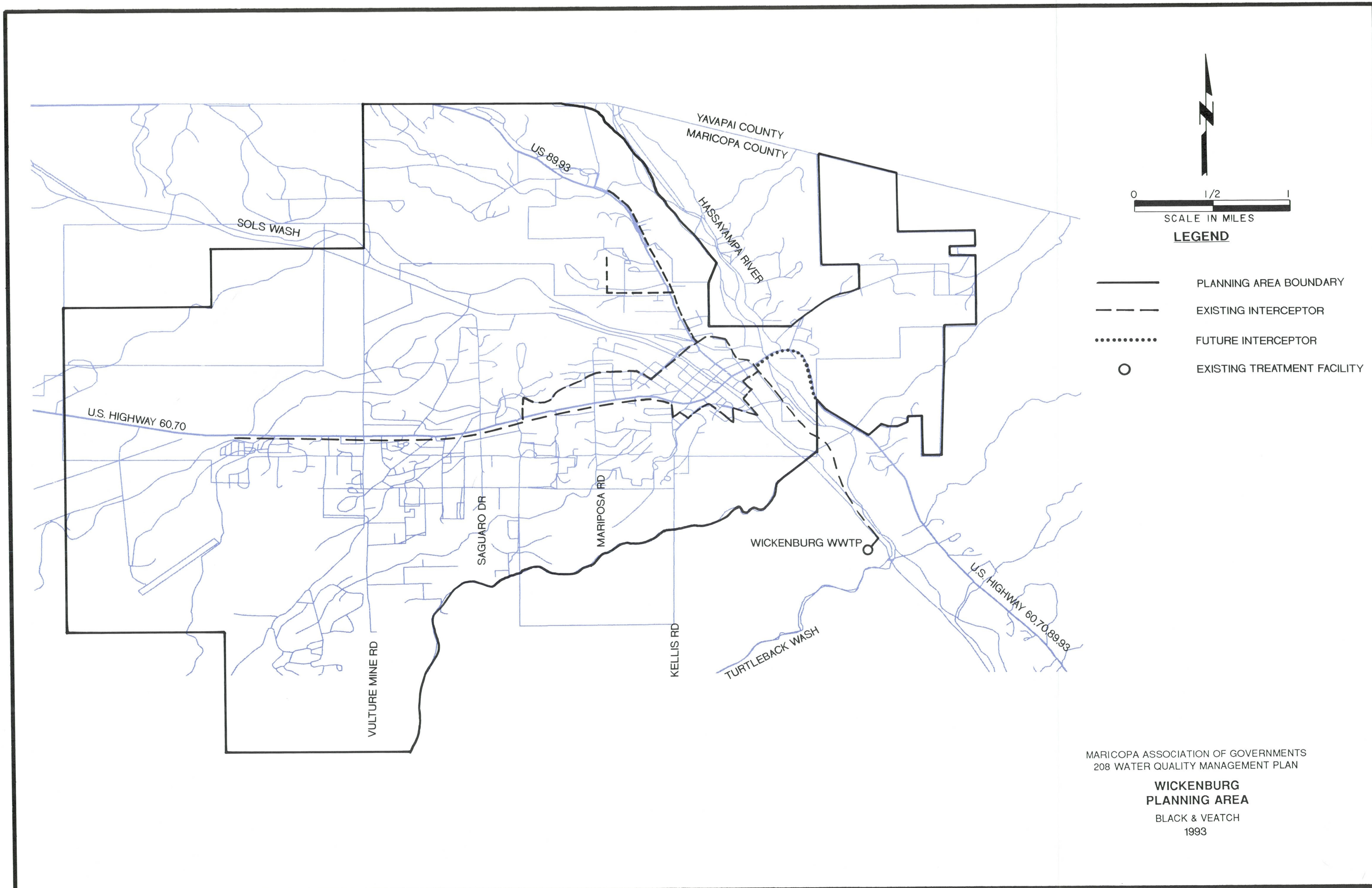
Summary of Proposed Wastewater System Improvements

Item	Estimated Cost[1]
WWTP improvements, as per 1978 Facility Plan	$880,000
Line existing ponds	480,000
Dechlorination facilities	75,000
Total	$1,435,000

[1]August 1990 costs (ENR Construction Cost Index = 4750). Costs from the Facility Plan have been inflated to current levels using a ratio of the ENR CCI.

4.5.7.2 Wickenburg

Wastewater collection and treatment service is provided by the Town of Wickenburg to portions of the incorporated Town, which corresponds to MAG District 1. The Town of Wickenburg is the designated wastewater management agency for this area. Much of the planning area is currently undeveloped. A master plan was prepared in 1977 for extension of trunk sewers to new areas as they develop. In addition, a substantial portion of developed area, including much of the lower density residential areas in rocky terrain, are unsewered. The homes in these areas are served by onsite septic tanks. A 1985 sewer system master plan update indicates that the extension of the collection system to such areas is unlikely unless the septic systems begin to fail. Figure 4-25 depicts the Wickenburg planning area and current service area.



YAVAPAI COUNTY
MARICOPA COUNTY
US 89,93
HASSAYAMPA RIVER
SOLS WASH
U.S. HIGHWAY 60,70
SAGUARO DR
MARIPOSA RD
VULTURE MINE RD
KELLIS RD
TURTLEBACK WASH
WICKENBURG WWTP
U.S. HIGHWAY 60,70,89,93
0
1/2
1
SCALE IN MILES
LEGEND
PLANNING AREA BOUNDARY
EXISTING INTERCEPTOR
FUTURE INTERCEPTOR
EXISTING TREATMENT FACILITY
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WICKENBURG
PLANNING AREA
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FIGURE 4-25

Population and Flow Projections. Wickenburg is projected to continue to grow at a moderate pace. As noted above, it is likely that a significant portion of the population will not be served by the collection system. Currently, most flow is from residences with some flow contributed by commercial and light industrial sources. Table 4-37 presents current MAG population projections (adopted 1992) for Wickenburg as well as projections of the population to be served by wastewater system and the resulting wastewater flows, provided by the Town. The projections are based on the assumption that approximately 95 percent of future increases will be served by the wastewater system.

The previous 208 Plan indicated a per capita flow of 114 gpcd. This was described by Town representatives as being too high. For planning purposes, this study estimates per capita flow at 100 gpcd.

TABLE 4-37
WICKENBURG
POPULATION AND FLOW PROJECTIONS

Year	Planning Area Population	Estimated Population Served	Projected Flow (mgd)
1990	6,699	3,350	0.34
1995	7,821	4,416	0.44
2000	9,136	5,665	0.57
2005	10,521	6,981	0.70
2010	12,055	8,438	0.84

If the Town decides to expand service to additional developed areas, or if water-intensive commercial/industrial development occurs, wastewater flows would increase beyond the figures presented in Table 4-37. If the entire Town were served, projected flow would reach 1.21 mgd by year 2010.

Existing Collection System. The Wickenburg collection system serves the developed core of the community. Several collection system improvement projects have been undertaken in recent years. This includes extending service in 1986 to the relatively small area of Wickenburg lying east of the Hassayampa River, as well as adding a small area north of Sols Wash. In 1987 sewer service was extended approximately 1 mile north along U.S. Highway 89. The Casandro Wash interceptor was constructed to relieve an overloaded sewer serving the western area.

Existing Treatment Facilities. The Wickenburg treatment plant is rated at 0.8 mgd, with plans for ultimate expansion to 2.4 mgd as needed. Based on the flow projections presented herein, it is estimated that the existing 0.8 mgd capacity will be adequate for the duration of the planning period. The plant includes: a manual bar screen, aerated grit chamber, comminutor, two extended aeration activated sludge basins equipped with surface aerators, two secondary clarifiers, and effluent chlorination facilities. The plant was put into service in April 1980.

The Town holds an NPDES permit for effluent discharge to the Hassayampa River. However, effluent is typically disposed in infiltration basins located in a wash upstream from the river. The Town has a Notice of Disposal on file concerning this discharge. Effluent reuse is being considered as a future option. A golf course now in the preliminary planning stages could be a possible reuse site.

Sludge is withdrawn from the secondary clarifiers and aerobically digested. Residual solids are dewatered using drying beds. The digested, dewatered solids are disposed of in the Town landfill.

Future Wastewater System Development. Based on the flow projections presented herein, the existing Wickenburg treatment plant's capacity is adequate to meet the needs of the Town through year 2010. If a reuse project is undertaken or discharge standards become more stringent, treatment process improvements may become necessary.

Additional treatment capacity may be necessary if there is water-intensive commercial/industrial development, or if the collection system is expanded to serve developed but unsewered areas. The latter is not expected unless septic tank failures begin to occur.

Future plans for development of the collection system include extending the system to the airport industrial park when development begins there. A sewer is also planned southeast along U.S. Highway 60-89 for approximately one-half mile. Master planning has been performed for trunk sewers for the entire potential service area.

As long as the outlying areas' population densities remain low, it is unlikely that they will be sewered.

Summary of Proposed Wastewater System Improvements

Item	Estimated Cost[1]
Airport Industrial Park interceptor	$400,000
Eastside sewer to Town limits	170,000
Total	$ 570,000

[1]Costs have been adjusted to August 1990 Levels (ENR Construction Cost Index = 4,750).

4.5.7.3 Gila River Indian Community

The Gila River Indian Community (GRIC) includes areas in both Maricopa and Pinal Counties. The GRIC has recently joined the Maricopa Association of Governments. However, this community prepared a 208 Plan covering the entire GRIC reservation, which was approved by EPA in 1982. The GRIC is the designated wastewater management agency for this area. Because the GRIC has established its own 208 Plan, it shall not be included as part of the Maricopa Association of Governments 208 Plan. This discussion is presented for reference only.

Population Projections. The projected future population of the portion of the GRIC within Maricopa County, corresponding to MAG District 102, is presented in Table 4-38, based on adopted MAG population projections.

TABLE 4-38
GILA RIVER INDIAN COMMUNITY
POPULATION PROJECTIONS

Year	Population
1990	2,711
1995	3,273
2000	3,717
2005	4,159
2010	4,632

Wastewater System Development. The selected plan for wastewater treatment at the GRIC falls under the jurisdiction of the GRIC 208 Plan.

4.5.7.4 Unincorporated Communities

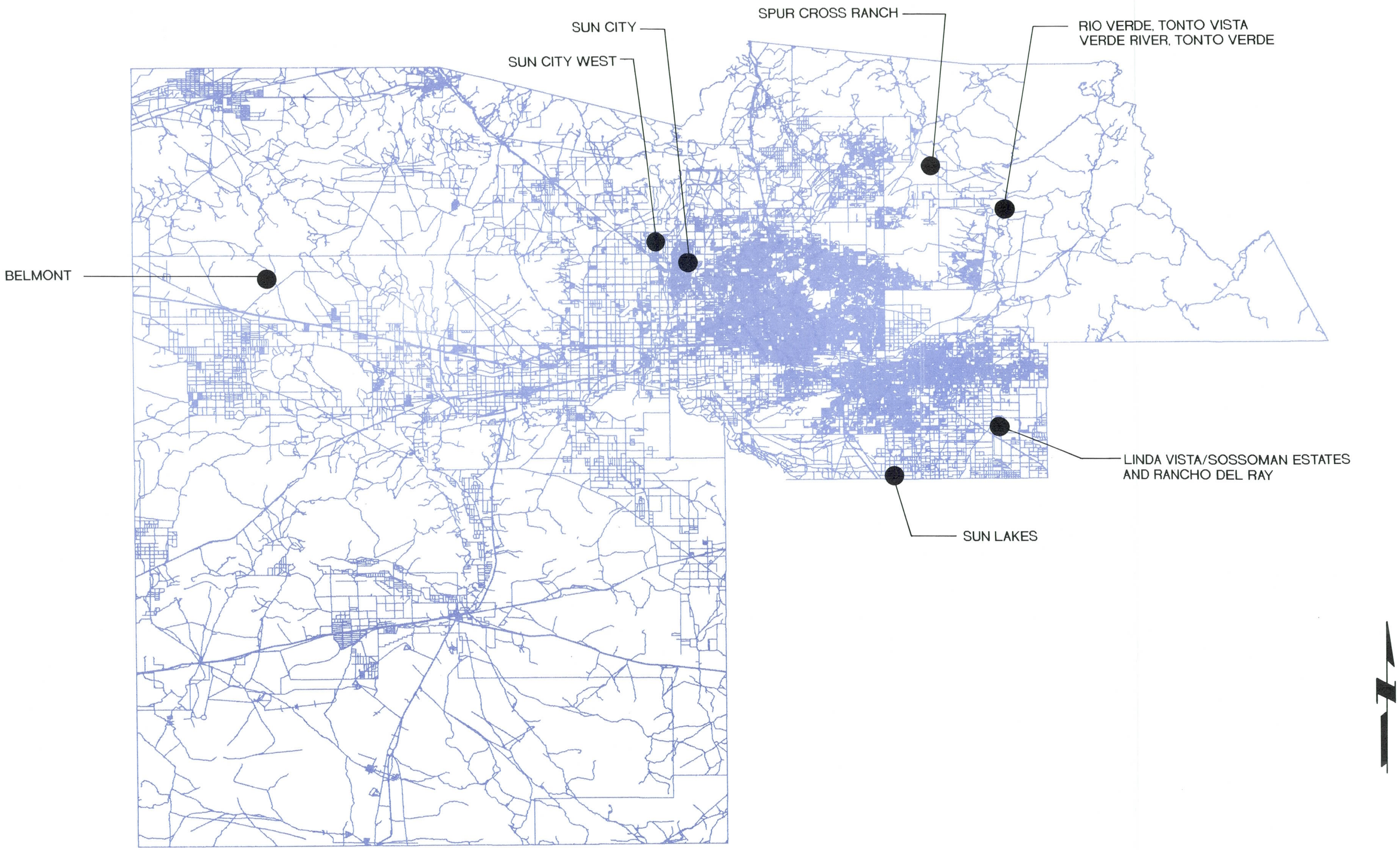
Much of the land area of Maricopa County is not designated within other agencies' planning areas. This area corresponds to the bulk of the unincorporated areas in the County with the exception of Indian Communities, areas enclosed within municipal strip-annexations and some other areas at the periphery of municipalities which have developed plans to serve those areas. Because a number of communities have incorporated and begun operating municipal wastewater utilities within the past decade, the number of sizeable communities under the direct jurisdiction of the County has diminished.

Existing or approved master-planned developments in unincorporated areas of the County are the following:

- Spur Cross Ranch (Cave Creek area).
- Rio Verde, Verde River, Tonto Vista, and Tonto Verde.
- Belmont.
- Sun Lakes.
- Sun City and Sun City West.

Wastewater from Sun City is treated by the Tolleson WWTP, as described in Point Source Plan Element for Tolleson. Wastewater plans for the remainder of the communities listed above are described below, based on information provided by the Maricopa County Department of Environmental Management, Environmental Quality, and Community Services Agency (MCEQCSA). Figure 4-26 identifies the location of approved master-planned developments that are expected to develop wastewater treatment facilities.

Population and Flow Projections. Projected populations for year 2010 and corresponding wastewater flow for each communities are summarized in Table 4-39. A unit wastewater flow of 100 gallons per capita per day (gcd) is used for flow



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MARICOPA COUNTY PLANNING AREA

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FIGURE 4-26

projections, with the exception of Rio Verde. Rio Verde flow projections were provided by MCEQCSA based upon Rio Verde planning studies.

TABLE 4-39
MARICOPA COUNTY
MASTER-PLANNED DEVELOPMENTS
POPULATION AND FLOW PROJECTIONS

Community	Projected Year 2010 Population		Projected Year 2010 Flow mgd	
Belmont		37,000[1]		3.70
Rio Verde area				
Rio Verde	2,812		0.28	
Tonto Verde	1,811		0.18	
Tonto Vista	1,968		0.19	
Verde River	1,333		0.14	
Subtotal - Rio Verde area		7,924		0.79
Spur Cross Ranch		1,600		0.16
Sun City West		33,000		3.3
Sun Lakes		16,849		1.7
Total		96,373		9.65

[1]Ultimate projected population is 150,964, projected for year 2040.

Note: These population figures may exceed the MAG population projections for the districts in the Maricopa County unincorporated area in which the developments are located. The MAG population projections were adopted by the MAG Regional Council in January, 1992. In preparing these projections, MAG noted that the projections are interim and subject to various conditions, including the following:

1. The methodology for preparing these projections is based on a model developed in 1989 and does not reflect recent changes in economic conditions.
2. These projections should be used with caution. They are subject to fluctuation as a result of recent changes in economic conditions.

Wastewater System Development

Belmont

Belmont is a master planned community to be located approximately 40 miles west of downtown Phoenix. The development will be constructed in five phases over a 50-year period. Phases I and II are projected to occur during the MAG 208 planning period.

Completion of Phase I is projected to occur by year 2000. Interceptor sewers varying from 8 to 36 inches in diameter will be constructed. A temporary treatment facility will be constructed near 306th Avenue and Bethany Home Road. This facility will provide tertiary treatment; effluent will be produced at a quality suitable for landscape irrigation.

Phase II development is expected to occur from year 2000 to year 2010. The interceptor system will be extended to accommodate flows. A lift station and force main will be added near 339th Avenue and Bethany Home Road. The initial stages of a 4.5 mgd treatment facility will be constructed. The facility will provide tertiary treatment; effluent will be produced at a quality suitable for landscape irrigation.

All effluent is expected to be reused for irrigation of golf courses and landscaping. If flows are to be discharged to stream or wash, a NPDES permit will be required. It is planned that sludge be dewatered with a sludge press and deposited at the Hassayampa Landfill during the early phases of the development, and deposited at the Southwest Regional Landfill in later phases. Agricultural reuse of sludge has also been proposed in the wastewater plan.

Spur Cross Ranch

Spur Cross Ranch is located east of the Town of Cave Creek. Wastewater collection and treatment will be provided by a private sewer company. Large lots will be served by septic tanks. The development plan of 1986 proposed a 320,000-gpd treatment facility that will include extended aeration, disinfection, and sludge thickening. Effluent will be reused for landscape irrigation. Sludge disposal issues have not been addressed.

Rio Verde Utilities

Rio Verde Utilities will provide wastewater collection and treatment services for Rio Verde, Tonto Vista, Tonto Verde, and Verde River developments. All wastewater is treated at the Rio Verde WWTP located near the southeast corner of Rio Verde. The current treatment capacity is 300,000 gpd. Secondary treatment is accomplished by an oxidation ditch, followed by tertiary treatment by sand filtration. Effluent is reused for golf course irrigation. Sludge is pressed and landfilled. As the population increases, treatment capacity will be added in 150,000-gpd increments. Effluent will be distributed to new and existing golf courses. The ultimate treatment capacity will be 0.9 mgd.

Sun Lakes

Wastewater collection and treatment for Sun Lakes is provided by Pima Utilities Company. Currently, the treatment process is a series of aerated lagoons with a capacity of 1.0 mgd. As wastewater flows increase, additional lagoons or a mechanical treatment plant will be added. Ultimate capacity is planned for 3.11 mgd. Treatment capacity for the MAG 208 planning period is 1.7 mgd. Effluent will be reused for golf course and greenbelt irrigation. The plant does not currently have any permits for reuse or discharge. A draft reuse permit prepared by ADEQ would require that the effluent meet standards for open-access irrigation. This would not be achievable by the existing lagoons and a mechanical treatment plant would be necessary.

Sun City West

Wastewater collection and treatment for Sun City West are provided by the Citizens Utilities Company. The Phase I treatment facility has a capacity of 2.14 mgd. The ultimate treatment plant capacity is planned for 6.44 mgd. It consists of a headworks, primary clarifiers, trickling filters, and secondary clarifiers. Sludge is digested and disposed of by a land application operation by Citizens Utilities Company. The treatment capacity required through year 2010 for the MAG 208 planning period is 3.3 mgd. Effluent is disposed of by land application, it will be reused for golf course and landscape irrigation. A plan for expansion of the treatment plant to 3.14 mgd includes a proposal for groundwater recharge and recovery of the effluent.

Other Facilities. Table 4-40 summarizes additional small wastewater treatment facilities in unincorporated areas of Maricopa County.

TABLE 4-40
MARICOPA COUNTY
SMALL WASTEWATER TREATMENT FACILITIES

Facility Name & Location	Design Capacity, gpd	Process	Disposal
Arizona Rendering, Laveen	-	Lagoon	Percolation
Arizona Nuclear Power Project	60,000	Activated sludge	-
	150,000	Physical-chemical	Cooling
ADOT-Sentinel Rest Area Eastbound	-		-
ADOT-Sentinel Rest Area Westbound	-		-
Canyon Lake Marina	18,000	Activated sludge	NPDES
Gila Compressor Station, Arlington	-		-
Salt-Gila Pumping Station	3,800	Activated sludge	Percolation
Lake Pleasant Recreation Area - Maricopa County Parks & Recreation	20,000	Activated sludge	-
Palo Verde Mobile Home Park, Tonopah	200,000	Activated sludge	Percolation
Pioneer RV Park - Pioneer Road	35,000	Activated sludge	Percolation
Rip Griffin Truck Stop	80,000	Activated sludge	Percolation
Ruth Fisher School - Tonopah	15,000	Activated sludge	Irrigation
St. John's Mission - Laveen	-	-	-
Tortilla Flat Campground - U.S. Forest Service	10,000	Activated sludge	Irrigation
Tortilla Flat Resort - Tortilla Flat	5,000	Activated sludge	NPDES

Wastewater System Costs. Table 4-41 summarizes the estimated costs associated with wastewater system development in Maricopa County. The costs presented are based upon costs of $4 per gpd for capacities less than 3 mgd and $3 per gpd for capacities greater than or equal to 3 mgd.

TABLE 4-41
MARICOPA COUNTY
MASTER-PLANNED DEVELOPMENTS
ESTIMATED WASTEWATER SYSTEM COSTS

Development	Treatment Capacity mgd	Cost[1]
Belmont	10.0	$30,000,000
	4.5	13,500,000
	1.0	4,000,000
Subtotal	15.5	$47,500,000
Spur Cross Ranch	0.32	1,280,000
Rio Verde Utilities	0.9	3,600,000
Sun Lakes	0.7	2,800,000
Sun City West	1.16	4,640,000
Total	18.58	$59,820,000

[1]August 1990 Dollars (ENR Construction Cost Index = 4750).

4.6 Small Plant Review and Approval Process

4.6.1 Introduction

Part of the Multi-City SROG selected point source plan in the 1982 MAG Point Source Plan Update was to provide an option to further expansion of the 91st Avenue WWTP and other major treatment plants. This option was the construction of small reclamation plants. Rather than amend the MAG 208 Plan to include every acceptable new small plant, the communities developed a small plant review and approval process.

Using this process, a small plant not specifically identified in the Point Source Plan can be approved as part of the 208 Plan if the plant goes through the approved Small Plant Review and Approval Process. By requiring proposed plants in the area to obtain approval using this formal process, an uncontrolled proliferation of small plants that could cause problems in the future should be prevented. The communities adopted a small plant process goal of allowing the Cities and Towns the maximum level of control in the approval of small plants. A Small Plants Technical Steering Committee was formed in 1982, composed of representatives from the cities, state, county, and homebuilders. This committee, in conjunction with consultants and MAG staff, developed the Small Plant Review and Approval Process.

4.6.1.1 Small Plant Definition. A small plant is one with an ultimate capacity of 2.0 mgd or less. Plants greater than 2.0 mgd which are not specifically identified in the MAG 208 Plan would be required to go through a formal 208 analysis and amendment.

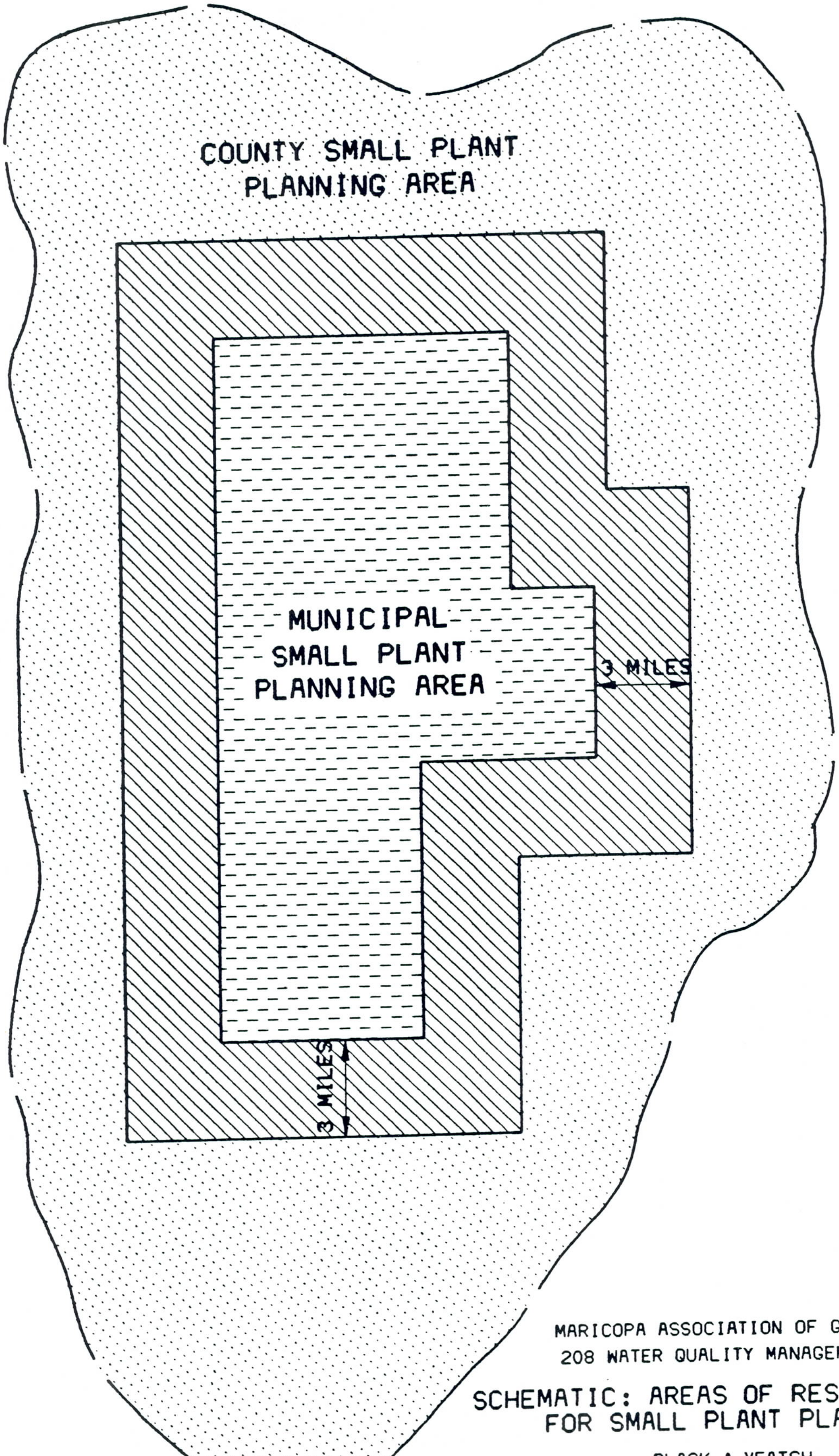
4.6.1.2 Areas of Responsibility. Three areas of responsibility are defined. One is the Municipal Small Plant Planning Area. This is the area identified by the municipality within which the City or Town would have responsibility for the first review and approval of proposed wastewater facilities.

The second area is the County Planning Area and within this area, the County would have the responsibility for deciding which wastewater facilities were constructed.

Between the two areas is a third area. This is the area in the County that is within three miles of a Municipal Small Plant Planning Area. Although this area is within the County's area of responsibility, the County must consider the comments of the nearby City or Town concerning proposed facilities in this three-mile area.

Figure 4-27 schematically illustrates the relationship between the three areas of responsibility.

4.6.1.3 Review and Approval Process. In the process developed for a proposed facility within a Municipal Small Plant Planning Area, the City or Town would work with a developer to come up with a suitable small plant concept. When an acceptable concept has been worked out, the City would send a letter to MAG stating that the proposed small plant is in keeping with the City's wastewater plans for the area. MAG would then review the proposal and send a letter to the Arizona Department of Environmental Quality (ADEQ) stating whether the small plant is compatible with the overall 208 Plan. The Arizona Department of Environmental



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208 WATER QUALITY MANAGEMENT PLAN

SCHEMATIC: AREAS OF RESPONSIBILTY
FOR SMALL PLANT PLANNING

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FIGURE 4-27

Quality has the legal authority to identify compliance with the 208 Plan. Therefore, the final 208 letter of compliance must come from ADEQ. This letter would go to the developer and the Maricopa County Environmental Quality and Community Services Agency (MCEQCSA). Upon receiving an approval letter, MCEQCSA would review the plans and specifications for the construction of the wastewater system in the proposed development.

Should a developer not be able to work out the details of its proposed small plant with the particular City or Town, it would not be able to proceed. The County would not approve the plans and specifications without the compliance letter from the ADEQ. The state will not give a letter of compliance unless they receive the approval letters from the City and MAG.

For a proposed project in the County, the County would play the same role as the City in the early project review and development. Projects within three miles of a Municipal Small Plant Planning Area would be reviewed and commented on by the affected City or Town. Projects with major problems to the City or Town which could not be resolved, would not receive compliance from ADEQ.

The specific process adopted in the MAG 208 Plan in 1982 is set forth below.

4.6.2 MAG Small Plant Process

No wastewater treatment plant greater than 2.0 mgd ultimate capacity is considered to be in compliance with this plan unless it is specifically named in the Plan or added through 208 Plan Amendments.

Wastewater treatment plants with an ultimate capacity of 2.0 mgd or less are considered to be in compliance with this plan if they are approved using the following processes:

1. <u>Within Municipal Planning Area</u>

To be approved for construction, a small wastewater treatment plant (2.0 mgd ultimate capacity or less) not otherwise mentioned in the MAG 208 Plan but located within a Municipal Small Plant Planning Area must:

1. Have the approval of the municipality in whose planning area it will be located;
2. Not adversely affect the operation or financial structure of existing or proposed wastewater treatment plants;

3. Be consistent with State and County regulations and other requirements; and,

4. Be otherwise consistent with the MAG 208 Plan.

The process for approval of a small plant is as follows:

1. Developer prepares an engineering report on his proposal and submits the report to the City.

2. City reviews the proposal based upon the guidelines in the attached list (Table 4-42) and any others depending upon the needs and desires of the specific City or Town. If the City or Town does not have the staff capability to perform this review, the review process used would be that for small plants outside a Municipal Planning Area. It is also recommended that the City or Town reviewing a proposed development contact any adjacent community if the proposed development is within three miles of boundary between the two communities.

3. If the proposal fits into the City's Master Plan, then the City sends a letter and a summary of the proposal to MAG (copy to the developer) stating the proposal is approved by the City and it is compatible with the 208 Plan covering the City's Planning Area.

4. MAG reviews the proposal for overall 208 Plan compliance to ensure that the Small Plant Process is followed, and to ensure that regional impacts are addressed. This evaluation will be coordinated by the MAG Water Quality Advisory Committee. Recommendations from the Water Quality Advisory Committee will be presented to the MAG Management Committee. Recommendations from the Management Committee will be presented to the Regional Council.

5. Based on Regional Council actions, MAG sends a letter to ADEQ and the proposal summary (copies to developer, City, and MCEQCSA) stating whether the proposed project is compatible with the overall 208 Plan.

6. Upon receipt and review of the letter from MAG, ADEQ submits a letter and proposal summary to MCEQCSA and developer stating whether the proposed project is in conformance with the MAG 208 Plan.

7. The developer, after receiving an approval letter from ADEQ, submits plans and specifications to MCEQCSA for review together with a copy of the approved design concept.

8. MCEQCSA reviews, based on ADEQ Bulletin #11 and County regulations, the plans and specifications and issues permit to construct.

For the purpose of this process, a Sanitary District is treated in the same fashion as a Municipality.

TABLE 4-42
GUIDELINES FOR SMALL PLANTS
WITHIN MUNICIPAL SMALL PLANT PLANNING AREA

Plant Justification

Why Plant is Required
- Limited capacity at existing plant or sewer
- Too far from trunk sewer
- Temporary plant
- Soil limitations
- Effluent reuse or water conservation
- Other

Master Plan Compatibility
- Is plant compatible with future plans for the area?
- Will proposed plant impact existing or proposed plants?
- Will proposed plan impact existing or proposed reuse plans in the region?

Benefits of Plant
- Net water saving
- Delays major capital expenditures
- Better scheduling and project control
- Allows development

Potential Problems
- High capital and operational costs
- Impacts on groundwater
- Impacts on surface water
- Inability to meet State regulations
- Financial failure of operation
- Poor operation and maintenance

Financial
- Who will fund construction?
- Who will fund O&M costs - short term?
- Who will fund O&M costs - long term?
- Financial Security

Operation
- Who will operate plant - short term?
- Who will operate plant - long term?

2. Outside of Municipal Planning Areas

To be approved for construction, a small wastewater treatment plant (2.0 mgd ultimate capacity or less) not otherwise mentioned in the MAG 208 Plan and located within a Municipal Small Plant Planning Area must:

1. Have the review and comment of any municipality whose Small Plant Planning Area is within three miles of the proposed plant location or service area;

2. Not adversely affect the operation or financial structure of existing or proposed wastewater treatment plants;

3. Be consistent with State and County regulations and other requirements;

4. Be otherwise consistent with the MAG 208 Plan; and,

5. Be evaluated and approved, or modified by Maricopa County Environmental Quality and Community Services Agency (MCEQCSA).

The process for approval of a small plant is as follows:

1. Developer submits engineering report to Maricopa County and any cities whose Municipal Small Plant Planning Areas are within 3 miles of the proposed plant's service areas. This report would contain sufficient information for evaluation of the report based upon the attached guidelines as set forth in Table 4-43.

2. The involved Cities evaluate the report and send a letter containing their recommendations to Maricopa County (copies to MAG and developer).

3. Maricopa County incorporates City's concerns and sends a letter and summary of the proposal to MAG (with copies to involved Cities and developers), stating whether the proposal for wastewater is acceptable to the County.

4. MAG evaluates the proposed plant for overall MAG 208 Plan conformance to ensure that the Small Plant Process is followed and to ensure that regional impacts are addressed. This evaluation will be conducted by the MAG Water Quality Advisory Committee. Recommendations from the Water Quality Advisory Committee will be presented to the MAG Management Committee. Recommendations from the Management Committee will be

presented to the Regional Council. Based upon Regional Council action, MAG submits letter on 208 compliance to ADEQ (with copies to Maricopa County, the developer and any involved cities).

5. After review of the MAG Submittal, ADEQ submits letter to MCEQCSA (with copy to the developer) indicating 208 Plan compliance.

6. After receipt of an approval letter from ADHS, MCEQCSA reviews and approves plans and specifications based upon Bulletin No. 11 and issues permit to construct.

It should be noted that before a development proceeds, approval has to be obtained for the entire master plan. Approval by the State and County Departments only constitutes one part of the approval process.

TABLE 4-43
CRITERIA FOR FEASIBILITY REPORT FOR
SMALL PLANTS OUTSIDE OF MUNICIPAL SMALL
PLANT PLANNING AREA

1. Technical Criteria
   - Why is small plant desired?
     - Depth to groundwater less than _______ ft.
     - Soil limitations prevent use of septic tanks
     - Potential for reuse or water conservation
     - Lot size one acre or less
     - Area not planned for regional service for _______ years
     - Density of projected population
     - Will serve industrial or commercial area
   - Why can't wastewater be treated at an existing facility?
     - Distance too great
     - Limited current or projected capacity at nearby facilities
     - Limited current or projected reuse capability at nearby facilities
     - Problem with using existing facilities
   - What is the anticipated quality of the wastewater?
     - Domestic
     - Commercial and/or Industrial
     - If commercial and/or industrial wastes are anticipated, what provisions are being taken to insure no toxic substances will be discharged?

TABLE 4-43
CRITERIA FOR FEASIBILITY REPORT FOR
SMALL PLANTS OUTSIDE OF MUNICIPAL SMALL
PLANT PLANNING AREA

- How and why was small plant design and capacity selected?
  - What criteria were used?
  - What alternatives were considered?
  - What are benefits, problems of alternatives?
  - Will there be problems meeting State or County regulations?

2. Planning Criteria
   - Is proposed plant compatible with County adopted master plans, guidelines, etc., for the area?
     - What plans apply?
     - What guidelines or policies apply?
   - Can the proposed plant be expanded to serve growing population?
     - What population is projected for the service area?
     - Would certain areas lend themselves, topographically or hydrologically, by planned use or density to being included in the service area?
   - Will proposed plant adversely impact existing or approved nearby land uses?
     - What are land uses within _______ miles?
     - What is zoning for the surrounding area?
     - What are reactions of nearby landowners to proposed facility?
   - Will there be a net water saving from effluent reuse?
     - How will effluent be disposed of?
     - What is the estimated water saving?
   - Do nearby existing or proposed land uses indicate a need for a larger capacity sewage plant than that proposed?
     - Should nearby areas be sewered or otherwise join the proposed plant for water quality or economic reasons?
     - Do these areas wish to join the proposed plant?
3. Development Criteria
   - Who will fund construction?
   - Who will fund operation and maintenance costs?
   - Is there adequate financial security to assure continual and proper operation and maintenance?
   - Who will operate and maintain the plant and system?
   - What are anticipated capital and operation and maintenance costs?

4.7 Environmental Assessment of Point Source Plan

Environmental impacts and issues were considered on an areawide basis. This section provides an overview of existing conditions, followed by an assessment of the following categories: air quality, geology and soils, surface waters, groundwater, biological resources, cultural resources, public health and aesthetics, land use, public facilities and services, economic activity, public and institutional acceptability, and socioeconomic impacts.

4.7.1 Existing Conditions

4.7.1.1 Climate. The climate of Phoenix is semiarid, characterized by low annual rainfall, hot summers, and mild winters. Maximum daily temperatures range from 65°F (18°C) in January to 105°F (41°C) in July. Average daily low temperatures range from 78°F (26°C) in July to 38°F (3°C) in January. The annual rainfall in Phoenix averages approximately 7 inches.

4.7.1.2 Air Quality. Phoenix has experienced increasing air pollution, largely as a result of automobile emissions. The location of the metropolitan area in a broad valley is conducive to the accumulation of air pollutants. In addition, general atmospheric conditions favor the development of temperature inversions that may persist for extended periods of time, allowing ambient pollutant concentrations to exceed levels defined in State and Federal standards. Three kinds of air pollutants generally exceed standards in the Phoenix area: ozone, carbon monoxide, and particulate matter which is 10 microns in size or less (PM-10). Because of problems with these air pollutants, the Maricopa County area has been designated a "nonattainment" area for photochemical oxidants (ozone), carbon monoxide, and PM-10 particulate pollution under requirements of the Clean Air Act Amendments of 1990.

Minor local, short-term air quality changes will occur during construction phases of the wastewater management plan. These changes will consist principally of increases in fugitive dust. Increases in dust will occur most often during excavation and laying of interceptor lines. Dust associated with construction is subject to State fugitive-dust-control regulations, which will be complied with during facility construction.

4.7.1.3 Geology and Soils. The Maricopa County area is within the Basin and Range Physiographic Province of the western United States, characterized by wide, flat, alluvium-filled valleys surrounded by rugged, low-relief mountain ranges. Phoenix lies within the Salt River Valley and is surrounded by the Phoenix, Salt River, McDowell, Usury, Sierra Estrella, and White Tank Mountains. Uplifting and down faulting of the land surface formed these fault block mountains. Erosion filled the valley with alluvium, which consists of silts, clays, sands, and gravels deposited in layers.

Valley soils are deep, mixed in texture, and low in organic material. Most soils contain adequate amounts of nutrients, and when irrigation is available, good cropland can usually be developed. General soil types are sandy loams, limy clay loams, and limy loams.

The Point Source Plan is not expected to have any significant impact with respect to geology and soils.

4.7.1.4 Biological Resources. The Maricopa County area is part of the lower Sonoran Life Zone, which is part of the Sonoran Desert Formation, one of four desert formations in North America. Natural vegetation in the area is mainly composed of desert communities, although small areas of deciduous forest occur along the banks of water bodies. The major desert communities are paloverde-saguaro on mountain slopes, creosotebush-bursage in the lower drier areas, and desert saltbush in the fine-grained alluvium that fills the valley in the area. Riparian vegetation is present along stream channels and associated terraces and in areas of shallow groundwater.

A great diversity of desert fauna also exists within the area. Most of the fauna occupy the creosotebush-bursage and paloverde-saguaro communities and include the desert kangaroo rat, desert pocket mouse, Gambel's quail, black-throated sparrow, desert horned lizard, the Harris' antelope squirrel, cactus mouse, gila woodpecker, desert tortoise, desert iguana, zebra-tailed lizard, and western diamondback rattlesnake.

Cropland, which constitutes approximately one-third of the metropolitan area, provides habitat for certain adaptable wildlife species, particularly many species of songbirds and game birds. Other wildlife associated with cropland include the cotton tail rabbit, valley pocket gopher, and gopher snake.

Artificial surface impoundments associated with agricultural lands also support a number of riparian communities. These agricultural storage ponds tend to have a beneficial effect on the local biologic community in that they support a wider variety of species than would be found without the presence of surface water.

Construction of treatment facilities under the selected plan will result in removal of small portions of cropland, saltbush, and creosotebush-bursage communities. Many of these saltbush and creosotebush-bursage communities that will be removed are of poor quality, primarily as a result of intensive human encroachment in the study area. These communities, along with the paloverde-saguaro and riparian communities, will also undergo changes due to plant operations and associated habitat management schemes. No habitat affected by the selected plan is known to presently support species of wildlife on the Federal list of threatened or endangered species.

4.7.1.5 Community Facilities.

4.7.1.5.1 Transportation. Rapid growth in the Maricopa County area has strained the existing transportation network, as automobile traffic and congestion have increased. Since 1985, the Arizona Department of Transportation has been developing an urban freeway and expressway program to serve the metropolitan Phoenix area. A ballot initiative to create a regional rail transit system (ValTrans) was defeated in recent years.

4.7.1.5.2 Water Supply. The Salt River Project distributes water from the Salt and Verde Rivers via canals to the Phoenix area for municipal and agricultural use. The Central Arizona Project imports Colorado River water to the Phoenix area and elsewhere. Municipal and industrial water is also supplied by private and public wells in the study area. A number of communities in the metropolitan area rely on groundwater sources alone. Treatment of groundwater supplies varies from no treatment to chlorination to desalination. Treatment of surface water typically includes sedimentation, filtration, and chlorination.

4.7.1.5.3 Wastewater Treatment. Wastewater treatment plants serving the metropolitan area are described elsewhere in this chapter.

4.7.1.5.4 Energy. Electricity in the metropolitan area is provided primarily by the Arizona Public Service Company (APS) and the Salt River Project (SRP). Each operates a number of electric generating stations. SRP also generates hydropower. APS and SRP are participants in an energy consortium, the Arizona Nuclear Power Project (ANPP), which operates the Palo Verde Nuclear Generating Station west of Buckeye.

4.7.1.6 Archaeological Resources. The Phoenix metropolitan area was a major population center during portions of the prehistoric past and contains abundant archaeological remains. Earliest archaeological sites in the area belong to local variants of the Archaic tradition. Archaic sites have been found in the area but are few in number. The Hohokam tradition, which appears about 350 B.C., is the principal cultural complex represented within the area. Known Hohokam sites within the Salt River Valley are reported to be in excess of 800. The majority of these sites, located both along the area's major and tributary river systems and on irrigable lands adjacent to rivers, consist of villages or large permanent habitation sites, or of medium to large-sized shard areas which may also be the remains of habitation sites. In addition, at least seven major prehistoric irrigation canal systems (totalling more than 315 miles in length) are known to have existed within the Salt River Valley. Each of these canal systems is generally associated with one or several major Hohokam village sites.

While many of these sites have been destroyed due to urbanization and agricultural development, others have been excavated and reported by archaeologists, thus providing a permanent record of their existence. In addition, the remains of several major sites have been preserved and restored and are accessible to the general public. Several prehistoric sites, including the Pueblo Grande Ruin (Phoenix), Hohokam-Mormon Canals (Mesa), and Hohokam-Pima Irrigation Sites (Phoenix), have been entered on the National Register of Historic Places. Numerous other archaeological sites have either been nominated to or are considered to be potentially eligible for inclusion in the State or National Registers of Historic Places.

4.7.1.7 Historical Resources. An initial survey of historic sites in metropolitan Phoenix prepared for the U.S. Army Corps of Engineers during preparation of the 1979 208 Plan identified more than 550 existing historic sites. Seven sites had been entered on the National Register of Historic Places. They are: Hackett House, Tempe; Farmer Goodwin House, Tempe; Taliesin West, Scottsdale; Rosson House, Phoenix; the Phoenix Carnegie Library and Library Park, Phoenix; Evans House, Phoenix; and the Arizona State Capitol Building, Phoenix. An additional 176 historic sites were considered to be potentially eligible for nomination to either the State or National Registers of Historic Places.

4.7.2 Environmental Consequences of Point Source Plan

Environmental consequences of the Point Source Plan were evaluated by comparing these alternatives to a "No Action" alternative. The No Action alternative represents present and projected conditions in the study area under the assumption that there would be no new construction or expansion of municipally owned wastewater treatment facilities. Wastewater treatment would be provided by means of the existing system and individually owned home treatment units or privately owned and operated package plants.

In general, the No Action alternative would mean the expansion of low density urbanization, because much of the population would rely on septic tanks or private package plants for wastewater treatment under this alternative. A proliferation of single-family dwellings on relatively large homesites (to accommodate septic tank use) would occur.

4.7.2.1 Air Quality. Air quality impacts are defined in terms of the consistency or inconsistency between data in the nonattainment area plan (NAAP) and the 208 plan. Population projections used in the 208 program are the same as those used to forecast the effect of control strategies on air quality parameters in the NAAP. No major discrepancies are apparent between the NAAP and the project alternatives on this account. In addition, there are construction site controls in place in the Maricopa County area which are designed to reduce particulate pollution.

4.7.2.2 Geology and Soils. Geological impacts focus on the exclusion of sand and gravel or other valuable geological materials from extraction due to location of facilities in minable areas. Major impacts in this category are not apparent.

4.7.2.3 Surface Waters. Environmental changes are related to the availability of treated wastewater which is related to the location of treatment plants. Impacts are mainly seen as beneficial (augmenting community and agricultural water supplies), with the exception of potential instances where effluent does not meet water quality standards or affects public health and aesthetics. ADEQ regulatory programs for surface and groundwater protection are designed to protect these types of situations from occurring.

All alternatives would result in more beneficial effects to surface water supplies than would the No Action alternative.

4.7.2.4 Groundwater. Effects on groundwater center around changes in quality and quantity that can occur depending on the location of wastewater discharge in the area. Under the No Action alternative, groundwater quantity might benefit because there would be more recharge and less export of pumped water. However, groundwater quality would be affected adversely if septic tanks were used at too great a density. Also, many of the planned or operating treatment facilities are designed to recharge aquifers with high-quality reclaimed water.

4.7.2.5 Biological Resources. Changes in biological resources can occur through introduction of surface waters into the desert environment of the study area and through removing, degrading, or improving existing terrestrial habit. Biological resources would be improved by all project alternatives, in comparison to the No Action alternative. Improvements in biological resources consist primarily of creation of wetland habitat, which is of high value in the area, through the addition of surface water in the form of aerated lagoons, stabilization ponds, and impoundments for storing treated wastewater for irrigation.

Some loss of terrestrial habitat would occur under all alternatives. Despite losses in terrestrial habitat associated with the project alternatives, biological advantages related to surface water augmentation outweigh disadvantages in this category.

4.7.2.6 Cultural Resources. Project actions can disturb archaeological or historical sites, mainly through direct removal of artifacts or structures by construction of facilities or interceptor lines. No historically sensitive sites are known to be located in areas affected by proposed expansion or construction of facilities.

Adverse impacts to archaeological resources would occur with all project alternatives due to urbanization. Losses of artifacts would be less extensive than with the No Action Alternative because the area of urbanization assumed for the project alternatives is not as great as for the No Action alternative. Additional archaeological impacts could occur during construction of sewage treatment systems.

4.7.2.7 Public Health and Aesthetics. In general, providing improved wastewater treatment and reducing the use of on-site treatment facilities will have a significantly positive impact on public health. The incidence of mosquitoes around surface water areas, the likelihood of intentional or inadvertent contact with wastewater, and the likelihood of odors are potential negative consequences of operation of treatment plants. Mitigative measures can reduce or eliminate these impacts. Particular mitigative measures include pesticide control applications, odor suppression techniques, and proper designation of wastewater areas by posting of signs and fencing of enclosures to deter public access.

4.7.2.8 Land Use. Effects on land use depend on the degree of compatibility of existing and projected land uses employed in the local wastewater treatment master or facility plan with the local comprehensive land use plan. Several local jurisdictions are ensuring that small wastewater treatment plants are designed to be compatible with nearby residential areas.

4.7.2.8.1 Agricultural Land Use. The consequences of the project alternatives on agricultural land use fall into two main categories: the loss of farmland for treatment facility sites, and the continued support of farming due to availability of effluent for irrigation. The more significant impacts are associated with the latter category, and are considered positive.

4.7.2.8.2 Urban Land Use. The Point Source Plan is compatible with the adopted MAG Regional Development Guide which anticipates continued urbanization of the Phoenix metropolitan area.

4.7.2.8.3 Recreation and Open Space. Wetlands associated with the treatment and storage of effluent for irrigation or other purposes not only provide an important natural resource but also provide opportunities for recreational land uses such as hunting, picnicking, and bird watching. Under the No Action Alternative, no creation of significant wetland is anticipated, whereas the project alternatives contribute to wetland formation.

The use of reclaimed water for irrigation of turfed areas enables parks and recreational areas to be developed which otherwise might not be.

4.7.2.9 Public Facilities and Services. These impacts concern the extent to which the proposed project action would affect existing or proposed public facilities or the operation of service delivery systems. Consideration is also given to secondary impacts in which project actions may alter future revenues to public agencies without a compensating change in the cost or level of services they must provide. The project alternatives support planning based upon the local land use and development plans. The project alternatives are also compatible with the MAG Regional Development Guide.

4.7.2.10 Economic Activity. Major changes in the level and nature of area economic activity, employment, income, and property values that can be attributed to construction and operation of wastewater treatment facilities. These effects are often closely linked to changes in land use and population. The project alternatives would be accompanied by changes in the economy which include reduction in scale of agricultural activity, but not as rapidly as under the No Action Alternative. Most sectors of the economy would increase, but the public service sector would not grow as large as under the No Action Alternative. A major portion of the costs for the various alternatives would be spent within the region for construction, supplies, and labor. Direct long-term impacts include employment at facilities and loss in revenues from agricultural production from land required for plant sites, both of which are relatively insignificant.

4.7.2.11 Public and Institutional Acceptability. All of the project alternatives will meet the demand for areawide wastewater treatment, so public acceptability issues focus on the local communities' choice of individual sites for treatment and potential reuses of effluent.

4.7.2.12 Socioeconomic Impacts. The principal socioeconomic impacts of the selected plan are discussed in the following categories:

- Impacts of proposed facilities.
- Impacts of proposed effluent reuses.
- Impacts of plan implementation.

4.7.2.12.1 Impacts of Proposed Facilities. Construction of proposed facilities will primarily affect agricultural areas by conversion of agricultural land for use for treatment facilities. Much of this land would eventually be urbanized in any case.

Site availability is another important consideration. Several of the plants included in the selected plan will not be needed for five to ten years. To ensure their availability when required, these sites should be acquired or optioned well before they can be utilized and land acquisition costs may be substantial.

4.7.2.12.2 Impacts of Proposed Effluent Reuse. Although construction of treatment facilities in some cases will remove a small amount of farmland from production, use of reclaimed water for irrigation may support agriculture. This type of reuse may include (1) provision of additional agricultural water supplies, (2) requirements that may include the long-term commitment of land irrigated with effluent to agricultural purposes under reuse agreements, and (3) improvement of groundwater supplies through additional recharge.

Under the terms of the existing agreement effluent is used at the Palo Verde Nuclear Generating Station in energy production.

4.7.2.12.3 Impacts of Plan Implementation. One area of concern is the impact of user charges. Construction and operation costs of the new treatment system components may be financed through user charges. Section 204 of the Clean Water Act specifies the types of use charges which can be levied by operating entities to pay for wastewater treatment within their service areas. In general, charges must be proportional to use, and a separate schedule is provided for industries. This system is designed to achieve equity such that the users of the services provided are the ones who pay for it.

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Chapter 5 - Nonpoint Source Plan

5.1 Description of Nonpoint Sources

This chapter describes the major nonpoint sources of water pollution of concern in the planning area. Previous studies to characterize some aspects of nonpoint source pollution and applicable regulatory programs are reviewed and assessed.

By definition, nonpoint sources of pollution are those discharges that "do not originate from a specific single location such as a single pipe" (U.S. Environmental Protection Agency, 1987). However, in areas such as Maricopa County, the distinction between point and nonpoint sources is blurred. Groundwater is the receiving water for many nonpoint sources and is also impacted by many point sources. Under the Environmental Quality Act, ADEQ's principal statutory authorization for nonpoint source control, either an individual or general aquifer protection permit is required for all nonexempt discharges to groundwater, regardless of the source.

Impacts to groundwater are more difficult to assess and manage than impacts to surface water. Sampling locations are limited, and due to the depth to groundwater, which can vary from 30 feet to 350 feet, the expense of installing monitoring wells for additional sampling locations is considerable. Furthermore, in Maricopa County, the aquifers are heterogeneous, and the directions of groundwater flow are not precisely known. Unlike surface water, for which flow is mainly one-dimensional, the movement of groundwater is three-dimensional and can change in response to pumping. Complete reversals of flow have occurred in parts of the planning area during the past 40 years.

Two inventories of nonpoint source pollution are relevant to the planning area: the 1979 report for the MAG 208 Program (Maricopa Association of Governments, 1979) and the more recent 1988 Nonpoint Source Assessment Report completed by ADEQ (Arizona Department of Environmental Quality). The ADEQ assessment report inventoried nonpoint sources for the entire state in accordance with U.S. EPA categories; however, impacts to surface water were emphasized. In contrast, the earlier MAG study emphasized groundwater impacts in Maricopa County only.

In the following sections, categories of nonpoint sources are described using the ADEQ and MAG studies as references.

5.1.1 Urban Runoff

Nonpoint sources of urban pollution include discharges of storm runoff to surface water and groundwater. Pollutants in storm runoff include nitrates (from various sources), pesticides, bacteria, heavy metals, volatile organic compounds (VOCs), petroleum products, and sediment. The impact of these constituents in impairing surface water quality has not been well-documented in the planning area. In Maricopa County, most runoff from moderate storms is collected in infiltration basins and drywells, which can be conduits to groundwater. The storm sewer systems for urban areas in the county are incomplete. To reduce street flooding, city building codes require on-site retention of runoff from moderate storm events.

Runoff that is retained on site is commonly disposed by allowing it to slowly infiltrate into the soil in a retention basin or by more rapid infiltration in a dry well. Dry wells allow infiltrating water to bypass the shallow soil layers, short-circuiting the natural filtration processes. Some drywells can be deep enough to facilitate pollutant access to the water table.

To provide answers to some of the questions surrounding the use of drywells for disposal of storm runoff, an urban runoff study was commissioned by MAG in 1983 and 1984 (Schmidt, 1985). The objective of the study was to evaluate the pollution potential of urban runoff that was disposed in dry wells at the parking lot of a shopping center. The study reported that heavy metals and low concentrations of pesticides were present in runoff entering the drywells. However, shallow groundwater in the vicinity of the drywells was not noticeably affected, possibly due to the sorptive capacity of the drywell backfill and the aquifer material. Storm runoff from the shopping center may also have been diluted by recharge from other sources, including runoff from a nearby irrigation system.

Construction activities also contribute to pollution of urban runoff. Sediment is a primary concern, since several pollutants of concern known to be associated with storm runoff may be adsorbed by sediments. In the 1988 Nonpoint Source Assessment, ADEQ expressed concern that runoff from construction sites previously subject to agricultural uses may be responsible for the partial contribution and transport of chlorinated pesticides to the Gila River and for concentrations of pesticides that have been detected in river sediments.

5.1.2 Agriculture

Pollutants associated with agriculture include sediment, pesticides, bacteria, viruses, nitrates from both fertilizer and animal wastes, and salinity. These pollutants can be discharged to surface waters in irrigation return flows and to groundwater by percolation of irrigation water to the water table.

A limited number of pesticides associated with agricultural activity have been identified in sediments associated with surface water and in groundwater. The Gila River is the most seriously affected surface water body. In tissue samples of fish collected from the Gila River in the planning area, toxaphene and degradation products of dichlorodiphenyl trichloroethene (DDT) have been detected in concentrations that constitute a hazard for human consumption (Arizona Department Environmental Quality, 1988). In groundwater, soluble fumigants dibromochloropropane (DBCP) and ethylene dibromide (EDB), that were used in the past to control nematodes in citrus crops, have been detected in several parts of the planning area.

Nitrates may be the most ubiquitous pollutant associated with agriculture. The most serious impact is on groundwater. Concentrations of nitrates exceed drinking water standards in shallow groundwater in large areas in Maricopa County. In some areas, the occurrence can be linked to over applications of nitrogen-bearing fertilizer. There are also some area where high concentrations of nitrates occur naturally in the groundwater. Nitrates are highly soluble and can leach to groundwater through percolation of irrigation return flow. In other areas, high nitrate levels may be attributed to animal wastes from dairies or feedlots, although such impacts have not been documented in Maricopa County.

Increase in the salinity of groundwater is another widespread problem that is associated with irrigated agriculture. When water is applied to crops, evapotranspiration increases the concentration of dissolved solids in the return flow. When groundwater is recycled for irrigation, the dissolved solids may increase in concentration to the point where the water no longer is useable for crops. Such increases have occurred in areas along the Lower Salt and Gila Rivers and have restricted the use of groundwater for irrigation. The Buckeye Irrigation District operates drainage wells to lower the water table in the parts of the District where saline return flows have raised the water table to the point where crop production has been adversely affected. The water pumped from these drainage wells is then discharged to the Gila River (Water Resources Research Center, 1978).

5.1.3 *Land Disposal*

Nonpoint sources associated with land disposal activities in the planning area include landfills, wastewater ponds, and septic tanks. Pollutants associated with these sources include salinity, bacteria, heavy metals, nitrates, ammonia, phosphates, pesticides, and volatile organic compounds (VOCs). Water quality impacts have been documented at landfills located in former sand and gravel pits adjacent to the Salt River and its tributaries in the planning area. Where pits have been excavated below the water table, landfilled solid waste can be in direct contact with groundwater. At other pits that are above the water table, infiltrating surface water has leached contaminants to the water table during floods. Erosion and washouts have occurred at landfills along the Salt River during some large reservoir releases and floods.

Disposal of liquid wastes at landfills and in industrial wastewater lagoons is another documented source of nonpoint pollution in the planning area. Disposal of industrial wastes in unlined lagoons was an accepted disposal alternative in parts of the planning area prior to the availability of sewers. Landfills were also used to dispose of some liquid wastes. Some of these wastes, such as VOCs, are now considered hazardous, and the resulting groundwater contamination has created several CERCLA ("Superfund") and WQARF sites.

Septic tanks in combination with a leach bed or a dry well are used for onsite disposal of domestic liquid wastes in unsewered parts of the planning area. There have been few documented groundwater quality problems attributable to the use of these systems in the MAG planning area (Arizona Department of Environmental Quality, 1988). However, industrial use of septic tanks and leach beds are suspected sources of pollution in some areas. Potential contaminants include cyanide, heavy metals, ammonia, nitrates, bacteria, viruses, and VOCs.

Table 5-1, reproduced from the MAG Waste Stream Study, is an inventory of solid waste facilities in or in the vicinity of the planning area.

5.1.4 *Wastewater Treatment Plant Effluent*

Use of effluent for irrigation or disposal of effluent to stream channels or lagoons has potential to impact surface water or groundwater quality in parts of the planning area. Pollutants of major concern include nitrate, heavy metals, and pathogens (bacteria and viruses). Boron, elevated concentrations of dissolved solids, and fluoride have also been identified as potential pollutants in sewage effluent.

Impacts of sewage effluent to groundwater in the planning area were studied for over 10 years at the 91st Avenue and 23rd Avenue Projects. At these pilot projects, effluent from the 91st Avenue (Flushing Meadows) and 23rd Avenue treatment plants was spread in infiltration basins and then used to recharge groundwater. Passage of the effluent through soils in the floors of the infiltration basins reduced the concentrations of some pollutants, but others were not affected (Bouwer, 1981).

5.1.5 Hydrologic Modifications

The term hydrologic modifications refers to man-made alterations to or withdrawals from surface waters or aquifers. Nonpoint source pollution issues that can be related to hydrologic modifications in surface waters and groundwater may include:

- Eutrophication and bacterial contamination of surface waters.
- Sedimentation and accumulation of heavy metals and persistent pesticides in reservoirs.
- Impacts of water storage projects and floodplain development on instream water quality and riparian habitats.
- Lowering of the water table and changes in vertical and horizontal directions of flow due to large-scale pumping and diversions.
- Formation of "perched" groundwater due to irrigation return flows or other sources of recharge. Importation of water from the Colorado River to the planning area is a hydrologic modification that has potential impacts on the quality of groundwater and surface water.

Water quality impacts due to hydrologic modifications in the planning area are significant, and many cannot be eliminated or even significantly reduced without profound changes in the patterns of water use. The water quality and quantity impacts of hydrologic modifications are difficult to anticipate and are difficult to manage. Historically, they have been relegated to a position of secondary importance due to overriding water quantity concerns.

5.1.6 *Leaks and Spills*

Unintentional leaks and spills of chemicals and petroleum products were not identified as a nonpoint source category in the original 1979 MAG 208 Plan. However, during the period after the 1979 edition of the Plan was completed, leaks and spills from underground storage tanks and hazardous waste containments emerged as a groundwater quality problem of major proportions in the planning area. The magnitude of the problem began to be identified in the mid-1980s, when state and federal regulations for upgrading underground storage tanks (USTs) were enacted. Since then, many UST owners in the planning area have closed USTs rather than attempt to comply with the requirements of the new regulations. The regulations also include requirements for closure and clean-up of contamination from closed tanks. Leaks, spills, or other releases have been identified at an estimated 60 to 80 percent of the USTs that have been closed.

Most USTs in the planning area are used to store petroleum products, and most UST releases involve gasoline, motor oil, or diesel fuel. Some releases have involved solvents such as trichloroethylene (TCE), trichloroethane (TCA) and perchloroethylene (PCE). Because the depths to the water table is greater than 50 feet in most of the planning area, many small releases are adsorbed by the soil and never reach the water table. However, a thick vadose zone does not necessarily provide groundwater protection against all releases. Furthermore, in parts of the planning area, soil below a depth of 10 to 20 feet consists of boulders, gravel, and sand. These have low adsorption and high porosity, giving them less ability to retard the downward migration of contaminants. A leak from a UST can go undetected for years, and large quantities of products or chemicals can be released from a very small leak. In some cases, overfilling of USTs, and pipe leaks can also cause contamination.

5.2 Nonpoint Source Studies in the Planning Area

After the 1979 Plan was completed, MAG commissioned studies to more accurately evaluate specific nonpoint source issues, including: 1) irrigation return flow and "perched" groundwater, 2) urban storm runoff, 3) altered patterns of groundwater flow in the vicinity of Chandler and Goodyear, 4) landfills along the Salt River, and 5) pesticides (namely EDB and DBCP) and volatile organic chemicals (VOCs) in groundwater in eastern Mesa and other parts of the planning area. These studies were conducted by consultants and results are provided in reports located in MAG files.

5.2.1 Perched Groundwater

"Perched" groundwater, or groundwater that occurs in saturated zones above the main water table, occurs mainly below irrigated lands in the planning area. In some areas, the shallow groundwater may be truly perched in the sense of the classical definition: that is, it is separated from underlying groundwater by an unsaturated zone. However, in other areas, the "perched" groundwater may simply represent the top of the saturated zone in an area where the hydraulic head of the deeper groundwater has been reduced by pumping. In either situation, the shallow groundwater does not mix with deeper groundwater, and samples of the perched groundwater can be used to evaluate the impact of deep percolation in areas where mixing does occur.

In the MAG study, samples of perched groundwater were collected from existing irrigation wells and from monitoring wells. At irrigation wells, perched water sometimes cascades into the well through openings in the well casing above the water table. The cascading water can be sampled by lowering an open bucket down the well. Monitoring wells for sampling perched water are constructed by drilling into the shallowest saturated zone.

The results of the study showed that in some areas near irrigation canals, perched groundwater was caused by canal seepage, and the impact on deeper groundwater was generally positive. Water that seeps from canals is generally of better quality than that of groundwater in most of the former and present irrigated areas of the planning area. However, in other areas of perched groundwater, the perched water represented deep percolation of irrigation water and had a high salinity and nitrate content. In these areas, mixing of the perched water with the deeper groundwater would have adverse impacts on the quality of water pumped for most uses.

In six monitor wells that were installed near Gilbert for the specific purpose of sampling shallow groundwater affected by deep percolation of irrigation water, the concentration of total dissolved solids exceeded that of deeper water by a factor of three to four. However, no pesticides or arsenic were detected.

5.2.2 *Urban Storm Runoff*

In a study of urban storm runoff, MAG evaluated potential impacts by sampling at storm sewer outfalls along the Salt River and at a drywell. At the sewer outfalls, grab samples of runoff were collected during six winter storms and one summer storm in 1979 and 1980. In the drywell study, storm runoff was sampled near a drywell, monitor wells were installed, and samples of groundwater were collected.

Results of the dry well study indicated that storm runoff may not necessarily have a significant impact on the quality of groundwater. Heavy metals were detected in runoff, but mostly in nondissolved forms, presumably bound to fine-grained sediments such as silt and clay. The results also suggest that drywell sediments might contain hazardous concentrations of metals and organic compounds.

5.2.3 *Altered Patterns of Groundwater Flow*

In two parts of the planning area, increases in the concentration of total dissolved solids in groundwater have impacted municipal water supply wells. In both of these areas, Goodyear and Chandler, groundwater has historically been an important component of the municipal supply. MAG initiated studies to identify the reasons for the increased levels of TDS.

In the Chandler area, the results of the study were interpreted to indicate that increases in salinity in one of two areas in Chandler were due to the downward migration of highly saline shallow groundwater. In a second area, highly saline groundwater was migrating horizontally. In both cases, migration was due to hydraulic gradients that had been induced by large-scale pumping.

Results from the study conducted at Goodyear were similar to the results for Chandler. Increasing concentrations of dissolved solids in the wells were attributable to the horizontal movement of groundwater in response to hydraulic gradients that had been induced by large-scale pumping.

5.2.4 *Landfills*

On several occasions in recent years, inflows to the reservoir systems on the Salt and Verde Rivers exceeded storage capacity and significant quantities of water were released into the normally dry channel of the Salt River through metropolitan Phoenix. These flows caused flooding, washouts and an elevated groundwater table affecting landfills along the entire reach of the Salt River. The Salt River Landfill Advisory Committee, created by the City of Phoenix City Council in December 1984, identified 42 possible private and public landfills along the Salt River within the City of Phoenix. However, many other landfills outside the Phoenix city limits were not part of this study.

In February 1979, the Arizona Department of Health Services (ADHS), entered into a consent agreement with the City of Phoenix to cease operations at the Del Rio (16th Street) and 19th Avenue Landfills. The City of Phoenix also agreed to initiate geologic and hydrogeologic studies at the Del Rio Landfill, 19th Avenue Landfill, and 27th Avenue Landfill. These reports have been submitted to the Arizona Department of Environmental Quality (ADEQ). An initial set of groundwater monitoring wells were installed by the City at these three landfills and a quarterly groundwater quality monitoring program was initiated. Since 1979 the City has increased the number of groundwater monitoring wells at each of the landfill sites. All groundwater monitoring data is submitted quarterly to the ADEQ. Elevated organic constituents have been detected in both upgradient and downgradient monitor wells at these landfills.

The 19th Avenue Landfill is a federal Superfund site. This landfill has been extensively studied by environmental consultants retained by the City of Phoenix. The City is currently working on detailed construction plans for remedial actions at this site that were identified in a Remedial Action Plan (RAP) approved by both ADEQ and U.S. EPA. The implementation of this plan is directed by a recently filed Consent Decree between the City and ADEQ.

Another landfill, the Tri-Cities Landfill, was also evaluated by MAG as part of the landfill study. At monitor wells drilled downgradient from the landfill, "perched" groundwater was encountered during drilling, but no evidence of landfill leachate was identified in the monitor wells. However, subsequent sampling of wells in eastern Mesa, as part of the MAG study of pesticides and VOCs, showed that VOCs were present in both wells.

5.2.5 Pesticides and VOCs

The occurrence of VOCs and pesticides in groundwater was investigated by MAG as a continuation of a study that was initiated by ADHS. The objectives of the studies were to: 1) identify problem areas that should be avoided during the siting of public water-supply wells, and 2) to formulate possible remedial action measures.

Initial water quality sampling for the canceled pesticide dibromochloropropane (DBCP) was conducted by ADHS in areas of citrus production. Contamination was identified in four areas: East Mesa, Chandler Heights, South Phoenix, and Glendale. MAG subsequently undertook additional sampling to more accurately assess the extent of DBCP and VOCs in groundwater in Mesa which might impact the municipal water supply. Contamination of groundwater by DBCP had necessitated the removal of some wells from the city water-supply system. Trichlorethylene (TCE) and other VOCs were also identified in some of the wells.

The results of the study indicated that VOCs were present in concentrations greater than regulatory standards in wells situated downgradient of the Tri-Cities Landfill, near the community of Lehi. TCE, perchloroethylene (PCE), Freon-113, and 1,1-DCE (dichloroethane) were detected most frequently and/or in highest concentrations. However, no drinking water wells had been affected by the VOCs, and therefore no municipal supply wells were threatened.

DBCP was detected more frequently than were VOCs. It is estimated that 180,000 acre-feet of groundwater was contaminated, and three municipal water supply wells had been impacted and were removed from service. Depth-specific sampling showed that DBCP mainly occurred in groundwater that had characteristics of irrigation return flow. Therefore, the source of DBCP in the wells may have been precancellation applications of the chemical in the area's citrus orchards.

5.3 Nonpoint Sources in WQARF Sites

The Water Quality Assurance Revolving Fund (WQARF) was created by the Arizona Legislature in the early 1980s to provide a financial resource for the remediation of contaminated municipal water supplies, such as in the eastern Mesa area, where municipal wells had been closed due to the contamination by DBCP. WQARF was expanded by the 1986 Environmental Quality Act to also address those sites where nondrinking water quality has been adversely impacted or threatened by the release of hazardous substances. WQARF supports a remedial action program administered by ADEQ, in the form of providing grants to other agencies for the coordination of cleanup efforts. WQARF is also a source of funds for emergency response activities.

In January 1991, ADEQ listed 21 WQARF sites in the planning area. At 10 of these sites , WQARF funds are being used for investigation and/or remediation. At the other 11 sites, investigation and/or remediation is being conducted by voluntary parties.

VOCs are the main contaminant at WQARF sites. Of the 21 sites in the planning area, VOC contamination of groundwater has been identified at 16 sites. At the other 5 sites, contamination is due to pesticides and/or toxic metals. At most sites where VOCs are the contaminants, groundwater contamination has been identified. At other sites, surface waters have been contaminated or are threatened.

Ten WQARF sites are discussed in the following sections; these sites are being investigated and/or remediated with WQARF funds. WQARF sites that are being investigated and/or remediated by voluntary parties are listed on Table 5-1.

TABLE 5-1
WQARF SITES BEING INVESTIGATED
OR REMEDIATED BY VOLUNTARY PARTIES

Sites	Contaminants	Known Groundwater Contaminants?
Estes 40th Street Landfill	VOCs	Yes
General Electric	VOCs	Yes
Honeywell Deer Valley	VOCs	Yes
Honeywell Peoria	VOCs	Yes
Intel	VOCs	Yes[1]
Litton Connor Garret	VOCs	Yes
Motorola 56th Street	VOCs	Yes
Papago Military Reservation	VOCs	Unknown
Wickenburg Mill	Hazardous mining wastes	No

[1] Contaminated groundwater may not be part of a drinking water aquifer.

5.3.1 *West Van Buren Site*

At the West Van Buren WQARF site, contaminants that have been detected in concentrations that exceed regulatory limits include TCE, PCE, 1,1-DCE (dichloroethylene), 1,2-DCA (dichloroethane), trichlorofluoromethane, and benzene.

Contaminants have been detected in 13 wells. No active municipal supply wells have been adversely impacted, but a number of wells are within 3 miles of the site's boundaries. An investigation is underway to identify sources of pollution.

5.3.2 *South Mesa Site*

At the South Mesa WQARF site, contaminants that have been detected in concentrations exceeding regulatory levels are TCE, PCE, and 1,1-DCE.

Contaminants have been detected in only two production wells. However, VOCs have also been detected in monitor wells that were installed near the northwest corner of the site as part of a groundwater study for the investigation at a Motorola Mesa facility.

5.3.3 *West Central Phoenix*

The West Central Phoenix WQARF site lies immediately north of the West Van Buren site. Groundwater contaminants include TCE, 1,1-DCE, 1,2-DCE, and PCE; three separate plumes have been identified. Disposal of industrial wastes in septic tanks and seepage pits in the late 1950s and 1960s may have caused contamination in part of the site.

Four City of Phoenix municipal water supply wells have been impacted and have been taken out of service. Several responsible parties have been identified to date.

5.3.4 *Mesa DBCP Site*

The DBCP site is in northeast Mesa and includes the area where the MAG study and ADHS identified DBCP in about 18 production wells. Three water-supply wells have been impacted and have been taken out of service. At the present, WQARF funds are being used for remediation at one City of Mesa water-supply well.

The area coincides with an area of present or former citrus groves.

5.3.5 *East Washington Site*

At the East Washington WQARF site, the most common VOCs that have been detected are: TCE, PCE, 1,2-DCE, 1,1-DCE, benzene, vinyl chloride, and chloroform. Altogether, a total of 15 VOCs have been found in groundwater at concentrations exceeding regulatory levels.

Six specific areas of contamination have been identified in the East Washington site, and VOCs have been detected in a number of wells. Many of the impacted wells are monitor wells that have been installed by voluntary parties; a total of 13 private parties are conducting monitoring and/or remedial work with ADEQ oversight. No municipal water-supply wells have been adversely impacted, although a City irrigation well has.

5.3.6 *Sky Harbor Site*

At the Sky Harbor WQARF site, VOCs and fuel have been detected in groundwater, but no drinking-water supply wells have been impacted. The investigation of contaminated groundwater in the area is being conducted by the City of Phoenix. WQARF funds will be used to conduct investigations at properties leased by facilities that are not conducting their own assessments.

5.3.7 *Northeast Mesa*

The Northeast Mesa WQARF site is one of the smaller sites in the planning area. VOCs have been detected in one irrigation well on-site, but no water-supply wells have been impacted. Contaminants identified include: TCE and 1,1,-DCE.

5.3.8 *East Central Phoenix Site*

At the East Central Phoenix WQARF site, VOCs have been detected in irrigation wells but no drinking water-supply wells have been impacted. Contaminants that have been detected are TCE, PCE, and TCA. Dry cleaning facilities nearby are suspected as being among the potential sources of these contaminants.

5.3.9 *Lower/Middle Gila River WQARF Site*

Sediments and runoff contaminated with pesticides and heavy metals have adversely impacted water quality in the Lower and Middle Gila River. Segments of the river have been posted against fishing since relatively high levels of pesticides have been detected in fish tissue.

5.3.10 *Goodyear Water Supply Site*

The Goodyear Water Supply Site lies near a federal superfund site, the Phoenix-Goodyear Airport CERCLA site. WQARF funds have been used for groundwater monitoring of potentially affected wells located on the airport property.

5.4 Nonpoint Sources in CERCLA Sites

Eleven sites in Arizona which have been proposed or are listed on the EPA's National Priority List are being investigated under the EPA's "Superfund" program. Eight of these sites are in the planning area and VOCs in groundwater are the main water quality issue at each. The sites are described below.

5.4.1 *Indian Bend Wash (North and South)*

The Indian Bend Wash Superfund site is a 13-square mile area bounded by Chapparal Road on the north, Pima/Price Road on the east, Apache Boulevard on the south, and Scottsdale Road on the west. The study includes the Cities of Tempe and Scottsdale and is currently being managed as two separate sites: North Indian Bend Wash and South Indian Bend Wash, divided by the Salt River. VOCs have been detected in concentrations exceeding regulatory levels, at both sites, and municipal wells have been impacted.

In the North Indian Bend Wash site, responsible parties have been identified and negotiations with the EPA are underway to address remediation of contaminated groundwater. In the South Indian Bend Wash site, the U.S. EPA is still attempting to measure the extent of groundwater contamination and to identify responsible parties. In both of these sites, on-site disposal of industrial wastes may be responsible for the groundwater contamination. Landfills along the Salt River may also be a contributing factor.

5.4.2 *Mesa Area*

The Mesa Area was a proposed CERCLA site that was removed from the National Priority List. Groundwater has been contaminated by VOCs, and the Motorola, Inc. Mesa Center is the only identified source. Contamination may have been caused by leaks, spills, or disposal of industrial solvents. No drinking water-supply wells have been impacted.

Motorola, Inc. is pumping and treating groundwater from on-site and off-site wells and is using the water for industrial purposes after treatment.

5.4.3 *Motorola 52nd Street*

The Motorola 52nd Street Plant has been identified as a possible source of VOC contamination of groundwater via spills, leaks and on-site disposal of industrial solvents such as TCE and TCA.

A site investigation to measure the extent of contamination has been underway since 1983. During part of that time, a pilot treatment system has been in operation. Small quantities of groundwater have been pumped from onsite wells for in-plant treatment and industrial use. A larger-scale version of the system began operating in 1992 for capture and treatment of contaminated groundwater.

5.4.4 19th Avenue Landfill

The 19th Avenue Landfill was placed on the National Priority List after the earliest studies conducted by the City of Phoenix and MAG identified groundwater contamination due to flooding in the Salt River. A remedial investigation has been completed by the City. A remediation program which has been approved includes capping, methane venting, flood protection and groundwater monitoring. Groundwater treatment is not presently part of the remediation program. Since 1979, the concentration of some contaminants have decreased, possibly due to the discontinued use of the landfill and a reduction in flows in the Salt River.

5.4.5 Phoenix-Goodyear Airport

At the Phoenix-Goodyear Airport CERCLA site, VOCs have contaminated groundwater and soils. Chromium and cadmium contaminated soils have been excavated and stabilized. Spills, leaks, and disposal of industrial wastes and/or solvents at facilities near the airport are considered to be be the sources of these contaminants. A municipal water-supply well for the Town of Goodyear has been adversely affected.

Responsible parties have been identified and remedial efforts are currently underway.

5.4.6 Hassayampa Landfill

When the 19th Avenue Landfill was closed to dumping in 1978, many industrial disposal activities were transferred to the Hassayampa Landfill west of Phoenix. Liquid industrial wastes, some of which would now be classified as hazardous, were dumped in open trenches. The wastes infiltrated to the groundwater, and VOC contamination resulted.

A total of 85 voluntary parties, under ADEQ guidance, have initiated an investigation to identify the location of former waste pits, measure the extent of groundwater contamination, and monitor concentrations of contaminants in groundwater.

5.4.7 Luke Air Force Base

Luke Air Force Base, near Litchfield Park, is a National Priority List site due to soil contamination by VOCs and petroleum products. Investigations commenced under the Air Force's Installation Restoration Program, and more complete investigations are scheduled to commence under the terms of an agreement between the EPA, ADEQ, and Luke AFB.

5.4.8 *Williams Air Force Base*

Leaks, spills, and disposal of industrial chemicals, fuels, solvents, and pesticides have resulted in the contamination of soil and groundwater at Williams Air Force Base. The site is on the National Priority List. Investigation and remediation are being administered under the Air Force's Installation Restoration Program.

5.5 Leaking Underground Storage Tanks

Sites of leaking underground storage tanks (LUSTs) far exceed the number of any other single point or nonpoint source in the planning area. As of January 1, 1990, 509 LUST sites had been reported in Maricopa County, representing about 55 percent of the LUST sites statewide.

Most USTs hold petroleum products (diesel fuel, gasoline, or motor oil), and contamination from these sources is due to a combination of chemical compounds. Benzene, which occurs in concentrations as high as a few percent in gasoline but only at trace levels in diesel fuel, is frequently the most troublesome. Benzene is volatile, soluble, and carcinogenic when ingested. For drinking water supplies, the maximum contaminant level (MCL) for benzene is among the lowest of any contaminant: 5 ug/l or ppb.

Groundwater contamination from leaking USTs has occurred throughout the planning area. Every present or former gasoline station is a potential source. Thousands of USTs have also been installed by businesses and industries to store fuel for company vehicles. The more serious contamination incidents are associated with heavily used UST systems. Sites in the planning area where significant volumes of fuel have leaked include airports, the Van Buren tank farm, and the City of Phoenix Glenrosa Service Center. At the Glenrosa Service Center, an estimated 900,000 gallons of gasoline leaked to the groundwater. Remedial efforts have been underway for several years. At the Van Buren tank farm, which is primarily not a UST facility because most of the tanks are above ground, fuel releases have created a contaminant plume that is 4.5 miles long.

5.6 Existing Regulatory Programs

The Arizona Department of Environmental Quality (ADEQ) was established in 1986 and designated as the lead state agency with responsibility for regulating and abating nonpoint sources of water pollution. Specific programs that have been developed within ADEQ are described in the following sections. None of these programs existed in 1979, when the initial MAG 208 Plan was prepared.

5.6.1 Aquifer Protection Permits

5.6.1.1 Individual Permits. ADEQ's Aquifer Protection Permit (APP) program is the principal management program for regulating discharges to groundwater and most other sources that are considered nonpoint under federal definition. Aquifer protection permits are also required for point source discharge to surface waters. By statute, activities that require APPs include:

- Surface impoundments including holding, storage, settling, treatment or disposal pits, ponds and lagoons.
- Solid waste disposal facilities.
- Injection wells.
- Land treatment facilities.
- Facilities that add a pollutant to a salt dome, a salt bed, a dry well, or an underground cave or mine.
- Mine tailings piles and ponds.
- Mine leaching operation.
- Septic tank systems that have a capacity greater than 2000 gallons per day.
- Recharge, storage, and recovery projects for groundwater.
- Sewage or sludge ponds and wastewater treatment facilities.

- Point source discharges to navigable waters.

A facility in one of these categories is defined as a discharging facility and requires that the owner/operator acquire either a general or an individual APP, as required by statute.

5.6.1.2 General Permits. ADEQ has the statutory authority to issue general APPs for categories of facilities or activities that are similar in nature, large in number, for those for which the cost of issuing an individual permit cannot be justified by any environmental or public health benefit to be gained in such issuance, or where the appropriate conditions for aquifer protection can be met without an individual permit. To date, ADEQ has issued general permits for application of sludge, recharge from water treatment plants of less than 1000 gallons per day, hydrostatic pipeline testing, application of nitrogen fertilizers, and concentrated animal feeding operations.

5.6.1.3 BMP and BADCT. ADEQ has two regulatory tools to control pollutant discharges under the APP program: BADCT (best available demonstrated control technology) and BMPs (best management practices). An individual aquifer protection permit will require that a facility can demonstrate compliance with BADCT. To maintain eligibility for operation under a general permit, persons must comply with BMPs. Otherwise, ADEQ may require an individual permit.

ADEQ is in the process of preparing BMP and BADCT guidance documents. As of January 1, 1991, BADCT guidance documents had been prepared for the following four categories of discharges.

- Landfills.
- Mining.
- Municipal waste water treatment facilities.
- Industrial wastes and waste streams.

Best Management Practices may be established for the following facilities or activites:

- Onsite facilities for urban runoff.

- Storm sewers.
- Urban runoff.
- Silviculture activities.
- Septic tank systems that have a capacity not greater than 2000 gallon per day.
- Agricultural application of nitrogen fertilizer.
- Concentrated animal feeding operations.
- Other facilities or activities that are established by rule.

BMP guidance documents have been prepared for those categories of facilities for which general permits have been issued:

- Sludge application.
- Recharge from water treatment plants of less than 1000 gallons per day.
- Hydrostatic pipeline testing.
- Application of nitrogen fertilizer.
- Concentrated animal feeding operations.

5.6.1.4 Exempt Facilities. By statute, certain types of activities and facilities are exempt from the APP program. These activities or facilities may be regulated under other programs. They are perceived as not representing a threat to water quality. Exempt categories include household and domestic activities, discharges to a community sewer system, and facilities that are permitted to use reclaimed wastewater, among others.

Rules that establish procedures for obtaining and permit conditions for APPs have been finalized. In general, the rules address the transition from the predecessor program: the Groundwater Quality Protection Permits programs. More than 300 facilities had been granted permits prior to the introduction of the APP program. Under the APP rules, facilities that have obtained Groundwater Quality Protection

Permits and are operating under the conditions of the permit, without violating Aquifer Water Quality Standards, are deemed to be in compliance with the APP requirements. ADEQ has established a priority list for permitting these facilities under the new program.

5.6.2 UST Program

Leaking underground storage tanks are a nonpoint source that has had a significant impact on groundwater quality in the planning area. ADEQ has been given the statutory authority for regulating USTs and controlling and abating releases from leaking USTs.

The state statutes provide for UST registration, release detection systems, release detection record keeping, release reporting, and corrective action. The statutes also: 1) specify that UST owners provide evidence of financial responsibility, 2) establish liability for guarantors, 3) specify general tank performance standards, 4) establish a UST revolving fund for costs of corrective actions, and 5) give ADEQ authority to establish rules for administering and carrying out the UST program.

As of January 1, 1991, ADEQ had not developed any rules for UST management, although draft rules are scheduled for promulgation in 1991. Therefore, the program is currently being run under federal UST regulations. These regulations address most aspects of UST management with varying degrees of specificity.

5.6.3 Drywell Program

The Environmental Quality Act gives ADEQ the authority to establish a dry well management program. The Act authorizes ADEQ to establish rules for: 1) the performance, operation, construction, design, closure, location, and inspection of drywells; and 2) licensing of dry well drillers and 3) registration of all existing and new drywells.

As of January 1, 1993, ADEQ had not exercised its full authority for managing drywells. Drywell standards and licensing of drillers must be established by rule, and rules have not been written. Therefore, ADEQ's authority for regulating drywells is limited to those drywells that are included in the APP program: that is, dry wells into which a pollutant is introduced (ARS 49-241) or dry wells that drain areas in which hazardous substances are used, stored, loaded, or treated (AAC R18-9-102).

5.6.4 *Hazardous Waste Management Program*

ADEQ is the authorized state agency for Arizona's hazardous waste management program, which controls the generation, treatment, storage, transportation, and disposal of hazardous waste in accordance with federal regulations, primarily the Resources Conservation and Recovery Act (RCRA). ADEQ's main regulatory tool for controlling nonpoint pollution from hazardous wastes is the compliance inspection program. Sites where hazardous wastes are generated transported, treated, stored, or disposed are periodically inspected, and if necessary, corrections of violations are pursued through the compliance and enforcement process. If pollution is suspected, an investigation is required.

At RCRA sites where water pollution is suspected, investigation and remediation may be transferred to the WQARF program.

5.6.5 *Pesticide Management*

The 1986 Arizona Environmental Quality Act (EQA) mandated that ADEQ adopt a program of Pesticide Contamination Prevention (PCP) for agricultural use pesticides. The PCP program is not a permit program and does not utilize or rely upon the implementation of BMPs.

Nonpoint Source impacts of agricultural use pesticides upon groundwater are regulated by the ADEQ through the Pesticide Contamination Prevention program. The PCP program integrates six regulatory mechanisms as defined in statute in the Arizona EQA to accomplish the goal of protecting Arizona groundwater from NPS agricultural use pesticide contamination. These regulatory mechanisms consist of the following:

- Information submittal by pesticide registrants.
- Establishment of numeric values.
- Development of a groundwater protection list.
- Reporting on the use and sales of pesticides on the groundwater protection list by users and dealer.
- Monitoring and testing of groundwater and soil for agricultural use pesticide contamination.

- Upon detection, review of circumstances surrounding contamination to determine whether use of the pesticide should be modified or discontinued.

By statute, the registrant of an agricultural use pesticide for use in Arizona must submit to the ADEQ specific criteria for each active ingredient for evaluation for groundwater pollution potential. These criteria are listed as follows:

- Water Solubility.
- Vapor Pressure.
- Henry's Law Constant.
- Octanol Water Partition Coefficient.
- Soil Absorption Coefficient.
- Hydrolysis Half-life.
- Photolysis Half-life.
- Soil Aerobic Metabolic Half-life.
- Soil Anaerobic Metabolic Half-life.
- Field Dissipation Half-life.

The ADEQ has established by rule specific numeric criteria for water solubility, soil absorption coefficient, hydrolysis, anaerobic and aerobic soil metabolism and field dissipation. By rule, an active ingredient of an agricultural use pesticide which has a water solubility greater than 30 ppm or a soil absorption coefficient (kd) of less than 5 and any dissipation half-life greater than 3 weeks is indicated as having a capacity of leaching to groundwater. An agricultural use pesticide is therefore categorized as a "suspect leacher" if the chemical and physical criteria indicated that it is both mobile (based on water solubility or soil absorption value) and persistent (based on dissipation half-life).

The ADEQ shall be establishing by rule a groundwater protection list consisting of active ingredients for agricultural use pesticides which have the potential to pollute groundwater. Agricultural use pesticides which are identified as both mobile and persistent are placed on the groundwater protection list. Dealers will be required to make quarterly reports to the Director of ADEQ of all pesticide sales.

Agricultural use pesticides which are placed upon the groundwater protection list shall be included in statewide groundwater monitoring and soil testing programs. ADEQ will monitor both soil and groundwater in those areas of the state where agricultural use pesticides have been used and where a reasonable probability exists that a specific active ingredient may leach to pollute groundwater.

A registrant of an agricultural use pesticide shall be notified when an active ingredient or degradation product of an agricultural use pesticide is detected:

- 8 feet below the soil surface or below the root zone of a crop where the active ingredient was used.
- Below the soil microbial zone.
- In the groundwater of the state.

Upon notification that an active ingredient or a degradation product which has an identified potential to pose a threat to public health has been detected in the soil or groundwater of the State, a registrant may modify the label use instructions in such a manner that the active ingredient cannot pollute groundwater. If the label cannot be modified in manner which will ensure that the active ingredient will not pollute groundwater in the state the registration of the pesticide shall be canceled. If an agricultural use pesticide is found to be carcinogenic, mutagenic, teratogenic or toxic to humans, the registration shall be immediately canceled.

5.6.6 Water Quality Monitoring Program

ADEQ has the statutory authority to establish and conduct monitoring programs for surface and groundwater for the specific purposes listed below:

- Detect the presence of new and existing pollutants.
- Determine compliance with applicable water quality standards.
- Determine the effectiveness of BMPs and BADCTs.
- Evaluate the effects of pollutants on public health or the environment.

- Determine water quality trends.

As part of the monitoring program, ADEQ is also authorized to maintain a statewide data base of groundwater and soils that are sampled for pollutants. The data base was initiated in 1989 and is comprised of data obtained through ADEQ's monitoring efforts as well as the monitoring programs of the Arizona Department of Water Resources and other state and federal agencies.

5.6.7 Nonpoint Source Management Program

ADEQ is the lead agency designated to implement Section 319 of the 1987 Amendment to the federal Clean Water Act in Arizona. Section 319, "Nonpoint Source Management Programs," directs states to prepare a nonpoint source assessment report and a nonpoint source management program. The objectives of the assessment report are to:

- Identify navigable waters that, without nonpoint source pollution control, cannot be expected to meet water quality standards.
- Identify categories of nonpoint sources that add significant pollution to navigable waters.
- Describe the processes that will be used to develop BMPs that will control nonpoint sources.
- Identify state and local programs for controlling nonpoint sources.

The objectives of the management program are to:

- Identify BMPs and programs to implement BMPs for those nonpoint sources that are identified in the assessment report.
- Establish a schedule and identify sources of funding for implementing the management program.

The emphasis of the Section 319 program is on surface water; however, the degree to which a management program addresses groundwater quality protection from nonpoint sources is one criterion that is used to judge the eligibility of the program for federal funding.

ADEQ completed its 1988 Nonpoint Source Assessment Report in 1990. The Nonpoint Source Water Quality Management Plan was approved by EPA and certified in January 1990. As a result, the ADEQ has received federal implementation funds. ADEQ's nonpoint assessment report identified five major nonpoint sources of water pollution in the Middle Gila River Basin, which includes metropolitan Phoenix and most of Maricopa County. These sources are:

- Agricultural activities, including irrigation tailwater and return flows, pesticide usage, and concentrated animal feeding operations.
- Urban, construction, and military nonpoint sources. These include storm runoff and leaks, spills, or disposal activities at military bases.
- Resource extraction, mainly sand and gravel pits. These sources contribute sediment load and create hydrologic modifications.
- Land disposal, including landfills, waste disposal lagoons, and septic tanks.
- Hydrologic or habitat modifications, mainly due to the high degree of surface-water management and the subsequent reduction in free-flowing rivers and streams.

A total of 504 miles of rivers and streams were reported as assessed in the 1988 NPS Assessment Report for Middle Gila Basin. Full attainment of water quality standards was not reported in any of the rivers and streams. Partial attainment was reported in 73 percent of the assessed miles, and 26 percent of the assessed miles were in the nonattainment category.

The nonpoint source management program identifies programs to control nonpoint sources. Relevant programs in the planning area are listed in Table 5-2. The APP program is the identified control program for many of the federal categories of nonpoint sources. For other categories, such as pesticides and wastewater reuse, specific permit programs have been developed.

The status of the programs varies. BMPs and BADCT have been developed for some programs, but not for others such as control of nonpoint sources associated with construction.

TABLE 5-2
ARIZONA NONPOINT
SOURCE MANAGEMENT PROGRAM

Source Category	Water Quality Program Type	Guidance
Agriculture		
Irrigated cropland	General APP	BMP
Feedlots	General APP	BMP
Pesticides	State Mgt. Program	Label modifications
Construction	Local ordinances	BMP
Urban runoff	NPDES, drywell rules, local ordinances, general APP	BMP
Resource extraction	Individual APP	BMP (surface water) BADCT (groundwater)
Land disposal		
Landfills	Individual APP	BADCT
On-site wastewater	Individual APP	BADCT
Sludge	Individual APP	BADCT
Reuse	NPS rules, Reuse permit	BMP
Recharge	NPS rules, individual APP	BADCT
Hydrologic/Habitat Modification	404 Permit, 401C, State certification	BMP

Acronyms: APP = Aquifer Protection Permit
BMP = Best Management Practice
BADCT = Best Available Demonstrated Control Technology

5.6.8 Stormwater Management Program

The EPA has recently developed regulations that address pollution due to stormwater runoff. The regulations require municipalities with population of 100,000 or more, according to the most recent census, as well as certain industries to apply for and obtain a stormwater discharge permit under the provisions of the National

Pollution Discharge Elimination System (NPDES) of the Clean Water Act. In the planning area, it is expected that Phoenix, Mesa, Scottsdale, Glendale, and Tempe will be required to apply for permits. The permitting process is phased with a two-part application. In Arizona, the program is currently being administered directly by the EPA. Phoenix submitted Part I of the application in October 1991. Additional cities may also be required to apply based on 1990 census results.

The new program treats stormwater as a point source, even though storm runoff in urban areas has been traditionally treated as a nonpoint source of pollution. However, in most of the United States, stormwater is collected, conveyed, and discharged via a storm sewer system, and the discharge meets the legal definition of a point source. In many parts of the planning area, no storm sewers exist, and stormwater will not be regulated under the new federal program.

The program is intended to reduce pollution loading from stormwater discharges by: 1) improved characterization of the stormwater conveyance system (e.g., more complete identification of land uses and facilities in the watershed), 2) monitoring of outfalls, and 3) implementation of management programs to control the introduction of pollutants into the system. Management techniques may include structural and non-structural controls, programs to identify illegal connections and illegal dumping, monitoring of industrial runoff, and implementation of BMPs. Permittees such as municipalities that have integrated storm sewer systems will be required to implement and sustain compliance programs.

The Maricopa Association of Governments is closely coordinating with the Maricopa County Flood Control District in order to develop a regional approach for complying with the requirements of the Federal Stormwater Management Program. A Regional Stormwater Task Force has been established by MAG to develop this regional approach. The Task Force is composed of representatives from MAG member agencies and is staffed by the Maricopa County Flood Control District.

5.7 Additional Control Needs

In the 1979 MAG 208 Plan, control measures were proposed for three categories of nonpoint sources that had been identified: landfills, industrial wastes, and hydrologic modifications. Needs for regional and site-specific groundwater quality monitoring were also described. However, at the time that the Plan was completed, an institutional and regulatory framework did not exist for implementing the recommended measures.

The framework now exists. In the early 1980s, an increasing number of groundwater contamination incidents were identified in Arizona; many of them were in Maricopa County. The Arizona Legislature responded with the enactment of the 1986 Environmental Quality Act, creating the Arizona Department of Environmental Quality establishing the Aquifer Protection Permit (APP) program, the pesticide management program, statewide water quality monitoring, WQARF, and the dry well program. Other nonpoint source control programs that existed under ADEQ's predecessor agency, the Department of Health Services, were strengthened, and ADEQ has been given the statutory authority to manage federal programs that target other nonpoint sources such as hazardous wastes and USTs.

Although the regulatory and institutional frameworks for control of most nonpoint sources are now in place, control needs still exists. Because of funding and staffing shortfalls, most programs are underfunded and understaffed and, as a result, they have not reached their full level of effectiveness. Specific needs in existing regulatory programs that have a direct impact on nonpoint source control are listed below. ADEQ should continue to work with MAG member agencies to address the Nonpoint Source Management Program.

5.7.1 Aquifer Protection Permit Program

The Aquifer Protection Permit Program, ADEQ's main program for controlling nonpoint discharges to groundwater, has completed development of initial rules and is processing permits for new facilities. However, staffing and fundings levels are inadequate to address older facilities that were permitted under the predecessor program. At the current staffing levels, 20 to 25 years may be required to process Aquifer Protection Permits for the more than 1100 older facilities that have either filed Notices of Disposal or have obtained Groundwater Protection Permits.

The potential water quality impact from these older facilities cannot be assessed with complete accuracy; permitting requirements under the predecessor program were less stringent. The Legislature required ADEQ to develop a priority list and has increased permit staffing to allow permitting of 100 permits per year for 10 years. A priority list has been established for processing Aquifer Protection Permits so that facilities with the highest potential impact will be addressed first, but all of the facilities represent a potential impact and a nonpoint source control need to some degree.

The lack of a rigorous inspection program also may reduce the effectiveness of the APP program. Like other nonpoint source programs administratered by ADEQ, the APP program relies heavily on voluntary compliance. Informational and training seminars have been held for ADEQ's field inspectors and for field personnel at the county level. However, a closer integration of the APP program with other environmental and zoning programs at the city, county, and state level would improve the degree to which facilities are brought into compliance.

5.7.2 UST Program

The most urgent need with respect to UST management is increased staffing to deal with existing and future UST releases. At the existing staffing levels, the program has been overwhelmed by release incident reports. As a result, serious release incidents may not receive adequate and timely attention.

The present UST management program currently relies heavily on voluntary reporting and compliance, because of the staffing shortfall and the lack of rules. The degree to which UST owners and operators participate in the program is less than 100 percent. As a result, release incidents may not be reported, investigations and remedial activities are delayed, and the threat of water quality impacts is increased.

5.7.3 Dry Well Program

Rules for construction standards and licensing of dry well drillers have not been developed, and the existing registration program is voluntary. As a result, strong controls are lacking. Rules are needed, and a statewide inspection program should be considered to identify and register dry wells. Industrial facilities, particularly those that generate hazardous wastes, should be given highest priority.

5.7.4 Hazardous Waste Management Program

The federal and state programs for managing hazardous wastes are among the oldest and most highly developed of the nonpoint source control programs in the planning area. Since 1980, when the federal hazardous waste regulations became fully effective, a complex set of regulations and controls has spawned the development of a brand-new industry to transport, dispose, treat, and recycle hazardous wastes. However, the effectiveness of the Arizona program is seriously hampered by staffing shortages. As a result, inspections of permitted facilities are not completed on schedule, and compliance actions are delayed. At some facilities noncompliance has resulted in known released of hazardous wastes to the environment. When remediation has been postponed, potential impacts to water quality increase in severity.

No hazardous waste disposal facility currently exists in Arizona. Most hazardous wastes that are not recycled or treated are disposed out of state, and the lack of a local disposal facility may contribute to noncompliance with existing regulations. Hazardous waste disposal is expensive, and the premium for out-of-state disposal is an additional financial burden. Therefore, an in-state disposal facility for hazardous wastes could improve the degree of compliance and reduce nonpoint pollution.

5.7.5 *Pesticide Management Program*

ADEQ has implemented the initial phases of the pesticide management program. ADEQ estimates that completion of the studies will require multiyear funding at a level that is several times higher than the current funding level. If additional funding is not provided, the required field studies will not be completed on schedule.

The potential impacts of the funding and staffing shortages in the nonpoint source program cannot be accurately assessed. The purpose of the field studies and related monitoring activities is to more carefully evaluate listed pesticides under Arizona's climate and growing conditions. Results are used to cancel registrations for pesticides that show high levels of persistence, toxicity, or mobility. If the studies are not completed in a timely manner, pesticides with potential water quality impacts may continue to be used.

5.7.6 *Water Quality Monitoring Program*

The most significant nonpoint source control need with respect to water quality monitoring is an integrated data management program. The benefits of a statewide computerized water quality database that could be used by resource and regulatory agencies, water service organizations, and private facilities would be significant.

Since 1979, when the first Management Plan was prepared, the number of groundwater monitor wells in the planning area and the rate at which groundwater samples are collected have greatly increased, perhaps by a factor of 100 or more. A limited effort has been made by ADEQ, ADWR, the cities, and the irrigation districts to maintain water-quality databases, but no mechanism currently exists whereby the data from these programs can be integrated and accessed by outside users. Site-specific data from samples collected at sites investigated under existing programs such as UST, RCRA, CERCLA, and WQARF are even more restricted.

Much of these data presently exist only in individual reports and are virtually inaccessible.

ADEQ has the statutory responsibility for a state-wide water quality monitoring program and the creation of a computerized water quality database. However, the backlog of data is escalating at an increasing rate. Sampling continues at existing monitor wells and new wells are being drilled and sampled. As a result, the level of effort that will eventually be required may become so formidable that a functional water quality database will never become operational.

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Chapter 6 - Management Plan

A key element of the 208 planning process is identifying a management system to implement the plan. Specifically, Section C (1) of Section 208 of the Clean Water Act states that "*The Governor of each state in consultation with the planning agency shall designate one or more waste treatment management agencies which may be an existing or newly created local, regional or state agency or political subdivision.*" According to Section 208, the management agency must have authority:

(A) *to carry out appropriate portions of an areawide waste treatment management plan developed under subsection (b) of this section;*

(B) *to manage effectively waste treatment works and related facilities serving such area in conformance with any plan required by subsection (b) of this section;*

(C) *directly or by contract, to design and construct new works, and to operate and maintain new and existing works as required by any plan developed pursuant to subsection (b) of this section;*

(D) *to accept and utilize grants, or other funds from any source; for waste treatment management purposes;*

(E) *to raise revenues, including the assessment of waste treatment charges;*

(F) *to incur short and long-term indebtedness;*

(G) *to assure in implementation of an areawide waste treatment management plan that each participating community pays its proportionate share of treatment costs;*

(H) *to refuse to receive any wastes from any municipality or subdivision thereof, which does not comply with any provisions of an approved plan under this section applicable to such areas; and*

(I) *to accept for treatment industrial wastes.*

The Section 208 management requirements can be met by a single governmental entity or by distributing the duties and responsibilities to a group of governments, thus creating a management system.

The MAG 208 Water Quality Management Program calls for the MAG Regional Council, with the assistance of a Water Quality Advisory Committee and the MAG

Management Committee to be responsible for ongoing areawide wastewater management planning and coordination with local jurisdictions in meeting the requirements of the Clean Water Act. Coordination, local planning, grants management and operation are the responsibilities of local municipalities, plus in two cases subregional operating groups (SROGs) composed of local governments. The existing SROGs are the Multi-Cities SROG, comprised of Glendale, Mesa, Phoenix, Scottsdale, Tempe, and Youngtown; and the Peoria-Tolleson SROG.

The concept of subregional operating groups was originally developed to take advantage of the experience gained through intergovernmental cooperation by the local governments of Phoenix, Youngtown, Scottsdale, Mesa, Tempe, and Glendale. These local governments for over two decades have participated in a cooperative endeavor to provide wastewater management services. The concept has involved the designation of a Lead Agency and participation by various entities, jointly, to provide sewage collection and treatment facilities for much of the Phoenix metropolitan area.

The subregional operating group concept was designed to provide flexibility. Several governmental agencies of an area can participate jointly (multiple member SROG), and the concept is also applicable for other single entity areas (single member SROG). A local government may also be a member of more than one SROG.

The governing body of each city and town participating in a SROG has adopted a resolution establishing the SROG and agreeing to be a SROG member and requested, by letter, MAG designation of the SROG and its Lead Agency (Appendix B). MAG, in turn, adopted a resolution on January 17, 1979, designating each SROG and Lead Agency (Exhibit A). The cities of Avondale and Goodyear later adopted resolutions and were designated by MAG as the Avondale-Goodyear SROG; however, the Avondale-Goodyear SROG was subsequently dissolved. The future formation of additional multiple-member SROGs in the study area is possible but at present appears unlikely.

MAG is responsible for regional water quality management planning and for maintaining the MAG 208 Water Quality Management Program and process. The SROGs have each designated a Lead Agency to carry out the day-to-day operation of the system. Lead agency for the Multi-City SROG is the City of Phoenix. Lead agency for the Peoria-Tolleson SROG is the City of Tolleson.

Figure 6-1 identifies the agencies responsible for the various water quality management tasks. More than one agency is responsible for some tasks. For

	MAG	Multiple Member SROG			Municipality	ADEQ	Maricopa County Dept. of Environmental Management	EPA
		SROG Board	Lead Agency	City, Town, Sanitary District, Private Sewer Agency				
Areawide Planning (208 Plan)	•							
Adopt Plan and Update	•				•	•		
Assure Compliance with Adopted 208 Plan					•	•		
Assure Effective Management of Waste Treatment Works Under Conformance with 208 Plan		•	•	•	•	•		
Resolve Disagreements Among Local Governments	•	•						
Coordinate SROG Activities		•						
Facility Planning (201)		•	•	•	•	•		
Administer State Revolving Fund Loans		•	•	•	•	•		
Refuse to Receive Wastes for Non-compliance		•	•	•	•			
Operate and Maintain Wastewater Treatment Plants			•	•	•			
Construct Wastewater Treatment Plants			•	•	•			
Operate and Maintain Collection System				•	•			
Construct Collection System			•	•	•			
Industrial Discharge Monitoring			•	•	•			
Plant Monitoring and Regulation			•	•	•	•	•	•
Administer Monthly Service Charges				•	•			
Collect Connection Fees				•	•			
Incur Bonded Indebtedness				•	•			

Figure 6-1
WATER QUALITY MANAGEMENT SYSTEM - RESPONSIBILITIES

example, the responsibility for administering the state revolving loan funds could involve five agencies if a multiple member SROG is involved. In accordance with state regulations (R18-9-804(I)), the Arizona Department of Environmental Quality is responsible for determining consistency of proposed wastewater treatment systems with the MAG 208 Water Quality Management Plan. If a proposed system is inconsistent, the Department will not issue plan approval for the system. The jurisdiction in which the proposed facility would be located could request an amendment to the MAG 208 Plan, if the jurisdiction so desires. Once the amendment is approved by MAG the State and EPA, the proposed facility would become part of the 208 Plan.

ADEQ administers the revolving fund loan program for the EPA. In the case of a SROG, the Lead Agency is responsible for applying for the loan and meeting the State and Federal requirements attached to the loan. Each City and Town must approve the work done and application for the loan. The SROG has the responsibility of supervising the Lead Agency and assuring that all local, State, and Federal requirements are met.

A more detailed description of the agency responsibilities is given below.

6.1 Maricopa Association of Governments

The MAG Regional Council, Management Committee, and Water Quality Advisory Committee have major roles in managing the MAG 208 Water Quality Management Plan.

6.1.1 MAG Regional Council

The MAG Regional Council serves as the governing body of the Maricopa Association of Governments and is responsible for establishing and directing all MAG policies and activities. Membership is composed of one elected official, usually the mayor, from each member agency.

For water quality management planning, the MAG Regional Council maintains the MAG 208 Water Quality Management Program and the corresponding process. The Regional Council reviews pertinent water quality planning information; authorizes regional water quality studies as appropriate; adopts the MAG 208 Water Quality Management Plan; and approves plan updates and amendments.

6.1.2 MAG Management Committee

The MAG Management Committee serves as the primary advisory body to the MAG Regional Council. Membership is composed of the chief administrator from each member agency (usually the city, town, or county manager or designee).

The Management Committee reviews water quality information and recommendations from the MAG Water Quality Advisory Committee. The MAG Management Committee then makes recommendations on pertinent water quality matters to the MAG Regional Council.

6.1.3 MAG Water Quality Advisory Committee

The MAG Water Quality Advisory Committee provides recommendations on water quality issues that affect the MAG region such as the update of the MAG 208 Water Quality Management Plan. MAG serves as the designated regional planning agency for water quality management planning in Maricopa County. Within this role, the MAG Water Quality Advisory Committee reviews pertinent regional water quality information and issues; participates in the development of the MAG 208 Water Quality Management Plan; conducts public hearing on the 208 Plan, plan amendments, and plan updates; reviews State water quality management programs and requirements; and makes recommendations to the MAG Management Committee.

6.2 Subregional Operating Groups (SROGs)

Two multiple-member SROGs are currently designated by MAG for Maricopa County:

SROG	Lead Agency
Multi-City (Phoenix, Mesa, Tempe, Scottsdale, Youngtown, Glendale)	Phoenix
Tolleson-Peoria	Tolleson

The governing body of each city and town in each multiple member SROG has adopted a resolution to establish the SROG and agree to be a SROG member and requested designation by MAG (Appendix B). The resolutions also outline the duties and responsibilities assigned to MAG for overall planning and coordination of areawide water quality management in Maricopa County.

Intergovernmental Agreements describe SROG and member agency duties and responsibilities. The Intergovernmental Agreements establish a SROG Board appointed by the governing body of each member agency. Each of the SROGs may establish technical and/or citizen advisory committee(s) to assist in performing its duties and responsibilities.

Within each multiple member SROG, the Lead Agency fulfills the staff duties and responsibilities. The SROG Board serves as the supervisor for the Lead Agency. The Lead Agency provides staff to carry out the SROG duties and responsibilities and in most cases is responsible for operation and maintenance of the jointly-owned wastewater collection and treatment facilities of the subregion. Staff of the Lead Agency are financially supported by members of the Subregional Operating Group from revenues derived from locally-enacted wastewater service charges. The Lead Agency responsibilities are considered as part of the operation and maintenance expenses of the treatment facilities.

The Lead Agency also serves as a key contact with the U.S. Environmental Protection Agency, ADEQ, and Maricopa County Department of Environmental Management for implementation of various federal and state water quality standards and the National Pollution Discharge Elimination System (NPDES) permits. The Lead Agency in most situations is the NPDES permit holder. Key responsibilities of multiple member SROGs are outlined below.

Planning responsibilities are:

- Members of a SROG submit information to the SROG Board regarding wastewater collection and treatment facility needs, population, projected growth, major developments, capacity of existing system and relationship of new proposals to the adopted MAG plan. Plans are then developed based on this information.

Finance responsibilities are:

- The SROG Board coordinates the establishment of proportional cost sharing among the members for the financial support of the Lead Agency and the operation and maintenance of the commonly owned wastewater treatment facilities.

- The SROG Board coordinates cost sharing among the SROG members for joint construction projects.

- The Lead Agency prepares an annual budget for Lead Agency activities and the operation and maintenance of jointly-owned collection and treatment facilities.

- The Lead Agency is responsible for the application, receipt, and administration of federal or state funds on jointly-owned projects. For projects contained wholly within a multiple member SROG city or town boundary, that entity may apply for, receive and administer state revolving loan funds.

Operation and maintenance responsibilities are:

- The SROG Board coordinates and monitors the operation and maintenance of jointly-owned wastewater treatment plants and collection facilities.

- The SROG Board coordinates the preparation of industrial waste standards for the SROG area.

- The Lead Agency operates and maintains all jointly-owned wastewater collection and treatment facilities in conformance with Federal and State water quality standards and applicable permit requirements.

Construction responsibilities are:

- The Lead Agency supervises the construction of new jointly-owned facilities.

- The Lead Agency coordinates with EPA and ADEQ for construction approvals, audits and expenses for federally or state funded projects on jointly-owned facilities.

Enforcement and monitoring responsibilities are:

- The SROG Board coordinates EPA, ADEQ and Maricopa County Department of Environmental Management monitoring and enforcement of jointly-owned wastewater treatment plants.

- The Lead Agency conducts a monitoring program for treatment facilities to assure compliance with Federal and State water quality standards and applicable permit requirements.

- The Lead Agency coordinates the monitoring of industrial discharges by member agencies.

- The Lead Agency coordinates with EPA, ADEQ, and Maricopa County Department of Environmental Management monitoring and enforcement activities.

- The Lead Agency will notify the SROG Board of any violation of Federal or State water quality standards or applicable permit requirements.

6.3 Municipalities

The governing body of many cities or towns have adopted a resolution requesting designation as wastewater management agency for their planning area. These resolutions and requests for designation are shown in Appendix C.

City or town staff will also perform necessary activities to meet EPA management agency requirements. Key responsibilities of an individual municipalities are outlined below.

Planning responsibilities are:

- Plan for wastewater collection and treatment facility needs, population, projected growth, major developments, capacity of existing system, and relationship of new proposals to the adopted MAG 208 Plan.

Finance responsibilities are:

- Review, update and adopt appropriate revisions to the sewer user charge and industrial cost recovery program to meet EPA requirements.

- Obtain funds for wastewater facilities.

Operation and maintenance responsibilities are:

- Operate and maintain wastewater collection and treatment facilities within the entity.
- Prepare and adopt industrial waste standards.
- Operate treatment plants and pump stations in compliance with NPDES permit requirements and applicable water quality standards.
- Assure properly trained personnel at wastewater treatment plants.

Construction responsibilities are:

- Supervise the construction of new facilities.
- Coordinate with EPA, ADEQ, and Maricopa County for construction approvals, audits and inspections of facilities.

Enforcement and monitoring responsibilities are:

- Conduct monitoring program to ensure compliance with NPDES or other applicable permits.
- Coordinate with EPA, ADEQ, and Maricopa County Department of Environmental Management monitoring and enforcement activity.

6.4 State of Arizona

The State of Arizona is an active participant in water quality management activities affecting local governments and private agencies. According to the Clean Water Act, the role of state government is to oversee the implementation of 208 plans. The Arizona Department of Environmental Quality (ADEQ) in conjunction with EPA establishes water quality standards for the streams and lakes of the state and adopts the statewide revolving loan fund priority list.

ADEQ has been designated by the legislature as the State's water pollution control agency. The control is empowered by Arizona statutes to regulate water pollution ADEQ systems in Arizona. The ADEQ also contracts with EPA to administer several federal programs including:

- State requirements of the Clean Water Act (PL 92-500).

- Safe Drinking Water Act.
- NPDES permit drafting.

Congressional intent in the Federal legislation is to have the states take over as much of the functioning of the water and wastewater programs as possible.

ADEQ performs reviews of plans for proposed wastewater treatment facilities. One of the criteria reviewed by ADEQ is conformance with the adopted MAG 208 Plan. In the MAG region, proposed facilities, either new treatment plants or expansions of existing plants, must be included in the adopted 208 Plan to be considered in conformance. If the proposed facilities are not in conformance with the adopted 208 Plan, ADEQ will not grant permission to construct the facilities. Jurisdictions wishing to construct facilities not listed in the adopted 208 Plan must obtain a 208 Plan amendment to incorporate the facilities into the 208 Plan before the project can be considered to be in conformance.

6.5 Environmental Protection Agency

Although EPA carries major responsibility for implementing the provisions of the Clean Water Act, the Congressional intent was to encourage more state administration and local responsibility and initiative. EPA basically has two important inducements to require development of and compliance with the adopted plan. These inducements are:

- Federal revolving loan funds.
- Issuance of NPDES permits to local governments and private agencies.

Federal funds and/or a NPDES permit can be withheld for noncompliance with the adopted water quality management plan.

6.6 Management System Assessment

The point source management system, included in the adopted MAG 208 Water Quality Management Plan, is required by EPA regulations to possess acceptable legal, financial and managerial capabilities to carry out assigned responsibilities. This section describes the Clean Water Act, Section 208, assesses the adopted waste treatment management system in terms of meeting these requirements, and illustrates the managerial capabilities of the adopted point source management system.

6.6.1 *Implementation of the Plan*

Section 208 (c) (2) (A) requires that there be "*adequate authority to carry out appropriate portions of an areawide waste treatment management plan . . . .*"

Section 208 (c) (2) (B) requires that there be "*adequate authority to manage effectively waste treatment works and related facilities serving such area in conformance with the plan . . . .*"

Under these requirements, implementation of the water quality management plan developed by MAG must meet the criteria specified in Section 208 (b).

Municipalities and sanitary districts have adequate authority to perform these activities within their own jurisdiction. The Joint Exercise of Powers Act in Arizona permits counties, cities, towns, sanitary districts and other governmental agencies to enter into agreements for governmental services with the approval of their governing bodies. The governmental units may jointly "exercise any powers common to the contacting parties" and may enter into agreements for "joints or cooperative action."

Multiple-member SROGs can develop Intergovernmental Agreements (IGAs) that provide the specific authority necessary to meet the "adequate authority" requirements of Section 208 (c) (2) (A) and (3).

In the adopted MAG wastewater management system these required duties are shared by the Maricopa Association of Governments, subregional operating groups, lead agencies, and individual cities, towns and sanitary districts. Outside of the subregional operating groups, the individual cities, towns or sanitary districts are responsible for implementing the adopted MAG 208 plan for their jurisdiction and effectively managing the wastewater treatment facilities. Multiple-member SROGs will meet the requirements as individual cities, towns, and sanitary districts, and by intergovernmental agreements and membership in the SROGs. The Lead Agency of a multiple-member SROG will in most instances operate and maintain treatment facilities and be responsible for implementation of jointly-owned facilities in accordance with the adopted MAG 208 plan. Individual cities, towns, and sanitary districts will implement local aspects in accordance with the adopted plan and manage local wastewater treatment facilities.

The SROG Boards, MAG Management Committee and MAG Regional Council will monitor and oversee the compliance with these requirements.

6.6.2 *Construction and Operation*

Section 208 (c) (2) (C) provides that management agencies must have the authority "*directly or by contract to design and construct new works and to operate and maintain new and existing works as required by the plan . . . .*"

Arizona's cities, towns and sanitary districts are authorized to construct, purchase, acquire, own and maintain within or without their corporate limits, wastewater treatment and collection systems. As noted previously, they can also contract for any service common to them for joint or cooperative action.

The adopted point source management system provides for single member subregional operating groups to individually carry out this responsibility for facilities to be jointly-owned and operated. If a project is totally within the boundaries of a city, town or sanitary district, that entity would be responsible for this requirement.

6.6.3 *Finance*

Section 208 (c) (2) (D) requires that management agencies have adequate authority "*to accept and utilize grants or other funds from any source for waste treatment management purposes.*" Cities, towns, and sanitary districts in Arizona may accept and utilize grants from state, federal government or other sources for or in aid of construction for wastewater treatment facilities. The Lead Agency of a multiple member SROG would apply for and receive grants for joint projects, but the individual entity would be the applicant in most cases if a project was for the sole benefit of that community.

Section 208 (c) (2) (E) requires that management agencies have adequate authority "*to raise revenues, including the assessment of waste treatment charges.*" The Arizona Revised Statutes authorizes cities and towns that own or operate a wastewater treatment facility to collect user charges and to levy both property taxes and special assessments. This responsibility, in the adopted management system, will be conducted by individual cities, towns and sanitary districts.

Section 208 (c) (2) (F) requires that there be adequate authority "*to incur short and long-term indebtedness.*" Arizona cities, towns, and sanitary districts have authority to incur short- and long-term debt and this responsibility will continue to be met individually in each entity in the adopted wastewater management system.

Section 208 (c) (2) (G) requires that management agency(s) have adequate authority "*to assure in the implementation of an areawide waste treatment management plan that each participating community pay its proportional share of treatment costs.*"

Cities, towns, and sanitary districts have sufficient statutory authority to comply with this requirement. The adopted point source management system provides for each city, town, and sanitary district to individually meet this requirement.

6.6.4 Regulation

Section 208 (c) (2) (H) requires that the management agency(s) have the power "*to refuse to receive wastes from any municipality or subdivision thereof, which does not comply with any provision of the approved plan . . . .*"

Section 208 (c) (2) (I) requires there be adequate authority "*to accept for treatment industrial wastes.*"

Individual cities and towns which are designated management agencies have agreed by resolution adopted by their respective governing bodies to meet these 208 requirements. The members of multiple member SROGs have also adopted resolutions agreeing to these requirements.

6.7 Annual Update Evaluation

In order to ensure that the MAG 208 Water Quality Management Plan remains an up-to-date document, MAG member agencies will be requested to submit a copy of their adopted Capital Improvement Programs annually to MAG. These programs will be reviewed to determine if charges to the wastewater treatment systems have occurred. The changes will then be presented to the MAG Water Quality Advisory Committee. If appropriate, the MAG Water Quality Advisory Committee may make a recommendation to the MAG Management Committee that the 208 Plan be amended to include the updated information.

Chapter 7 - Public Participation

One of the major requirements of the Clean Water Act is that the public play a decision-making role in all water pollution control activities at Federal, State, and local levels. The term "public" in the MAG 208 program refers to any entity other than the MAG staff directly involved in the study. In this broad sense the "public" can be thought of as coming from the governmental sector and interest groups, as well as the general public.

The objective of the public involvement program is to:

- Promote understanding of the manner and means by which water quality problems and needs are investigated and solutions are proposed.
- Provide an opportunity for a variety of interests to understand diverse viewpoints and resolve possible conflicts.
- Establish open communication among the public, the advisory groups, and the elected officials during the plan development.
- Solicit from the public their opinions and perceptions of problems, issues, concerns, and needs.
- Keep the public informed regarding the status and progress of studies and the results of planning activities.

To meet the objectives of the public participation program, various types of activities and public involvement techniques are used, namely:

- Establishment of an advisory group structure.
- Establishment of a 208 review process.
- Public meetings.

7.1 Advisory Group Structure

As an initial step in developing the MAG public participation program, an advisory group structure was established to assist the 208 staff in plan development. The advisory group reviewed and commented on program outputs in the areas of point sources, non-point sources and management, and made recommendations on elements of the plan.

7.1.1 *Water Quality Advisory Committee*

The MAG Water Quality Advisory Committee (WQAC) is comprised of representatives of various local government agencies, economic interests, environmental interests, and the private citizenry selected by MAG to provide technical expertise in the areas of concern. The WQAC provided insight into past, present, and future facility planning, and also reviewed and commented on the 208 Plan Revision Scope of Work, Point Source Plan, and Nonpoint Source Plan.

7.1.2 *Management Committee*

The MAG Management Committee is composed of the chief administrator from each MAG member agency, representing each city and town in the planning area as well as the County. The Management Committee reviews water quality information and recommendations from the MAG Water Quality Advisory Committee and then makes recommendations on water quality matters to the MAG Regional Council.

7.2 208 Review Process

In the MAG 208 Program, review occurs at local, State, and Federal levels. At the local level, the review process consists of three interrelated components: advisory group review, public review, and jurisdictional review.

The Water Quality Advisory Group is charged with the responsibility of reviewing, at critical points in the 208 program, the work of consultants and staff and making recommendations. Their recommendations, together with those of the Management Committee are then forwarded to the Regional Council, the policy-making body of MAG. The MAG Regional Council, whose membership consists of elected officials of the 24 cities and towns, the Gila River Indian Community, and the County, receive and review the recommendations and adopt the final elements of the plan. Formal public review of the 208 Plan includes a public meeting held to review the Draft 208 Plan Revision.

Regarding jurisdictional review, each of the cities and towns, the County, Gila River Indian Community, Luke Air Force Base, and the Fountain Hills Sanitary District have participated actively in reviewing the plan, particularly those elements applicable to their area. Each jurisdiction had an opportunity to directly participate in plan development and to review and indicate their preferences regarding plan elements before decisions are made by the MAG Regional Council. Following local review and adoption, the 208 Plan will also be reviewed for approval by the ADEQ and EPA.

Key issues and critical decision points in the development of final 208 plan elements were:

- Approval of the scope of work.
- Population projections and distribution.
- Selection of Point Source Plan elements.
- Nonpoint Source Plan.

7.2.1 *Work Plans*

In addition to meeting technical requirements, the final plan must be acceptable to the local communities, implementable, and serve as a basis for future planning.

7.2.2 *Population Projections*

On August 3, 1977, the Governor designated the Department of Economic Security (DES) as the official populations projecting and estimating agency for the State of Arizona. For each county, a control total is developed by DES. In Maricopa County, the Maricopa Association of Governments develops projections of future population totals in the various planning areas in the county. These projections are periodically reviewed and approved by the MAG Regional Council. Frequent updates are made to respond to trends and changes in development and growth patterns. The most recent set of adopted population figures has been used in this 208 Plan Revision.

7.3 Continued Public Involvement

A public participation program must be regularly adjusted or improved to meet the specific needs of each phase of planning activities. The identification of specific publics, the selection of a particular medium of communication, the feedback mechanism that is established, and the desired impact of the participant's responses must be closely coordinated to enhance long and short-range program goals.

A high degree of involvement in the 208 program by elected and appointed public officials, technical specialists, and the general public will be continued in the

MAG public participation efforts. Opportunities for the public to make decisions on water quality issues affecting them will be provided. The effectiveness of public meetings, field trips, workshops, advisory group meetings, and other mechanisms used to solicit public response will be evaluated and revised as necessary.

The membership and structure of the advisory groups will also be evaluated and changed as needed to make operation smoother and more responsive to the goals of the programs.

SOLID WASTE MANAGEMENT FACILITIES INVENTORY

LANDFILLS

OPERATING LANDFILLS

	REMAINING CAPACITY (10^6 CY)	REMAINING YEARS	OWNER	LOCATION	OTHER COMPONENTS
Glendale	37	40	City of Glendale	115th Ave & Glendale Ave (1/2 mile E. of Agua Fria River)	Landscape waste mulching (1993); WTP residuals monofill
New River	2	9	Maricopa County	3 1/2 miles west of I-17 on New River Rd	3.5 MGY NHLW evaporation pond (existing); planned expansion to 8.5 MGY (1993).
Northwest Regional	85	47	Maricopa County	Deer Valley Rd. and 195th Ave	Waste tire collection center.
Butterfield Station	60	50	Waste Management, Inc.	Near Mobile	2 MGY NHLW evaporation pond (planned, 1993)

OPERATING, WITH CLOSURE ANTICIPATED DURING CURRENT PLANNING PERIOD

	REMAINING CAPACITY (10^6 CY)	YEAR OF CLOSURE	OWNER	LOCATION	REMARKS ON CLOSURE
Cave Creek	5	1997	Maricopa County	3 miles west of Cave Creek Rd on south side of Carefree Highway	Life cycle.
Chandler	2	1997	City of Chandler	Northwest corner of Ocotillo Rd and McQueen Rd	Life cycle.
Gila Bend	2	1993	Maricopa County	3 miles north of Gila Bend on Old U.S. 80	RCRA regulations.
Hassayampa	4	1993	Maricopa County	Salome Hwy and Ward Rd/Baseline Rd	RCRA regulations.
Queen Creek	10	1998	Maricopa County	1/2 mile south of Chandler Heights Rd on Hawes Rd	Local concerns; availability of new Southeast regional facility.
Skunk Creek	21	2002	City of Phoenix	1/4 mile west of I-17 on Happy Valley Rd	Land lease expires.
Tri-City	20	2006	SRPMIC	South side of State Highway 87	New facility will meet the RCRA regulations.
Wickenburg	0.19	1993	Town of Wickenburg	NE quarter, section 7, township 7N, range 5W	Life cycle.
27th Avenue	-	1993	City of Phoenix	27th Ave and Lower Buckeye Rd	Life cycle.
Gila River Indian Community (2)	N/A	1995	GRIC	N/A	Life cycle.

PLANNED FOR DEVELOPMENT DURING THE CURRENT PLANNING PERIOD

	PLANNED CAPACITY (YEARS)	PLANNED SIZE (ACRES)	EXPECTED YEAR OF OPENING	OWNER	LOCATION	ADDITIONAL COMPONENTS (Conceptual)
Ocotillo Landfill	20	N/A	N/A	Laidlaw Waste Systems	Generally, Northern Pinal County	NHLW evaporation ponds
North Regional	50	N/A	2002	Maricopa County	Generally, North-Central Maricopa County	Monofill for WTP residuals
Southeast Regional	50	N/A	1995 - 1998	Maricopa/Pinal Counties	Generally, Northern Pinal County	NHLW Evaporation Ponds (9 - 12 MGY); Monofill for WTP Residuals
Southwest Regional	50	2,000	1993	Maricopa County	8 miles south of Buckeye, east of State Highway 85	NHLW Evaporation Ponds (14 MGY)
Tri-City (New)	N/A	N/A	1993	SRPMIC	Near existing landfill on State Highway 87	
Chandler (New Landfill)	N/A	N/A	1997	City of Chandler	to be determined	
New River Landfill	N/A	N/A	1993	Maricopa County	3 1/2 miles west of I-17 on New River Rd.	Additional NHLW Evaporation Ponds (5 - 12 MGY)

SOLID WASTE MANAGEMENT FACILITIES INVENTORY (Continued)

TRANSFER STATIONS

OPERATING

TRANSFER STATION NAME	OWNER/OPERATOR	LANDFILL FOR DISPOSAL	TYPES OF WASTE ACCEPTED	TRANSFER STATION LOCATION
Aguila	Maricopa County	Northwest Regional	Residential	3 miles west of Aguila on State Highway 60
Avondale	City of Avondale	Hassayampa/Southwest Regional	Residential	South of Lower Buckeye Rd., adjacent to old treatment plant site
Glendale	Glendale	Glendale	Residential	6210 W. Myrtle
Morristown	Maricopa County	Northwest Regional	Residential	North of 60-89-93 by Morristown overpass
Rainbow Valley	Maricopa County	Hassayampa/Southwest Regional	Residential	3 miles south of Ray Rd on Rainbow Valley Rd

PLANNED

TRANSFER STATION NAME	OWNER/OPERATOR	LANDFILL FOR DISPOSAL	TYPES OF WASTE ACCEPTED	TRANSFER STATION LOCATION
Tolleson	City of Tolleson	Northwest Regional/Glendale	Residential	1/4 mile south of Buckeye Rd and 1/4 mile west of 91st Ave
Chandler	City of Chandler	Chandler or Southeast Regional	Residential	Queen Creek Road at McQueen Road
Wickenburg (1993)	Town of Wickenburg	Northwest Regional	Residential	NE quarter, section 7, township 7N, range 5W
Gila Bend (1993)	Maricopa County	Southwest Regional	Residential	3 miles north of Gila Bend on Old U.S. Highway 80
Hassayampa (1993)	Maricopa County	Southwest Regional	Residential	Salome Hwy and Ward Rd/Baseline Rd

MATERIALS RECOVERY FACILITIES (MRFs)

FACILITY NAME	STATUS	OWNER/OPERATOR	AREAS SERVED	MATERIAL RECOVERY CAPACITY	LANDFILL FOR REJECTS	MRF LOCATION
Glendale	Operating	City of Glendale	Glendale	1,800 Tons Per Year	Glendale	Ocotillo Rd. at 58th Ave.
CRInc	New Facility in 1993	New England CRInc	Phoenix (S. of Cactus Rd.)	90,000 Tons per Year	Southwest Regional Skunk Creek	1919 E. University Dr.
North CRInc	Planned	New England CRInc	Phoenix (N. of Cactus Rd.)	90,000 Tons per Year	Southwest Regional Skunk Creek	to be determined.
Tri-City MRF	(Conceptual)	SRPMIC	Mesa, Chandler, Scottsdale	N/A	Tri-Cities	State Highway 87 near the Tri-City landfill site

COMBINED MATERIALS RECOVERY FACILITIES/TRANSFER STATIONS

FACILITY NAME	STATUS	OWNER/OPERATOR	AREAS SERVED	CAPACITIES (TONS/DAY) TRANSFER	RECOVERY	LANDFILL FOR DISPOSAL	FACILITY LOCATION
Southwest Transfer/ Recycling Station	Start-up: March, 1993	City of Phoenix	Phoenix (partial)	3,800	400	Southwest Regional Skunk Creek	27th Avenue and Lower Buckeye Road, adjacent to the 27th Avenue Landfill.
North Transfer/ Recycling Station	Planned 2002	City of Phoenix	Phoenix (N. of Cactus)	2,000	400	North Regional	to be determined
Southeast Transfer/ Recycling Station	Planned	City of Phoenix	Phoenix (S. of Cactus)	2,000	400	Southwest or Southeast Regional	to be determined
Sky Harbor Transfer Recycling Facility	Operating	Waste Management, Inc.	Tempe; commercial accounts	N/A		Butterfield Station	40th Street, north of University Drive
Chandler	(Conceptual)	City of Chandler	Chandler	N/A		Chandler / SE Regional	to be determined
Peoria	(Conceptual)	Peoria, or private	Peoria	40,000		Northwest Regional	to be determined

SOLID WASTE MANAGEMENT FACILITIES INVENTORY

LANDFILLS

OPERATING LANDFILLS

	REMAINING CAPACITY (10^6 CY)	REMAINING YEARS	OWNER	LOCATION	OTHER COMPONENTS
Glendale	37	40	City of Glendale	115th Ave & Glendale Ave (1/2 mile E. of Agua Fria River)	Landscape waste mulching (1993); WTP residuals monofill
New River	2	9	Maricopa County	3 1/2 miles west of I-17 on New River Rd	3.5 MGY NHLW evaporation pond (existing); planned expansion to 8.5 MGY (1993).
Northwest Regional	85	47	Maricopa County	Deer Valley Rd. and 195th Ave	Waste tire collection center.
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Hassayampa	4	1993	Maricopa County	Salome Hwy and Ward Rd/Baseline Rd	RCRA regulations.
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Gila River Indian Community (2)	N/A	1995	GRIC	N/A	Life cycle.

PLANNED FOR DEVELOPMENT DURING THE CURRENT PLANNING PERIOD

	PLANNED CAPACITY (YEARS)	PLANNED SIZE (ACRES)	EXPECTED YEAR OF OPENING	OWNER	LOCATION	ADDITIONAL COMPONENTS (Conceptual)
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North Regional	50	N/A	2002	Maricopa County	Generally, North-Central Maricopa County	Monofill for WTP residuals
Southeast Regional	50	N/A	1995 - 1998	Maricopa/Pinal Counties	Generally, Northern Pinal County	NHLW Evaporation Ponds (9 - 12 MGY); Monofill for WTP Residuals
Southwest Regional	50	2,000	1993	Maricopa County	8 miles south of Buckeye, east of State Highway 85	NHLW Evaporation Ponds (14 MGY)
Tri-City (New)	N/A	N/A	1993	SRPMIC	Near existing landfill on State Highway 87	
Chandler (New Landfill)	N/A	N/A	1997	City of Chandler	to be determined	
New River Landfill	N/A	N/A	1993	Maricopa County	3 1/2 miles west of I-17 on New River Rd.	Additional NHLW Evaporation Ponds (5 - 12 MGY)

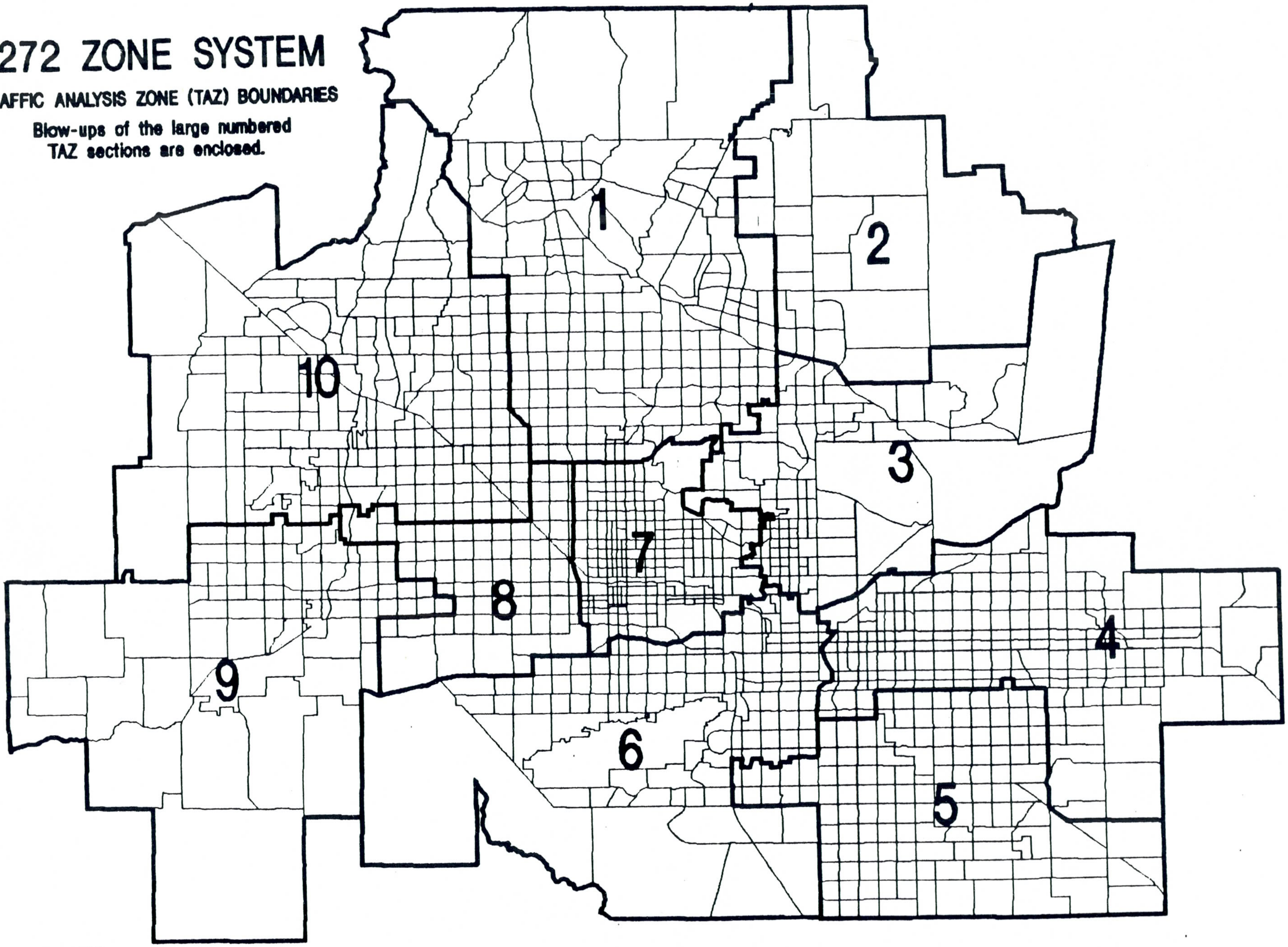
APPENDIX A

MAG Districts and Traffic Analysis Zones

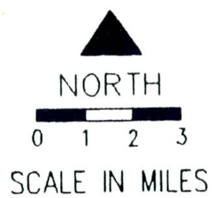
1272 ZONE SYSTEM

TRAFFIC ANALYSIS ZONE (TAZ) BOUNDARIES

Blow-ups of the large numbered TAZ sections are enclosed.

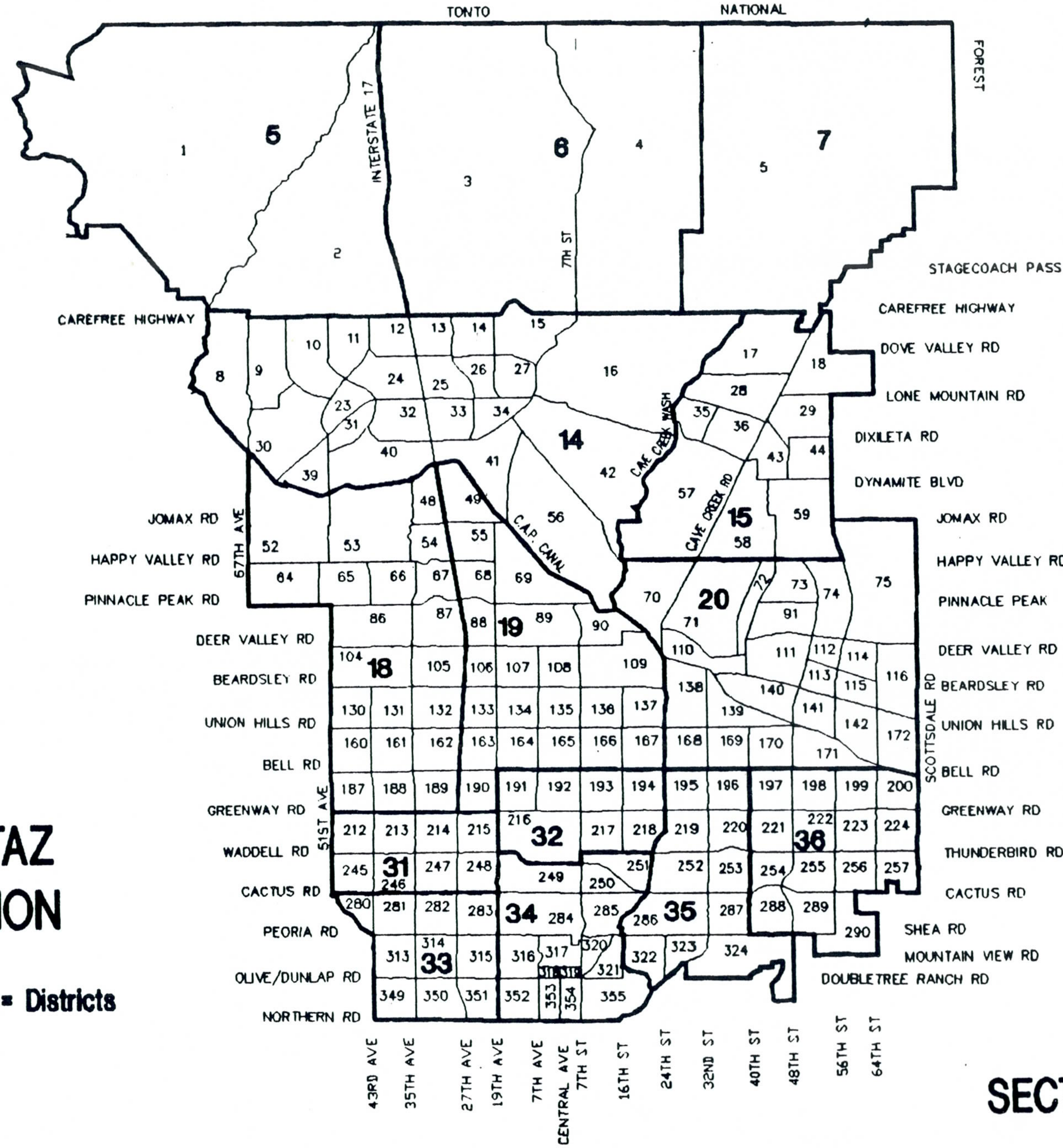


MARCH 1992



DISTRICT/TAZ CORRELATION

Bold Lines/Numbers = Districts



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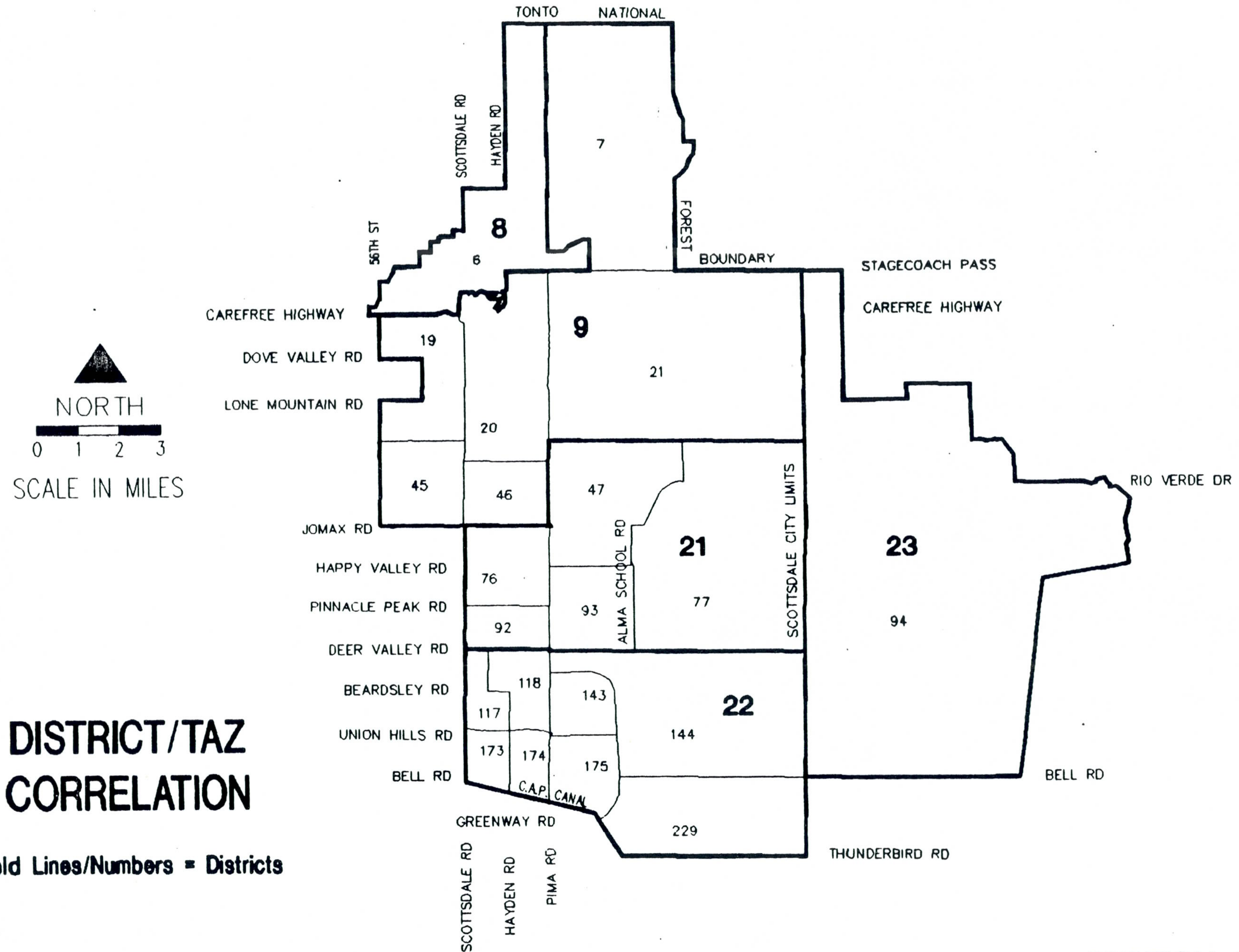
MARCH 1992

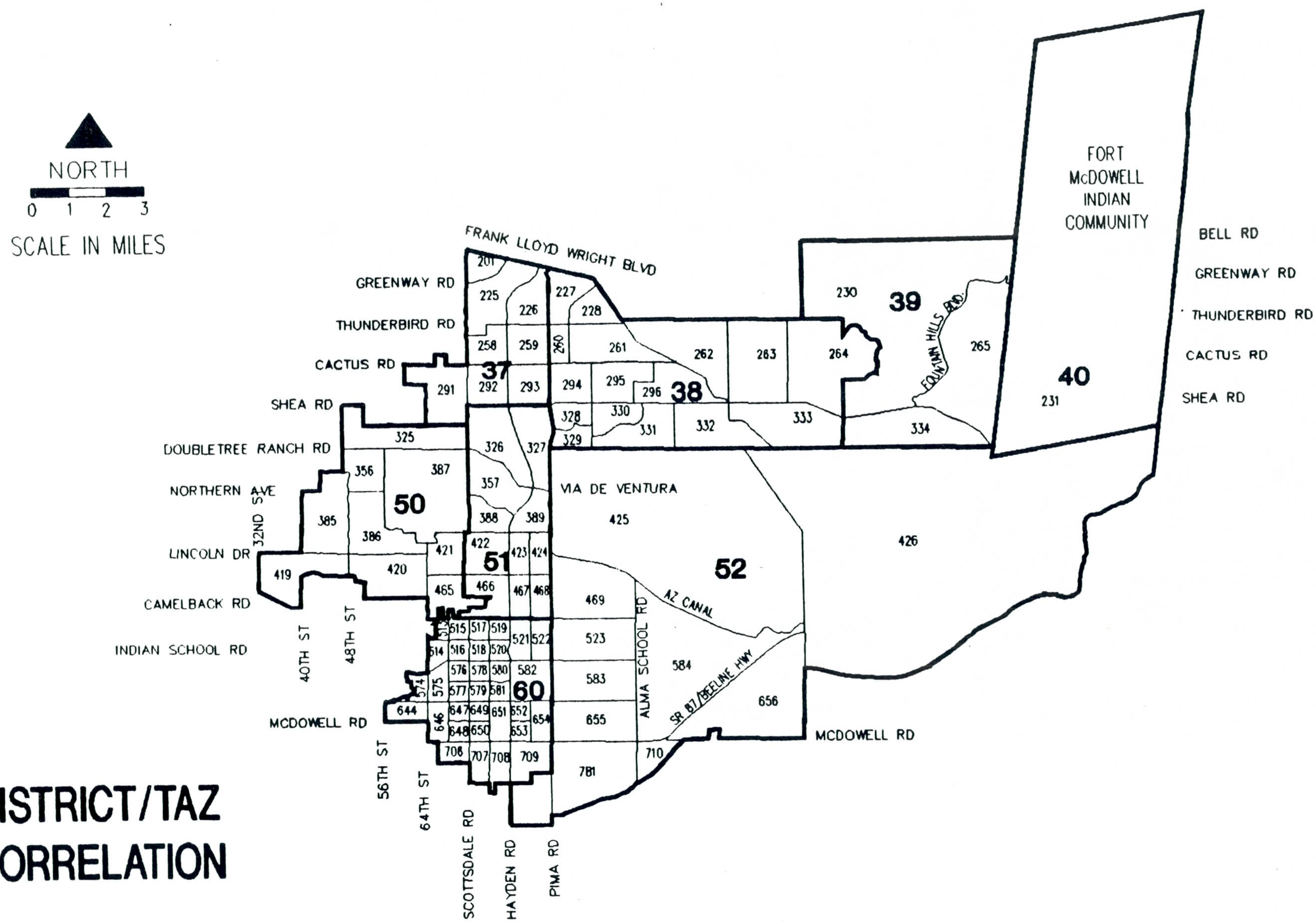


DISTRICT/TAZ CORRELATION

Bold Lines/Numbers = Districts

MARCH 1992

SECTION 2

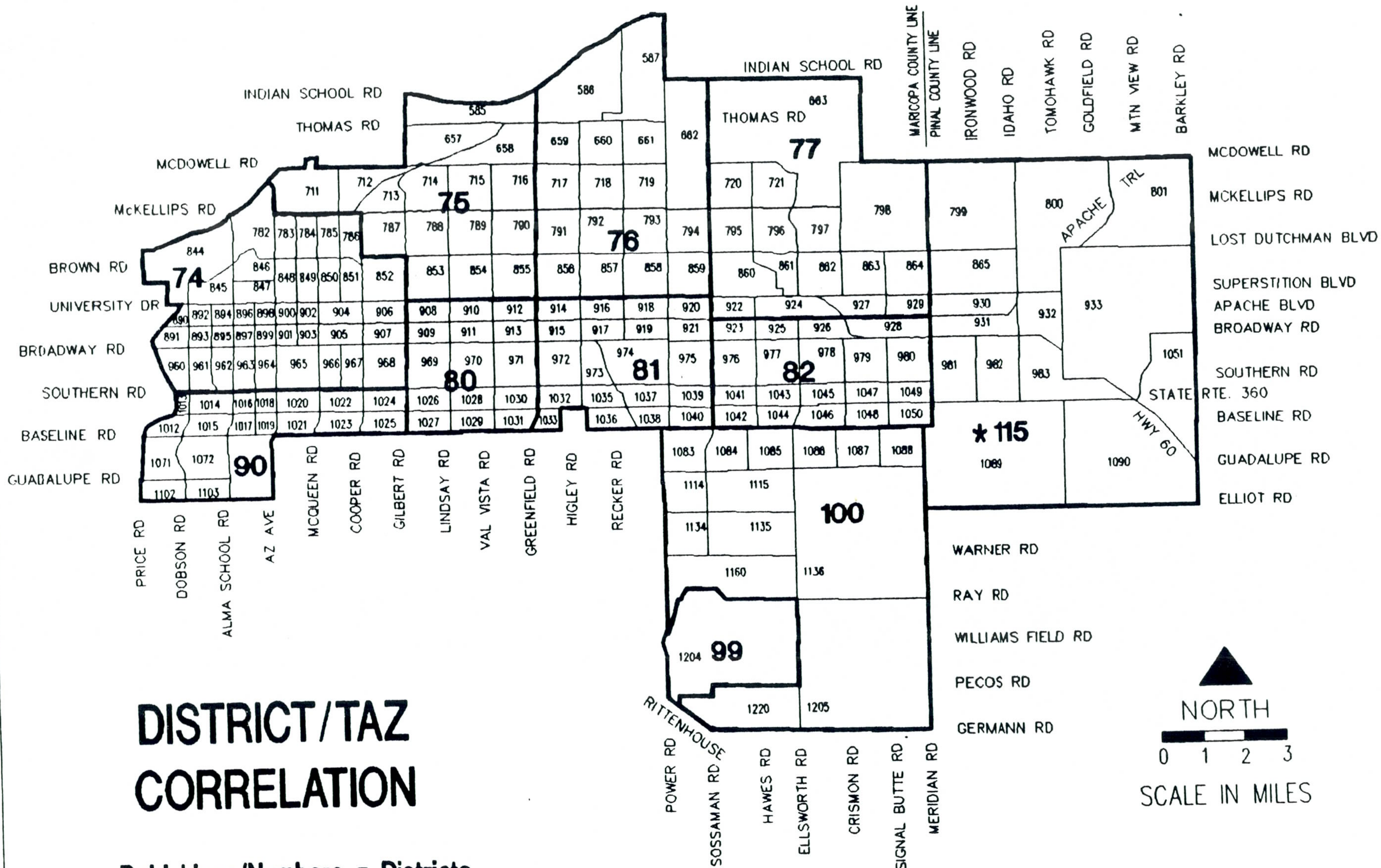


DISTRICT/TAZ CORRELATION

Bold Lines/Numbers = Districts

SECTION 3

MARCH 1992



DISTRICT/TAZ CORRELATION

Bold Lines/Numbers = Districts

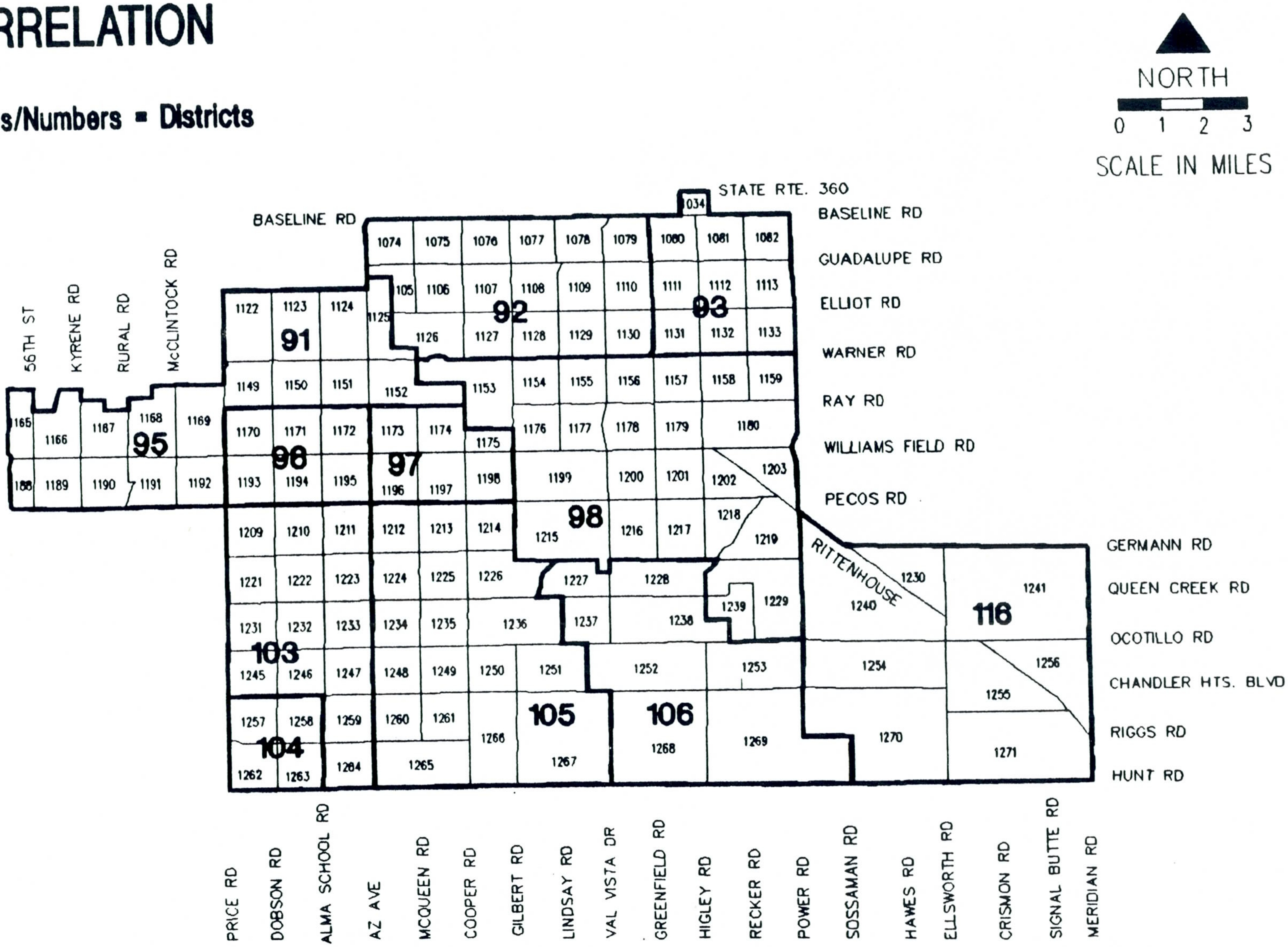
★Denotes the Apache Junction area which is not in Maricopa County, and therefore not a MAG MPA.

SECTION 4

MARCH 1992

DISTRICT/TAZ CORRELATION

Bold Lines/Numbers = Districts

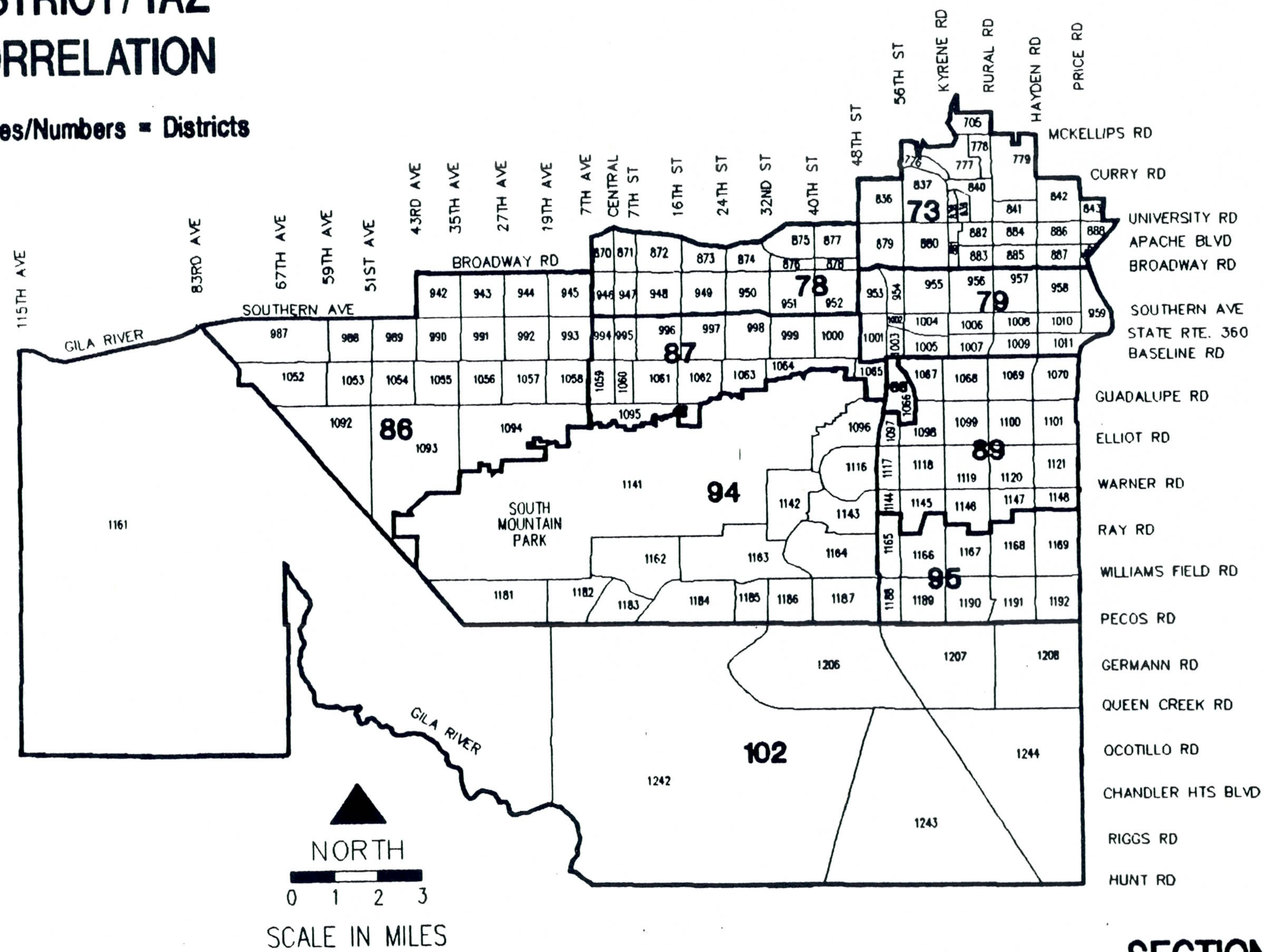


MARCH 1992

SECTION 5

DISTRICT / TAZ CORRELATION

Bold Lines/Numbers = Districts



SECTION 6

MARCH 1992

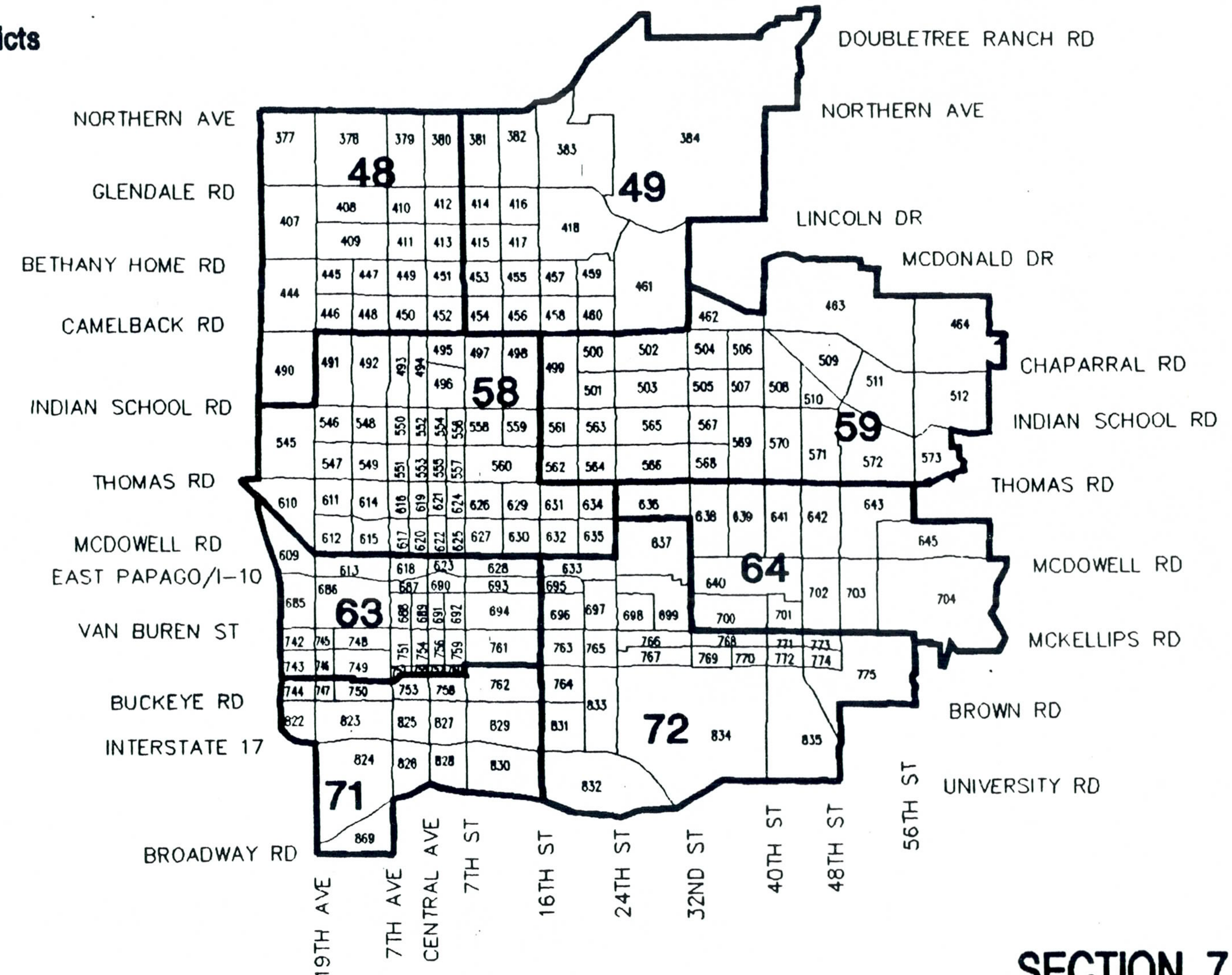
DISTRICT/TAZ CORRELATION

Bold Lines/Numbers = Districts

NORTH

0 1 2 3

SCALE IN MILES

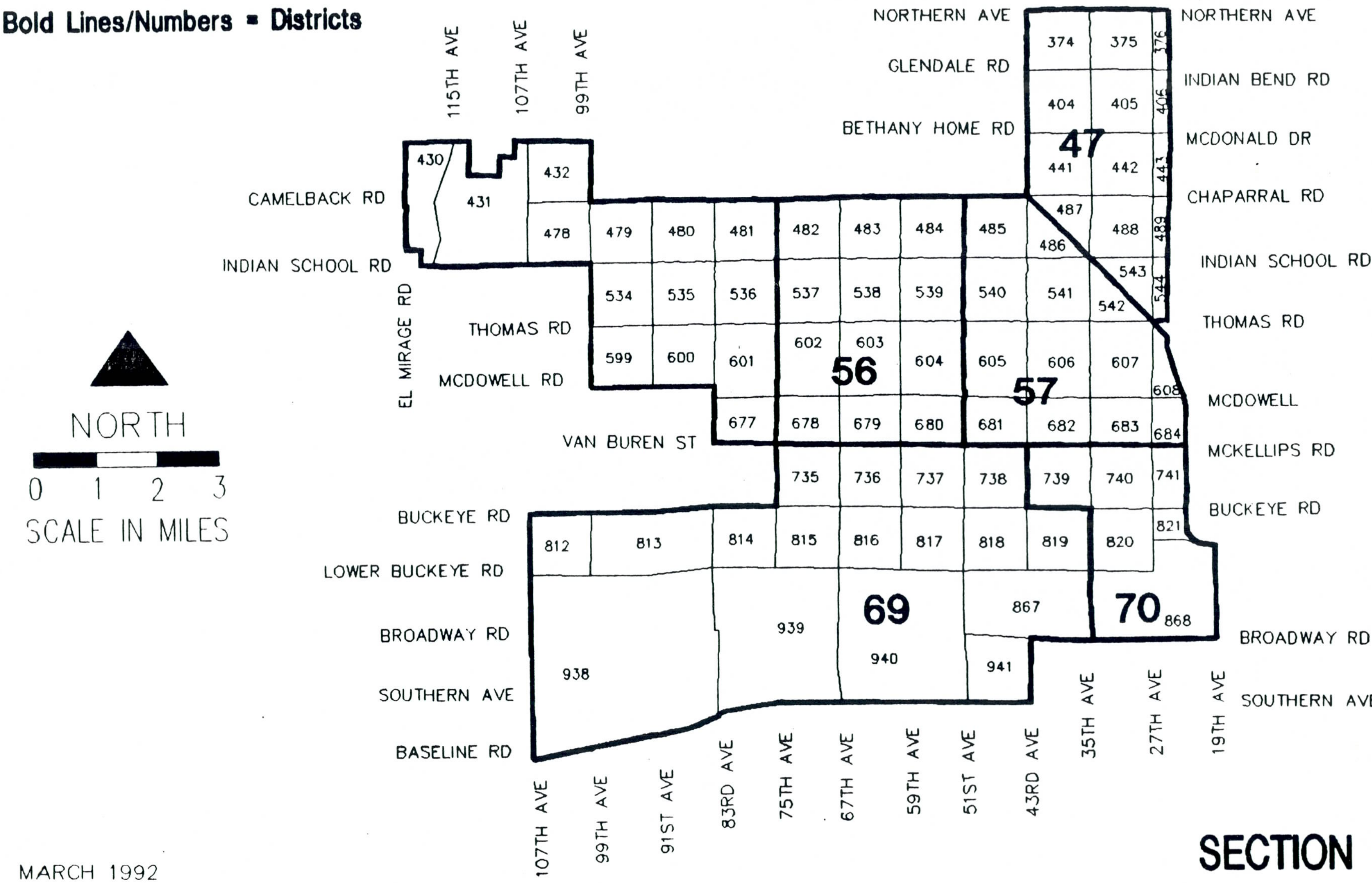


MARCH 1992

SECTION 7

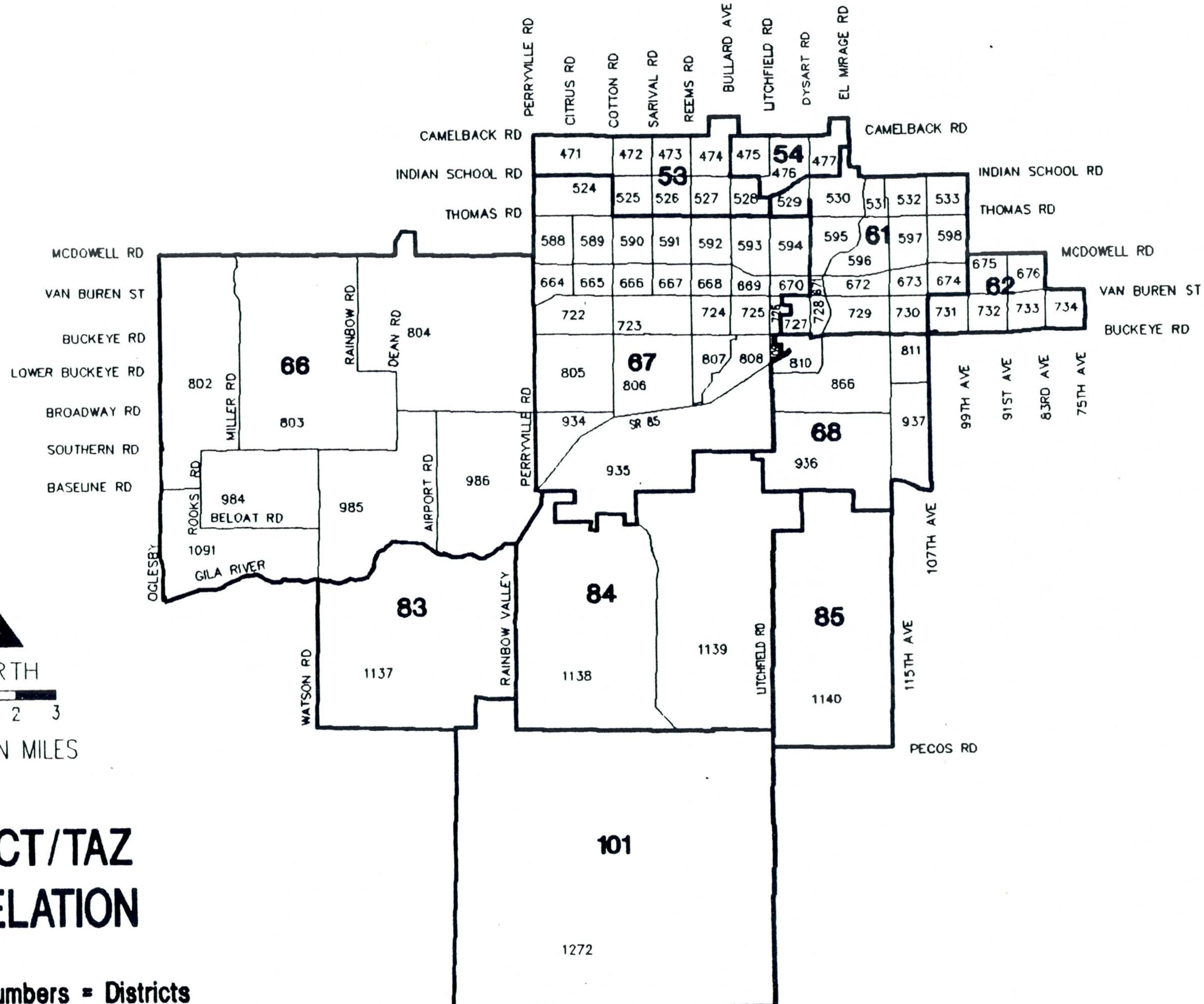
DISTRICT/TAZ CORRELATION

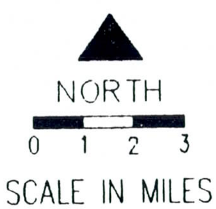
Bold Lines/Numbers = Districts



MARCH 1992

SECTION 8





DISTRICT/TAZ CORRELATION

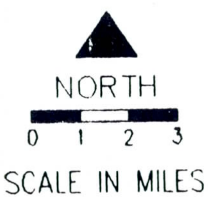
Bold Lines/Numbers = Districts

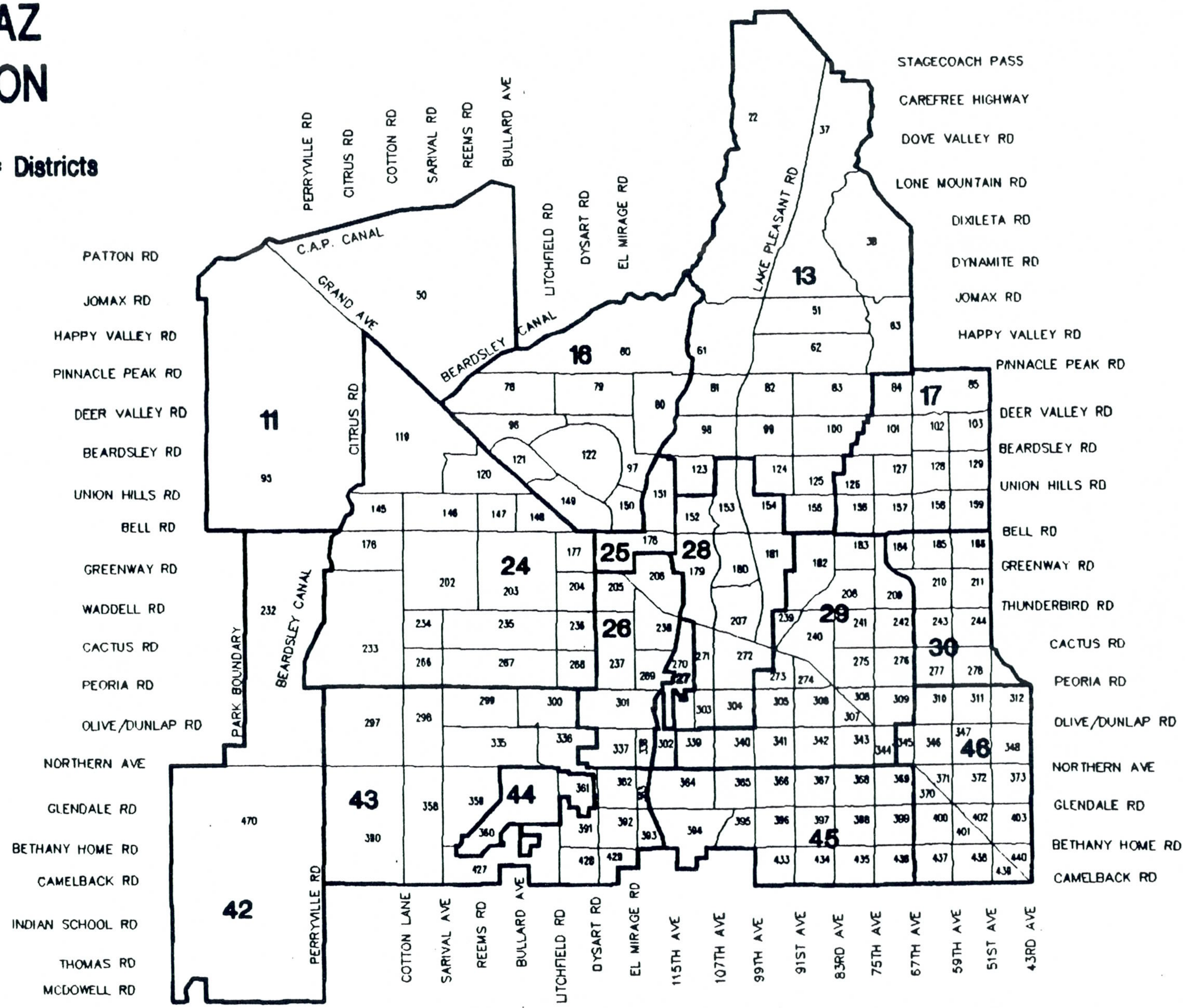
MARCH 1992

SECTION 9

DISTRICT/TAZ CORRELATION

Bold Lines/Numbers = Districts





MARCH 1992

SECTION 10

APPENDIX B

MAG Population Projections

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population: Total	Resident Population: In Households	Resident Population: Group Quarters	Non-Resident Population: Total	Non-Resident Population: Transient	Non-Resident Population: Seasonal
Avondale	061	1990	8,990	8,855	8,582	273	135	10	125
Avondale	061	1995	15,986	15,577	15,074	503	409	145	264
Avondale	061	2000	23,081	22,387	21,880	507	694	269	425
Avondale	061	2005	27,455	26,530	25,984	546	925	418	507
Avondale	061	2010	40,674	39,165	38,433	732	1,509	742	767
Avondale	061	2015	47,158	45,177	44,361	816	1,981	1,090	891
Avondale	061	2020	51,257	49,006	48,149	857	2,251	1,288	963
Avondale	061	2025	53,697	51,320	50,456	864	2,377	1,375	1,002
Avondale	061	2030	55,378	52,882	52,012	870	2,496	1,472	1,024
Avondale	061	2035	56,398	53,832	52,956	876	2,566	1,529	1,037
Avondale	061	2040	57,328	54,619	53,737	882	2,709	1,662	1,047
Avondale	068	1990	10,910	10,794	10,747	47	116	0	116
Avondale	068	1995	11,112	10,992	10,945	47	120	0	120
Avondale	068	2000	11,359	11,234	11,187	47	125	0	125
Avondale	068	2005	11,624	11,492	11,445	47	132	3	129
Avondale	068	2010	15,883	15,615	15,508	107	268	55	213
Avondale	068	2015	28,935	28,244	27,945	299	691	218	473
Avondale	068	2020	45,491	44,361	43,815	546	1,130	350	780
Avondale	068	2025	47,972	46,768	46,186	582	1,204	383	821
Avondale	068	2030	49,475	48,235	47,648	587	1,240	395	845
Avondale	068	2035	50,319	49,063	48,470	593	1,256	399	857
Avondale	068	2040	50,837	49,571	48,971	600	1,266	402	864
Avondale	085	1990	2	2	2	0	0	0	0
Avondale	085	1995	5	5	5	0	0	0	0
Avondale	085	2000	8	8	8	0	0	0	0
Avondale	085	2005	11	11	11	0	0	0	0
Avondale	085	2010	14	14	14	0	0	0	0
Avondale	085	2015	18	18	18	0	0	0	0
Avondale	085	2020	21	21	21	0	0	0	0
Avondale	085	2025	25	25	25	0	0	0	0
Avondale	085	2030	29	29	29	0	0	0	0
Avondale	085	2035	32	32	32	0	0	0	0
Avondale	085	2040	35	35	35	0	0	0	0

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population: Total	Resident Population: In Households	Resident Population: Group Quarters	Non-Resident Population: Total	Non-Resident Population: Transient	Non-Resident Population: Seasonal
Avondale	MPA	1990	19,902	19,651	19,331	320	251	10	241
Avondale	MPA	1995	27,103	26,574	26,024	550	529	145	384
Avondale	MPA	2000	34,448	33,629	33,075	554	819	269	550
Avondale	MPA	2005	39,090	38,033	37,440	593	1,057	421	636
Avondale	MPA	2010	56,571	54,794	53,955	839	1,777	797	980
Avondale	MPA	2015	76,111	73,439	72,324	1,115	2,672	1,308	1,364
Avondale	MPA	2020	96,769	93,388	91,985	1,403	3,381	1,638	1,743
Avondale	MPA	2025	101,694	98,113	96,667	1,446	3,581	1,758	1,823
Avondale	MPA	2030	104,882	101,146	99,689	1,457	3,736	1,867	1,869
Avondale	MPA	2035	106,749	102,927	101,458	1,469	3,822	1,928	1,894
Avondale	MPA	2040	108,200	104,225	102,743	1,482	3,975	2,064	1,911
Buckeye	065	1990	1,287	1,035	1,035	0	252	28	224
Buckeye	065	1995	1,373	1,117	1,117	0	256	28	228
Buckeye	065	2000	1,404	1,141	1,141	0	263	29	234
Buckeye	065	2005	1,437	1,167	1,166	1	270	30	240
Buckeye	065	2010	1,472	1,195	1,194	1	277	31	246
Buckeye	065	2015	1,509	1,224	1,223	1	285	32	253
Buckeye	065	2020	1,546	1,254	1,253	1	292	33	259
Buckeye	065	2025	1,584	1,285	1,284	1	299	34	265
Buckeye	065	2030	1,619	1,314	1,313	1	305	35	270
Buckeye	065	2035	1,649	1,339	1,338	1	310	36	274
Buckeye	065	2040	1,677	1,362	1,360	2	315	37	278
Buckeye	066	1990	8,490	8,167	8,089	78	323	51	272
Buckeye	066	1995	9,471	9,144	9,066	78	327	51	276
Buckeye	066	2000	9,667	9,336	9,258	78	331	51	280
Buckeye	066	2005	9,874	9,539	9,461	78	335	52	283
Buckeye	066	2010	10,101	9,762	9,684	78	339	52	287
Buckeye	066	2015	10,341	9,998	9,920	78	343	52	291
Buckeye	066	2020	10,611	10,241	10,163	78	370	75	295
Buckeye	066	2025	37,218	36,176	35,697	479	1,042	308	734
Buckeye	066	2030	93,566	91,303	89,958	1,345	2,263	684	1,579
Buckeye	066	2035	157,870	154,347	152,009	2,338	3,523	1,025	2,498
Buckeye	066	2040	222,706	217,766	214,454	3,312	4,940	1,430	3,510

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Buckeye	117	1990	31	7	7	0	24	0	24
Buckeye	117	1995	38	14	14	0	24	0	24
Buckeye	117	2000	45	20	20	0	25	0	25
Buckeye	117	2005	51	26	26	0	25	0	25
Buckeye	117	2010	58	32	32	0	26	0	26
Buckeye	117	2015	65	39	39	0	26	0	26
Buckeye	117	2020	73	46	46	0	27	0	27
Buckeye	117	2025	80	53	53	0	27	0	27
Buckeye	117	2030	88	60	60	0	28	0	28
Buckeye	117	2035	2,038	1,878	1,850	28	160	0	160
Buckeye	117	2040	4,469	4,131	4,069	62	338	0	338
Buckeye	118	1990	166	127	72	55	39	0	39
Buckeye	118	1995	176	136	81	55	40	0	40
Buckeye	118	2000	184	143	88	55	41	0	41
Buckeye	118	2005	192	150	95	55	42	0	42
Buckeye	118	2010	201	158	103	55	43	0	43
Buckeye	118	2015	211	167	112	55	44	0	44
Buckeye	118	2020	221	176	121	55	45	0	45
Buckeye	118	2025	231	185	130	55	46	0	46
Buckeye	118	2030	240	193	138	55	47	0	47
Buckeye	118	2035	249	201	146	55	48	0	48
Buckeye	118	2040	256	207	152	55	49	0	49
Buckeye	MPA	1990	9,974	9,336	9,203	133	638	79	559
Buckeye	MPA	1995	11,058	10,411	10,278	133	647	79	568
Buckeye	MPA	2000	11,300	10,640	10,507	133	660	80	580
Buckeye	MPA	2005	11,554	10,882	10,748	134	672	82	590
Buckeye	MPA	2010	11,832	11,147	11,013	134	685	83	602
Buckeye	MPA	2015	12,126	11,428	11,294	134	698	84	614
Buckeye	MPA	2020	12,451	11,717	11,583	134	734	108	626
Buckeye	MPA	2025	39,113	37,699	37,164	535	1,414	342	1,072
Buckeye	MPA	2030	95,513	92,870	91,469	1,401	2,643	719	1,924
Buckeye	MPA	2035	161,806	157,765	155,343	2,422	4,041	1,061	2,980
Buckeye	MPA	2040	229,108	223,466	220,035	3,431	5,642	1,467	4,175

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population: Total	Resident Population: In Households	Resident Population: Group Quarters	Non-Resident Population: Total	Non-Resident Population: Transient	Non-Resident Population: Seasonal
Carefree	008	1990	1,917	1,669	1,669	0	248	157	91
Carefree	008	1995	2,168	1,915	1,915	0	253	158	95
Carefree	008	2000	2,253	1,997	1,997	0	256	159	97
Carefree	008	2005	2,313	2,056	2,056	0	257	159	98
Carefree	008	2010	2,355	2,094	2,094	0	261	162	99
Carefree	008	2015	2,906	2,622	2,614	8	284	174	110
Carefree	008	2020	4,077	3,760	3,734	26	317	185	132
Carefree	008	2025	8,692	8,284	8,187	97	408	199	209
Carefree	008	2030	9,627	9,201	9,092	109	426	203	223
Carefree	008	2035	10,018	9,585	9,475	110	433	204	229
Carefree	008	2040	10,271	9,833	9,722	111	438	205	233
Carefree	MPA	1990	1,917	1,669	1,669	0	248	157	91
Carefree	MPA	1995	2,168	1,915	1,915	0	253	158	95
Carefree	MPA	2000	2,253	1,997	1,997	0	256	159	97
Carefree	MPA	2005	2,313	2,056	2,056	0	257	159	98
Carefree	MPA	2010	2,355	2,094	2,094	0	261	162	99
Carefree	MPA	2015	2,906	2,622	2,614	8	284	174	110
Carefree	MPA	2020	4,077	3,760	3,734	26	317	185	132
Carefree	MPA	2025	8,692	8,284	8,187	97	408	199	209
Carefree	MPA	2030	9,627	9,201	9,092	109	426	203	223
Carefree	MPA	2035	10,018	9,585	9,475	110	433	204	229
Carefree	MPA	2040	10,271	9,833	9,722	111	438	205	233
Cave Creek	007	1990	2,808	2,430	2,430	0	378	238	140
Cave Creek	007	1995	3,075	2,687	2,687	0	388	242	146
Cave Creek	007	2000	3,368	2,969	2,968	1	399	246	153
Cave Creek	007	2005	3,766	3,353	3,352	1	413	252	161
Cave Creek	007	2010	4,022	3,599	3,598	1	423	257	166
Cave Creek	007	2015	4,920	4,467	4,453	14	453	269	184
Cave Creek	007	2020	11,993	11,370	11,251	119	623	308	315
Cave Creek	007	2025	16,668	15,944	15,752	192	724	331	393
Cave Creek	007	2030	19,000	18,225	17,994	231	775	347	428
Cave Creek	007	2035	19,847	19,048	18,802	246	799	359	440
Cave Creek	007	2040	20,430	19,611	19,362	249	819	370	449

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population: Total	Resident Population: In Households	Resident Population: Group Quarters	Non-Resident Population: Total	Non-Resident Population: Transient	Non-Resident Population: Seasonal
Cave Creek	MPA	1990	2,808	2,430	2,430	0	378	238	140
Cave Creek	MPA	1995	3,075	2,687	2,687	0	388	242	146
Cave Creek	MPA	2000	3,368	2,969	2,968	1	399	246	153
Cave Creek	MPA	2005	3,766	3,353	3,352	1	413	252	161
Cave Creek	MPA	2010	4,022	3,599	3,598	1	423	257	166
Cave Creek	MPA	2015	4,920	4,467	4,453	14	453	269	184
Cave Creek	MPA	2020	11,993	11,370	11,251	119	623	308	315
Cave Creek	MPA	2025	16,668	15,944	15,752	192	724	331	393
Cave Creek	MPA	2030	19,000	18,225	17,994	231	775	347	428
Cave Creek	MPA	2035	19,847	19,048	18,802	246	799	359	440
Cave Creek	MPA	2040	20,430	19,611	19,362	249	819	370	449
Chandler	091	1990	40,610	40,366	40,323	43	244	51	193
Chandler	091	1995	44,873	44,427	44,345	82	446	170	276
Chandler	091	2000	46,187	45,649	45,554	95	538	233	305
Chandler	091	2005	47,387	46,761	46,654	107	626	298	328
Chandler	091	2010	47,910	47,221	47,113	108	689	352	337
Chandler	091	2015	48,205	47,495	47,385	110	710	368	342
Chandler	091	2020	48,421	47,695	47,584	111	726	382	344
Chandler	091	2025	48,811	48,068	47,957	111	743	394	349
Chandler	091	2030	49,081	48,323	48,210	113	758	405	353
Chandler	091	2035	49,533	48,757	48,644	113	776	418	358
Chandler	091	2040	49,793	49,005	48,891	114	788	427	361
Chandler	095	1990	18,190	17,853	17,853	0	337	209	128
Chandler	095	1995	29,137	28,507	28,336	171	630	273	357
Chandler	095	2000	31,655	30,902	30,713	189	753	340	413
Chandler	095	2005	32,800	31,987	31,798	189	813	377	436
Chandler	095	2010	33,641	32,788	32,597	191	853	401	452
Chandler	095	2015	34,107	33,204	33,013	191	903	442	461
Chandler	095	2020	34,370	33,441	33,250	191	929	463	466
Chandler	095	2025	34,752	33,744	33,553	191	1,008	538	470
Chandler	095	2030	35,140	34,050	33,859	191	1,090	615	475
Chandler	095	2035	35,477	34,306	34,115	191	1,171	692	479
Chandler	095	2040	35,563	34,334	34,143	191	1,229	750	479

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Chandler	096	1990	17,841	17,654	17,290	364	187	94	93
Chandler	096	1995	24,288	23,931	23,462	469	357	123	234
Chandler	096	2000	29,337	28,835	28,291	544	502	154	348
Chandler	096	2005	30,596	30,051	29,501	550	545	172	373
Chandler	096	2010	31,152	30,577	30,022	555	575	191	384
Chandler	096	2015	31,533	30,922	30,363	559	611	221	390
Chandler	096	2020	31,831	31,201	30,639	562	630	234	396
Chandler	096	2025	32,116	31,473	30,907	566	643	242	401
Chandler	096	2030	32,578	31,911	31,341	570	667	259	408
Chandler	096	2035	33,669	32,779	32,205	574	890	469	421
Chandler	096	2040	34,021	33,021	32,445	576	1,000	574	426
Chandler	097	1990	13,650	13,379	13,362	17	271	74	197
Chandler	097	1995	20,690	20,224	20,101	123	466	115	351
Chandler	097	2000	26,454	25,789	25,578	211	665	185	480
Chandler	097	2005	31,159	30,373	30,102	271	786	212	574
Chandler	097	2010	32,467	31,638	31,357	281	829	228	601
Chandler	097	2015	33,166	32,311	32,025	286	855	240	615
Chandler	097	2020	33,612	32,733	32,444	289	879	257	622
Chandler	097	2025	34,040	33,134	32,844	290	906	276	630
Chandler	097	2030	34,413	33,481	33,188	293	932	297	635
Chandler	097	2035	34,983	34,028	33,733	295	955	311	644
Chandler	097	2040	35,171	34,202	33,904	298	969	322	647
Chandler	103	1990	4,517	4,458	4,458	0	59	3	56
Chandler	103	1995	9,758	9,558	9,480	78	200	34	166
Chandler	103	2000	22,691	22,111	21,834	277	580	124	456
Chandler	103	2005	54,902	53,457	52,693	764	1,445	349	1,096
Chandler	103	2010	74,661	72,575	71,507	1,068	2,086	596	1,490
Chandler	103	2015	80,989	78,651	77,506	1,145	2,338	722	1,616
Chandler	103	2020	83,810	81,349	80,178	1,171	2,461	795	1,666
Chandler	103	2025	85,458	82,950	81,767	1,183	2,508	814	1,694
Chandler	103	2030	86,676	84,138	82,941	1,197	2,538	825	1,713
Chandler	103	2035	88,419	85,843	84,636	1,207	2,576	837	1,739
Chandler	103	2040	89,724	87,120	85,902	1,218	2,604	845	1,759

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Chandler	105	1990	2,482	2,477	2,477	0	5	2	3
Chandler	105	1995	3,417	3,353	3,353	0	64	51	13
Chandler	105	2000	10,152	9,752	9,651	101	400	239	161
Chandler	105	2005	22,337	21,399	21,115	284	938	541	397
Chandler	105	2010	44,822	43,127	42,515	612	1,695	854	841
Chandler	105	2015	90,165	87,379	86,097	1,282	2,786	1,033	1,753
Chandler	105	2020	100,614	97,577	96,146	1,431	3,037	1,089	1,948
Chandler	105	2025	103,330	100,223	98,757	1,466	3,107	1,112	1,995
Chandler	105	2030	105,018	101,872	100,392	1,480	3,146	1,127	2,019
Chandler	105	2035	106,243	103,071	101,575	1,496	3,172	1,138	2,034
Chandler	105	2040	107,576	104,375	102,858	1,517	3,201	1,146	2,055
Chandler	MPA	1990	97,290	96,187	95,763	424	1,103	433	670
Chandler	MPA	1995	132,163	130,000	129,077	923	2,163	766	1,397
Chandler	MPA	2000	166,476	163,038	161,621	1,417	3,438	1,275	2,163
Chandler	MPA	2005	219,181	214,028	211,863	2,165	5,153	1,949	3,204
Chandler	MPA	2010	264,653	257,926	255,111	2,815	6,727	2,622	4,105
Chandler	MPA	2015	318,165	309,962	306,389	3,573	8,203	3,026	5,177
Chandler	MPA	2020	332,658	323,996	320,241	3,755	8,662	3,220	5,442
Chandler	MPA	2025	338,507	329,592	325,785	3,807	8,915	3,376	5,539
Chandler	MPA	2030	342,906	333,775	329,931	3,844	9,131	3,528	5,603
Chandler	MPA	2035	348,324	338,784	334,908	3,876	9,540	3,865	5,675
Chandler	MPA	2040	351,848	342,057	338,143	3,914	9,791	4,064	5,727
County Areas	002	1990	104	56	56	0	48	0	48
County Areas	002	1995	145	96	96	0	49	0	49
County Areas	002	2000	154	104	104	0	50	0	50
County Areas	002	2005	164	113	113	0	51	0	51
County Areas	002	2010	175	123	123	0	52	0	52
County Areas	002	2015	186	133	133	0	53	0	53
County Areas	002	2020	198	144	144	0	54	0	54
County Areas	002	2025	210	155	155	0	55	0	55
County Areas	002	2030	222	166	166	0	56	0	56
County Areas	002	2035	232	175	175	0	57	0	57
County Areas	002	2040	241	183	183	0	58	0	58

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
County Areas	003	1990	1,436	1,337	1,314	23	99	0	99
County Areas	003	1995	1,530	1,428	1,405	23	102	0	102
County Areas	003	2000	1,554	1,449	1,426	23	105	0	105
County Areas	003	2005	1,582	1,474	1,451	23	108	0	108
County Areas	003	2010	1,610	1,499	1,476	23	111	0	111
County Areas	003	2015	1,640	1,526	1,503	23	114	0	114
County Areas	003	2020	1,675	1,557	1,534	23	118	0	118
County Areas	003	2025	1,719	1,597	1,574	23	122	0	122
County Areas	003	2030	1,770	1,644	1,621	23	126	0	126
County Areas	003	2035	1,824	1,694	1,671	23	130	0	130
County Areas	003	2040	1,879	1,744	1,721	23	135	0	135
County Areas	004	1990	1,588	1,471	1,425	46	117	0	117
County Areas	004	1995	1,604	1,485	1,439	46	119	0	119
County Areas	004	2000	1,633	1,510	1,464	46	123	0	123
County Areas	004	2005	1,663	1,537	1,491	46	126	0	126
County Areas	004	2010	1,696	1,566	1,520	46	130	0	130
County Areas	004	2015	1,731	1,597	1,551	46	134	0	134
County Areas	004	2020	1,766	1,628	1,582	46	138	0	138
County Areas	004	2025	1,802	1,660	1,614	46	142	0	142
County Areas	004	2030	1,835	1,691	1,645	46	144	0	144
County Areas	004	2035	2,069	1,908	1,862	46	161	0	161
County Areas	004	2040	3,712	3,430	3,291	139	282	0	282
County Areas	005	1990	1,452	1,452	179	1,273	0	0	0
County Areas	005	1995	1,458	1,458	181	1,277	0	0	0
County Areas	005	2000	1,468	1,468	187	1,281	0	0	0
County Areas	005	2005	1,478	1,478	192	1,286	0	0	0
County Areas	005	2010	1,489	1,489	198	1,291	0	0	0
County Areas	005	2015	1,499	1,499	204	1,295	0	0	0
County Areas	005	2020	1,510	1,509	211	1,298	1	1	0
County Areas	005	2025	6,822	6,712	5,329	1,383	110	22	88
County Areas	005	2030	14,292	14,033	12,531	1,502	259	59	200
County Areas	005	2035	19,703	19,341	17,751	1,590	362	85	277
County Areas	005	2040	22,327	21,910	20,282	1,628	417	99	318

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
County Areas	012	1990	0	0	0	0	0	0	0
County Areas	012	1995	1	1	1	0	0	0	0
County Areas	012	2000	2	2	2	0	0	0	0
County Areas	012	2005	3	3	3	0	0	0	0
County Areas	012	2010	4	4	4	0	0	0	0
County Areas	012	2015	5	5	5	0	0	0	0
County Areas	012	2020	6	6	6	0	0	0	0
County Areas	012	2025	1,958	1,921	1,891	30	37	5	32
County Areas	012	2030	9,464	9,296	9,150	146	168	23	145
County Areas	012	2035	15,971	15,695	15,448	247	276	37	239
County Areas	012	2040	19,327	18,990	18,691	299	337	45	292
County Areas	016	1990	16,822	16,308	16,232	76	514	26	488
County Areas	016	1995	17,930	17,408	17,177	231	522	30	492
County Areas	016	2000	18,569	18,033	17,651	382	536	32	504
County Areas	016	2005	20,954	20,368	19,798	570	586	39	547
County Areas	016	2010	26,225	25,520	24,717	803	705	56	649
County Areas	016	2015	31,237	30,417	29,383	1,034	820	75	745
County Areas	016	2020	38,444	37,458	36,138	1,320	986	109	877
County Areas	016	2025	47,717	46,550	44,867	1,683	1,167	139	1,028
County Areas	016	2030	49,935	48,719	46,755	1,964	1,216	158	1,058
County Areas	016	2035	51,377	50,108	47,864	2,244	1,269	194	1,075
County Areas	016	2040	52,312	51,026	48,538	2,488	1,286	200	1,086
County Areas	023	1990	661	661	661	0	0	0	0
County Areas	023	1995	1,395	1,377	1,377	0	18	1	17
County Areas	023	2000	2,135	2,099	2,099	0	36	2	34
County Areas	023	2005	2,730	2,681	2,681	0	49	3	46
County Areas	023	2010	3,455	3,390	3,390	0	65	4	61
County Areas	023	2015	3,776	3,703	3,703	0	73	5	68
County Areas	023	2020	4,088	4,009	4,009	0	79	5	74
County Areas	023	2025	7,034	6,896	6,857	39	138	15	123
County Areas	023	2030	8,433	8,272	8,233	39	161	17	144
County Areas	023	2035	9,153	8,981	8,941	40	172	18	154
County Areas	023	2040	9,239	9,066	9,026	40	173	18	155

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population: Total	Resident Population: In Households	Resident Population: Group Quarters	Non-Resident Population: Total	Non-Resident Population: Transient	Non-Resident Population: Seasonal
County Areas	028	1990	39,496	38,126	37,451	675	1,370	138	1,232
County Areas	028	1995	40,247	38,833	38,151	682	1,414	166	1,248
County Areas	028	2000	41,106	39,653	38,944	709	1,453	186	1,267
County Areas	028	2005	42,833	41,337	40,595	742	1,496	195	1,301
County Areas	028	2010	43,130	41,622	40,871	751	1,508	201	1,307
County Areas	028	2015	43,364	41,845	41,087	758	1,519	207	1,312
County Areas	028	2020	43,370	41,847	41,087	760	1,523	211	1,312
County Areas	028	2025	43,373	41,848	41,087	761	1,525	213	1,312
County Areas	028	2030	43,380	41,851	41,087	764	1,529	217	1,312
County Areas	028	2035	43,383	41,853	41,087	766	1,530	218	1,312
County Areas	028	2040	43,387	41,854	41,087	767	1,533	221	1,312
County Areas	040	1990	602	602	593	9	0	0	0
County Areas	040	1995	659	659	650	9	0	0	0
County Areas	040	2000	733	733	724	9	0	0	0
County Areas	040	2005	808	808	799	9	0	0	0
County Areas	040	2010	889	889	880	9	0	0	0
County Areas	040	2015	976	976	967	9	0	0	0
County Areas	040	2020	1,067	1,067	1,058	9	0	0	0
County Areas	040	2025	1,159	1,159	1,150	9	0	0	0
County Areas	040	2030	1,252	1,251	1,242	9	1	1	0
County Areas	040	2035	1,341	1,340	1,331	9	1	1	0
County Areas	040	2040	1,424	1,423	1,414	9	1	1	0
County Areas	041	1990	24	0	0	0	24	0	24
County Areas	041	1995	28	3	3	0	25	0	25
County Areas	041	2000	34	9	9	0	25	0	25
County Areas	041	2005	41	15	15	0	26	0	26
County Areas	041	2010	47	21	21	0	26	0	26
County Areas	041	2015	55	28	28	0	27	0	27
County Areas	041	2020	62	35	35	0	27	0	27
County Areas	041	2025	70	42	42	0	28	0	28
County Areas	041	2030	77	49	49	0	28	0	28
County Areas	041	2035	2,028	1,867	1,839	28	161	0	161
County Areas	041	2040	4,459	4,120	4,058	62	339	0	339

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

				Resident Population			Non-Resident Population		
MPA	Dist	Year	Total Population	Total	In Households	Group Quarters	Total	Transient	Seasonal
County Areas	042	1990	988	988	972	16	0	0	0
County Areas	042	1995	1,031	1,031	1,015	16	0	0	0
County Areas	042	2000	1,070	1,070	1,054	16	0	0	0
County Areas	042	2005	1,112	1,112	1,096	16	0	0	0
County Areas	042	2010	1,159	1,159	1,143	16	0	0	0
County Areas	042	2015	1,208	1,208	1,192	16	0	0	0
County Areas	042	2020	4,223	4,155	4,094	61	68	12	56
County Areas	042	2025	19,918	19,531	19,230	301	387	70	317
County Areas	042	2030	32,632	32,006	31,505	501	626	118	508
County Areas	042	2035	36,041	35,354	34,795	559	687	130	557
County Areas	042	2040	40,960	40,177	39,540	637	783	149	634
County Areas	052	1990	5,270	4,854	4,759	95	416	247	169
County Areas	052	1995	5,919	5,457	5,362	95	462	281	181
County Areas	052	2000	6,761	6,237	6,142	95	524	327	197
County Areas	052	2005	7,621	7,040	6,945	95	581	370	211
County Areas	052	2010	8,518	7,901	7,806	95	617	390	227
County Areas	052	2015	9,475	8,822	8,727	95	653	408	245
County Areas	052	2020	10,468	9,783	9,688	95	685	424	261
County Areas	052	2025	11,467	10,756	10,661	95	711	436	275
County Areas	052	2030	12,455	11,727	11,632	95	728	441	287
County Areas	052	2035	13,420	12,675	12,580	95	745	446	299
County Areas	052	2040	14,325	13,567	13,472	95	758	447	311
County Areas	083	1990	986	986	986	0	0	0	0
County Areas	083	1995	1,011	1,011	1,011	0	0	0	0
County Areas	083	2000	1,025	1,025	1,025	0	0	0	0
County Areas	083	2005	1,040	1,040	1,040	0	0	0	0
County Areas	083	2010	1,057	1,057	1,057	0	0	0	0
County Areas	083	2015	1,074	1,074	1,074	0	0	0	0
County Areas	083	2020	1,092	1,092	1,092	0	0	0	0
County Areas	083	2025	1,110	1,110	1,110	0	0	0	0
County Areas	083	2030	4,512	4,458	4,405	53	54	3	51
County Areas	083	2035	9,537	9,406	9,275	131	131	8	123
County Areas	083	2040	12,268	12,087	11,915	172	181	15	166

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
County Areas	104	1990	5,454	5,127	5,127	0	327	0	327
County Areas	104	1995	9,366	8,945	8,945	0	421	0	421
County Areas	104	2000	12,987	12,477	12,477	0	510	6	504
County Areas	104	2005	17,745	17,083	17,009	74	662	64	598
County Areas	104	2010	21,271	20,488	20,372	116	783	115	668
County Areas	104	2015	22,919	22,062	21,904	158	857	157	700
County Areas	104	2020	22,983	22,101	21,904	197	882	182	700
County Areas	104	2025	23,014	22,121	21,904	217	893	193	700
County Areas	104	2030	23,022	22,123	21,904	219	899	199	700
County Areas	104	2035	23,027	22,125	21,904	221	902	202	700
County Areas	104	2040	23,033	22,127	21,904	223	906	206	700
County Areas	106	1990	2,094	2,094	1,771	323	0	0	0
County Areas	106	1995	2,140	2,140	1,817	323	0	0	0
County Areas	106	2000	2,189	2,189	1,866	323	0	0	0
County Areas	106	2005	2,580	2,573	2,250	323	7	0	7
County Areas	106	2010	10,384	10,208	9,768	440	176	12	164
County Areas	106	2015	48,079	47,052	46,057	995	1,027	104	923
County Areas	106	2020	86,067	84,229	82,664	1,565	1,838	208	1,630
County Areas	106	2025	92,842	90,866	89,200	1,666	1,976	233	1,743
County Areas	106	2030	96,063	94,027	92,335	1,692	2,036	242	1,794
County Areas	106	2035	98,054	95,983	94,276	1,707	2,071	247	1,824
County Areas	106	2040	99,596	97,495	95,771	1,724	2,101	253	1,848
County Areas	107	1990	852	826	759	67	26	3	23
County Areas	107	1995	858	831	764	67	27	3	24
County Areas	107	2000	865	837	770	67	28	3	25
County Areas	107	2005	874	845	778	67	29	3	26
County Areas	107	2010	882	852	785	67	30	3	27
County Areas	107	2015	892	861	794	67	31	3	28
County Areas	107	2020	903	871	804	67	32	3	29
County Areas	107	2025	915	882	815	67	33	3	30
County Areas	107	2030	932	897	830	67	35	3	32
County Areas	107	2035	950	913	846	67	37	3	34
County Areas	107	2040	968	929	862	67	39	3	36

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
County Areas	109	1990	481	406	395	11	75	8	67
County Areas	109	1995	491	415	403	12	76	8	68
County Areas	109	2000	506	428	415	13	78	8	70
County Areas	109	2005	523	443	428	15	80	8	72
County Areas	109	2010	540	458	442	16	82	8	74
County Areas	109	2015	558	474	457	17	84	8	76
County Areas	109	2020	577	491	473	18	86	8	78
County Areas	109	2025	596	508	489	19	88	8	80
County Areas	109	2030	695	596	576	20	99	9	90
County Areas	109	2035	1,319	1,155	1,134	21	164	15	149
County Areas	109	2040	3,869	3,424	3,368	56	445	41	404
County Areas	110	1990	2,829	2,679	2,584	95	150	17	133
County Areas	110	1995	2,849	2,697	2,602	95	152	17	135
County Areas	110	2000	2,886	2,730	2,635	95	156	17	139
County Areas	110	2005	2,925	2,766	2,671	95	159	17	142
County Areas	110	2010	2,968	2,805	2,710	95	163	17	146
County Areas	110	2015	3,013	2,846	2,751	95	167	17	150
County Areas	110	2020	3,060	2,889	2,794	95	171	17	154
County Areas	110	2025	3,108	2,933	2,838	95	175	17	158
County Areas	110	2030	3,153	2,975	2,880	95	178	17	161
County Areas	110	2035	3,193	3,012	2,917	95	181	17	164
County Areas	110	2040	3,225	3,042	2,947	95	183	17	166
County Areas	111	1990	835	787	787	0	48	0	48
County Areas	111	1995	842	793	793	0	49	0	49
County Areas	111	2000	854	804	804	0	50	0	50
County Areas	111	2005	866	815	815	0	51	0	51
County Areas	111	2010	879	827	827	0	52	0	52
County Areas	111	2015	893	840	840	0	53	0	53
County Areas	111	2020	907	853	853	0	54	0	54
County Areas	111	2025	922	867	867	0	55	0	55
County Areas	111	2030	937	881	881	0	56	0	56
County Areas	111	2035	950	893	893	0	57	0	57
County Areas	111	2040	961	903	903	0	58	0	58

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

				Resident Population			Non-Resident Population		
MPA	Dist	Year	Total Population	Total	In Households	Group Quarters	Total	Transient	Seasonal
County Areas	112	1990	542	492	336	156	50	0	50
County Areas	112	1995	555	503	347	156	52	0	52
County Areas	112	2000	568	514	358	156	54	0	54
County Areas	112	2005	587	530	374	156	57	0	57
County Areas	112	2010	607	547	391	156	60	0	60
County Areas	112	2015	628	565	409	156	63	0	63
County Areas	112	2020	646	581	425	156	65	0	65
County Areas	112	2025	674	606	450	156	68	0	68
County Areas	112	2030	710	638	482	156	72	0	72
County Areas	112	2035	749	673	517	156	76	0	76
County Areas	112	2040	788	708	552	156	80	0	80
County Areas	113	1990	530	257	257	0	273	28	245
County Areas	113	1995	567	285	285	0	282	29	253
County Areas	113	2000	608	316	316	0	292	30	262
County Areas	113	2005	654	352	352	0	302	31	271
County Areas	113	2010	697	386	386	0	311	32	279
County Areas	113	2015	743	422	422	0	321	33	288
County Areas	113	2020	792	461	461	0	331	34	297
County Areas	113	2025	848	507	507	0	341	35	306
County Areas	113	2030	913	561	561	0	352	36	316
County Areas	113	2035	980	617	617	0	363	37	326
County Areas	113	2040	1,043	669	669	0	374	38	336
County Areas	114	1990	362	89	89	0	273	28	245
County Areas	114	1995	411	126	126	0	285	29	256
County Areas	114	2000	464	167	167	0	297	30	267
County Areas	114	2005	525	215	215	0	310	31	279
County Areas	114	2010	583	261	261	0	322	32	290
County Areas	114	2015	644	309	309	0	335	33	302
County Areas	114	2020	710	362	362	0	348	34	314
County Areas	114	2025	784	423	423	0	361	35	326
County Areas	114	2030	870	495	495	0	375	36	339
County Areas	114	2035	959	570	570	0	389	37	352
County Areas	114	2040	1,041	638	638	0	403	38	365

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
County Areas	MPA	1990	83,408	79,598	76,733	2,865	3,810	495	3,315
County Areas	MPA	1995	91,037	86,982	83,950	3,032	4,055	564	3,491
County Areas	MPA	2000	98,171	93,854	90,639	3,215	4,317	641	3,676
County Areas	MPA	2005	109,308	104,628	101,111	3,517	4,680	761	3,919
County Areas	MPA	2010	128,265	123,072	119,148	3,924	5,193	870	4,323
County Areas	MPA	2015	174,595	168,264	163,500	4,764	6,331	1,050	5,281
County Areas	MPA	2020	224,614	217,128	211,418	5,710	7,486	1,248	6,238
County Areas	MPA	2025	268,062	259,650	253,060	6,590	8,412	1,424	6,988
County Areas	MPA	2030	307,554	298,356	290,965	7,391	9,198	1,579	7,619
County Areas	MPA	2035	336,260	326,338	318,293	8,045	9,922	1,695	8,227
County Areas	MPA	2040	360,384	349,512	340,832	8,680	10,872	1,791	9,081
El Mirage	026	1990	5,053	5,034	4,980	54	19	0	19
El Mirage	026	1995	5,972	5,934	5,880	54	38	0	38
El Mirage	026	2000	6,999	6,939	6,885	54	60	0	60
El Mirage	026	2005	8,608	8,517	8,456	61	91	0	91
El Mirage	026	2010	15,503	15,268	15,107	161	235	6	229
El Mirage	026	2015	23,918	23,503	23,208	295	415	16	399
El Mirage	026	2020	29,034	28,515	28,152	363	519	24	495
El Mirage	026	2025	31,029	30,475	30,086	389	554	26	528
El Mirage	026	2030	32,026	31,457	31,065	392	569	27	542
El Mirage	026	2035	32,620	32,042	31,646	396	578	28	550
El Mirage	026	2040	33,063	32,478	32,079	399	585	28	557
El Mirage	MPA	1990	5,053	5,034	4,980	54	19	0	19
El Mirage	MPA	1995	5,972	5,934	5,880	54	38	0	38
El Mirage	MPA	2000	6,999	6,939	6,885	54	60	0	60
El Mirage	MPA	2005	8,608	8,517	8,456	61	91	0	91
El Mirage	MPA	2010	15,503	15,268	15,107	161	235	6	229
El Mirage	MPA	2015	23,918	23,503	23,208	295	415	16	399
El Mirage	MPA	2020	29,034	28,515	28,152	363	519	24	495
El Mirage	MPA	2025	31,029	30,475	30,086	389	554	26	528
El Mirage	MPA	2030	32,026	31,457	31,065	392	569	27	542
El Mirage	MPA	2035	32,620	32,042	31,646	396	578	28	550
El Mirage	MPA	2040	33,063	32,478	32,079	399	585	28	557

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

				Resident Population			Non-Resident Population		
MPA	Dist	Year	Total Population	Total	In Households	Group Quarters	Total	Transient	Seasonal
Fountain Hills	039	1990	10,624	10,119	10,119	0	505	14	491
Fountain Hills	039	1995	16,819	16,142	16,014	128	677	60	617
Fountain Hills	039	2000	17,926	17,156	16,966	190	770	130	640
Fountain Hills	039	2005	18,534	17,708	17,518	190	826	175	651
Fountain Hills	039	2010	18,556	17,708	17,518	190	848	197	651
Fountain Hills	039	2015	18,572	17,708	17,518	190	864	213	651
Fountain Hills	039	2020	18,608	17,708	17,518	190	900	249	651
Fountain Hills	039	2025	18,630	17,708	17,518	190	922	271	651
Fountain Hills	039	2030	18,654	17,708	17,518	190	946	295	651
Fountain Hills	039	2035	18,670	17,708	17,518	190	962	311	651
Fountain Hills	039	2040	18,679	17,708	17,518	190	971	320	651
Fountain Hills	MPA	1990	10,624	10,119	10,119	0	505	14	491
Fountain Hills	MPA	1995	16,819	16,142	16,014	128	677	60	617
Fountain Hills	MPA	2000	17,926	17,156	16,966	190	770	130	640
Fountain Hills	MPA	2005	18,534	17,708	17,518	190	826	175	651
Fountain Hills	MPA	2010	18,556	17,708	17,518	190	848	197	651
Fountain Hills	MPA	2015	18,572	17,708	17,518	190	864	213	651
Fountain Hills	MPA	2020	18,608	17,708	17,518	190	900	249	651
Fountain Hills	MPA	2025	18,630	17,708	17,518	190	922	271	651
Fountain Hills	MPA	2030	18,654	17,708	17,518	190	946	295	651
Fountain Hills	MPA	2035	18,670	17,708	17,518	190	962	311	651
Fountain Hills	MPA	2040	18,679	17,708	17,518	190	971	320	651
Gila Bend	108	1990	2,103	1,817	1,812	5	286	259	27
Gila Bend	108	1995	2,443	2,116	2,111	5	327	296	31
Gila Bend	108	2000	2,828	2,451	2,446	5	377	341	36
Gila Bend	108	2005	3,217	2,795	2,790	5	422	382	40
Gila Bend	108	2010	3,635	3,164	3,159	5	471	426	45
Gila Bend	108	2015	4,084	3,560	3,555	5	524	474	50
Gila Bend	108	2020	4,546	3,971	3,966	5	575	520	55
Gila Bend	108	2025	5,007	4,387	4,382	5	620	561	59
Gila Bend	108	2030	5,463	4,802	4,797	5	661	598	63
Gila Bend	108	2035	5,907	5,208	5,203	5	699	632	67
Gila Bend	108	2040	6,328	5,590	5,585	5	738	667	71

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Gila Bend	MPA	1990	2,103	1,817	1,812	5	286	259	27
Gila Bend	MPA	1995	2,443	2,116	2,111	5	327	296	31
Gila Bend	MPA	2000	2,828	2,451	2,446	5	377	341	36
Gila Bend	MPA	2005	3,217	2,795	2,790	5	422	382	40
Gila Bend	MPA	2010	3,635	3,164	3,159	5	471	426	45
Gila Bend	MPA	2015	4,084	3,560	3,555	5	524	474	50
Gila Bend	MPA	2020	4,546	3,971	3,966	5	575	520	55
Gila Bend	MPA	2025	5,007	4,387	4,382	5	620	561	59
Gila Bend	MPA	2030	5,463	4,802	4,797	5	661	598	63
Gila Bend	MPA	2035	5,907	5,208	5,203	5	699	632	67
Gila Bend	MPA	2040	6,328	5,590	5,585	5	738	667	71
Gila River	102	1990	2,711	2,679	2,607	72	32	16	16
Gila River	102	1995	3,273	3,033	2,961	72	240	217	23
Gila River	102	2000	3,717	3,429	3,357	72	288	256	32
Gila River	102	2005	4,159	3,835	3,763	72	324	284	40
Gila River	102	2010	4,632	4,272	4,200	72	360	312	48
Gila River	102	2015	5,142	4,739	4,667	72	403	346	57
Gila River	102	2020	5,664	5,226	5,154	72	438	372	66
Gila River	102	2025	6,185	5,718	5,646	72	467	393	74
Gila River	102	2030	6,699	6,209	6,137	72	490	409	81
Gila River	102	2035	7,194	6,690	6,618	72	504	416	88
Gila River	102	2040	7,657	7,141	7,069	72	516	421	95
Gila River	MPA	1990	2,711	2,679	2,607	72	32	16	16
Gila River	MPA	1995	3,273	3,033	2,961	72	240	217	23
Gila River	MPA	2000	3,717	3,429	3,357	72	288	256	32
Gila River	MPA	2005	4,159	3,835	3,763	72	324	284	40
Gila River	MPA	2010	4,632	4,272	4,200	72	360	312	48
Gila River	MPA	2015	5,142	4,739	4,667	72	403	346	57
Gila River	MPA	2020	5,664	5,226	5,154	72	438	372	66
Gila River	MPA	2025	6,185	5,718	5,646	72	467	393	74
Gila River	MPA	2030	6,699	6,209	6,137	72	490	409	81
Gila River	MPA	2035	7,194	6,690	6,618	72	504	416	88
Gila River	MPA	2040	7,657	7,141	7,069	72	516	421	95

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population: Total	Resident Population: In Households	Resident Population: Group Quarters	Non-Resident Population: Total	Non-Resident Population: Transient	Non-Resident Population: Seasonal
Gilbert	092	1990	28,760	28,578	28,578	0	182	40	142
Gilbert	092	1995	36,157	35,851	35,851	0	306	57	249
Gilbert	092	2000	62,999	61,939	61,525	414	1,060	208	852
Gilbert	092	2005	66,983	65,799	65,357	442	1,184	254	930
Gilbert	092	2010	68,512	67,271	66,816	455	1,241	280	961
Gilbert	092	2015	69,501	68,221	67,760	461	1,280	300	980
Gilbert	092	2020	70,330	69,023	68,555	468	1,307	311	996
Gilbert	092	2025	71,108	69,651	69,178	473	1,457	453	1,004
Gilbert	092	2030	72,740	71,156	70,677	479	1,584	558	1,026
Gilbert	092	2035	75,399	73,691	73,190	501	1,708	645	1,063
Gilbert	092	2040	76,191	74,428	73,920	508	1,763	689	1,074
Gilbert	093	1990	2,318	2,264	2,264	0	54	23	31
Gilbert	093	1995	4,719	4,593	4,579	14	126	47	79
Gilbert	093	2000	13,711	13,249	13,100	149	462	183	279
Gilbert	093	2005	25,998	25,183	24,791	392	815	294	521
Gilbert	093	2010	28,563	27,677	27,260	417	886	314	572
Gilbert	093	2015	29,400	28,466	28,042	424	934	345	589
Gilbert	093	2020	29,853	28,900	28,470	430	953	356	597
Gilbert	093	2025	30,170	29,207	28,772	435	963	360	603
Gilbert	093	2030	30,453	29,483	29,045	438	970	363	607
Gilbert	093	2035	30,770	29,790	29,346	444	980	367	613
Gilbert	093	2040	31,442	30,448	30,001	447	994	370	624
Gilbert	098	1990	5,211	4,864	4,864	0	347	9	338
Gilbert	098	1995	11,758	11,267	11,174	93	491	29	462
Gilbert	098	2000	23,285	22,441	22,172	269	844	123	721
Gilbert	098	2005	33,887	32,722	32,318	404	1,165	234	931
Gilbert	098	2010	61,424	59,526	58,716	810	1,898	416	1,482
Gilbert	098	2015	107,273	104,239	102,761	1,478	3,034	629	2,405
Gilbert	098	2020	116,869	113,572	111,978	1,594	3,297	715	2,582
Gilbert	098	2025	124,004	120,508	118,844	1,664	3,496	797	2,699
Gilbert	098	2030	129,237	125,500	123,811	1,689	3,737	960	2,777
Gilbert	098	2035	132,566	128,710	127,003	1,707	3,856	1,032	2,824
Gilbert	098	2040	136,105	132,042	130,320	1,722	4,063	1,183	2,880

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Gilbert	MPA	1990	36,289	35,706	35,706	0	583	72	511
Gilbert	MPA	1995	52,634	51,711	51,604	107	923	133	790
Gilbert	MPA	2000	99,995	97,629	96,797	832	2,366	514	1,852
Gilbert	MPA	2005	126,868	123,704	122,466	1,238	3,164	782	2,382
Gilbert	MPA	2010	158,499	154,474	152,792	1,682	4,025	1,010	3,015
Gilbert	MPA	2015	206,174	200,926	198,563	2,363	5,248	1,274	3,974
Gilbert	MPA	2020	217,052	211,495	209,003	2,492	5,557	1,382	4,175
Gilbert	MPA	2025	225,282	219,366	216,794	2,572	5,916	1,610	4,306
Gilbert	MPA	2030	232,430	226,139	223,533	2,606	6,291	1,881	4,410
Gilbert	MPA	2035	238,735	232,191	229,539	2,652	6,544	2,044	4,500
Gilbert	MPA	2040	243,738	236,918	234,241	2,677	6,820	2,242	4,578
Glendale	017	1990	11,695	11,610	11,575	35	85	40	45
Glendale	017	1995	23,835	23,301	22,981	320	534	236	298
Glendale	017	2000	38,469	37,126	36,595	531	1,343	724	619
Glendale	017	2005	44,464	42,710	42,109	601	1,754	1,021	733
Glendale	017	2010	46,721	44,654	44,032	622	2,067	1,294	773
Glendale	017	2015	47,783	45,444	44,817	627	2,339	1,548	791
Glendale	017	2020	48,251	45,767	45,136	631	2,484	1,687	797
Glendale	017	2025	48,570	46,016	45,377	639	2,554	1,753	801
Glendale	017	2030	48,866	46,278	45,635	643	2,588	1,783	805
Glendale	017	2035	49,180	46,567	45,918	649	2,613	1,805	808
Glendale	017	2040	49,652	46,984	46,329	655	2,668	1,853	815
Glendale	030	1990	38,443	38,418	37,643	775	25	13	12
Glendale	030	1995	44,546	44,332	43,468	864	214	78	136
Glendale	030	2000	46,399	46,120	45,232	888	279	102	177
Glendale	030	2005	47,002	46,696	45,795	901	306	117	189
Glendale	030	2010	47,374	47,053	46,143	910	321	124	197
Glendale	030	2015	47,564	47,228	46,310	918	336	136	200
Glendale	030	2020	47,760	47,353	46,427	926	407	206	201
Glendale	030	2025	47,963	47,520	46,587	933	443	240	203
Glendale	030	2030	48,136	47,664	46,723	941	472	268	204
Glendale	030	2035	48,313	47,832	46,884	948	481	275	206
Glendale	030	2040	48,427	47,939	46,984	955	488	280	208

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population: Total	Resident Population: In Households	Resident Population: Group Quarters	Non-Resident Population: Total	Non-Resident Population: Transient	Non-Resident Population: Seasonal
Glendale	043	1990	4,722	4,667	4,653	14	55	22	33
Glendale	043	1995	4,913	4,858	4,844	14	55	22	33
Glendale	043	2000	5,024	4,969	4,955	14	55	22	33
Glendale	043	2005	16,913	16,602	16,414	188	311	44	267
Glendale	043	2010	30,935	30,312	29,910	402	623	75	548
Glendale	043	2015	40,363	39,525	39,002	523	838	102	736
Glendale	043	2020	72,223	70,726	69,740	986	1,497	171	1,326
Glendale	043	2025	84,606	82,881	81,709	1,172	1,725	192	1,533
Glendale	043	2030	109,307	107,170	105,623	1,547	2,137	232	1,905
Glendale	043	2035	131,135	128,652	126,781	1,871	2,483	265	2,218
Glendale	043	2040	141,739	139,070	137,073	1,997	2,669	284	2,385
Glendale	044	1990	4,371	4,371	3,392	979	0	0	0
Glendale	044	1995	4,371	4,371	3,392	979	0	0	0
Glendale	044	2000	4,371	4,371	3,392	979	0	0	0
Glendale	044	2005	4,371	4,371	3,392	979	0	0	0
Glendale	044	2010	4,371	4,371	3,392	979	0	0	0
Glendale	044	2015	4,371	4,371	3,392	979	0	0	0
Glendale	044	2020	4,371	4,371	3,392	979	0	0	0
Glendale	044	2025	4,371	4,371	3,392	979	0	0	0
Glendale	044	2030	4,371	4,371	3,392	979	0	0	0
Glendale	044	2035	4,371	4,371	3,392	979	0	0	0
Glendale	044	2040	4,371	4,371	3,392	979	0	0	0
Glendale	045	1990	18,721	18,706	18,706	0	15	0	15
Glendale	045	1995	23,724	23,557	23,511	46	167	51	116
Glendale	045	2000	43,733	42,997	42,652	345	736	170	566
Glendale	045	2005	48,013	47,153	46,772	381	860	209	651
Glendale	045	2010	49,986	49,062	48,673	389	924	232	692
Glendale	045	2015	50,995	50,041	49,648	393	954	242	712
Glendale	045	2020	51,688	50,719	50,318	401	969	246	723
Glendale	045	2025	52,305	51,324	50,921	403	981	250	731
Glendale	045	2030	52,919	51,925	51,518	407	994	255	739
Glendale	045	2035	54,235	53,219	52,808	411	1,016	258	758
Glendale	045	2040	54,800	53,770	53,355	415	1,030	263	767

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Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Glendale	046	1990	81,811	81,296	80,714	582	515	248	267
Glendale	046	1995	87,109	86,401	85,737	664	708	330	378
Glendale	046	2000	88,800	88,017	87,327	690	783	368	415
Glendale	046	2005	89,835	89,011	88,300	711	824	391	433
Glendale	046	2010	91,010	90,130	89,403	727	880	425	455
Glendale	046	2015	92,241	91,290	90,550	740	951	473	478
Glendale	046	2020	93,665	92,651	91,898	753	1,014	511	503
Glendale	046	2025	95,293	94,218	93,454	764	1,075	544	531
Glendale	046	2030	96,888	95,763	94,987	776	1,125	572	553
Glendale	046	2035	98,165	96,995	96,207	788	1,170	598	572
Glendale	046	2040	99,349	98,141	97,342	799	1,208	618	590
Glendale	MPA	1990	159,763	159,068	156,683	2,385	695	323	372
Glendale	MPA	1995	188,498	186,820	183,933	2,887	1,678	717	961
Glendale	MPA	2000	226,796	223,600	220,153	3,447	3,196	1,386	1,810
Glendale	MPA	2005	250,598	246,543	242,782	3,761	4,055	1,782	2,273
Glendale	MPA	2010	270,397	265,582	261,553	4,029	4,815	2,150	2,665
Glendale	MPA	2015	283,317	277,899	273,719	4,180	5,418	2,501	2,917
Glendale	MPA	2020	317,958	311,587	306,911	4,676	6,371	2,821	3,550
Glendale	MPA	2025	333,108	326,330	321,440	4,890	6,778	2,979	3,799
Glendale	MPA	2030	360,487	353,171	347,878	5,293	7,316	3,110	4,206
Glendale	MPA	2035	385,399	377,636	371,990	5,646	7,763	3,201	4,562
Glendale	MPA	2040	398,338	390,275	384,475	5,800	8,063	3,298	4,765
Goodyear	053	1990	36	22	22	0	14	0	14
Goodyear	053	1995	82	68	68	0	14	0	14
Goodyear	053	2000	666	639	630	9	27	0	27
Goodyear	053	2005	14,319	13,969	13,753	216	350	51	299
Goodyear	053	2010	24,982	24,331	23,959	372	651	138	513
Goodyear	053	2015	28,357	27,573	27,161	412	784	204	580
Goodyear	053	2020	36,856	35,771	35,237	534	1,085	349	736
Goodyear	053	2025	37,720	36,612	36,074	538	1,108	358	750
Goodyear	053	2030	38,228	37,105	36,561	544	1,123	364	759
Goodyear	053	2035	38,582	37,449	36,899	550	1,133	370	763
Goodyear	053	2040	39,482	38,328	37,774	554	1,154	378	776

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Goodyear	067	1990	7,582	7,059	4,999	2,060	523	313	210
Goodyear	067	1995	7,870	7,338	5,253	2,085	532	321	211
Goodyear	067	2000	13,658	12,971	10,766	2,205	687	348	339
Goodyear	067	2005	19,382	18,512	16,197	2,315	870	420	450
Goodyear	067	2010	43,919	42,239	39,539	2,700	1,680	743	937
Goodyear	067	2015	71,245	68,642	65,539	3,103	2,603	1,124	1,479
Goodyear	067	2020	125,267	120,976	117,075	3,901	4,291	1,819	2,472
Goodyear	067	2025	156,961	151,783	147,395	4,388	5,178	2,183	2,995
Goodyear	067	2030	169,709	164,183	159,581	4,602	5,526	2,342	3,184
Goodyear	067	2035	175,128	169,477	164,801	4,676	5,651	2,390	3,261
Goodyear	067	2040	178,282	172,561	167,829	4,732	5,721	2,411	3,310
Goodyear	084	1990	467	467	450	17	0	0	0
Goodyear	084	1995	783	783	766	17	0	0	0
Goodyear	084	2000	791	791	774	17	0	0	0
Goodyear	084	2005	798	798	781	17	0	0	0
Goodyear	084	2010	806	806	789	17	0	0	0
Goodyear	084	2015	815	815	798	17	0	0	0
Goodyear	084	2020	22,580	21,885	21,548	337	695	294	401
Goodyear	084	2025	87,543	85,138	83,810	1,328	2,405	930	1,475
Goodyear	084	2030	120,359	117,155	115,308	1,847	3,204	1,238	1,966
Goodyear	084	2035	125,485	122,137	120,190	1,947	3,348	1,310	2,038
Goodyear	084	2040	127,654	124,251	122,261	1,990	3,403	1,331	2,072
Goodyear	101	1990	159	159	159	0	0	0	0
Goodyear	101	1995	159	159	159	0	0	0	0
Goodyear	101	2000	159	159	159	0	0	0	0
Goodyear	101	2005	159	159	159	0	0	0	0
Goodyear	101	2010	159	159	159	0	0	0	0
Goodyear	101	2015	159	159	159	0	0	0	0
Goodyear	101	2020	159	159	159	0	0	0	0
Goodyear	101	2025	10,313	10,115	9,960	155	198	29	169
Goodyear	101	2030	58,174	56,990	56,100	890	1,184	298	886
Goodyear	101	2035	133,345	130,663	128,616	2,047	2,682	725	1,957
Goodyear	101	2040	235,211	230,393	226,830	3,563	4,818	1,272	3,546

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Goodyear	MPA	1990	8,244	7,707	5,630	2,077	537	313	224
Goodyear	MPA	1995	8,894	8,348	6,246	2,102	546	321	225
Goodyear	MPA	2000	15,274	14,560	12,329	2,231	714	348	366
Goodyear	MPA	2005	34,658	33,438	30,890	2,548	1,220	471	749
Goodyear	MPA	2010	69,866	67,535	64,446	3,089	2,331	881	1,450
Goodyear	MPA	2015	100,576	97,189	93,657	3,532	3,387	1,328	2,059
Goodyear	MPA	2020	184,862	178,791	174,019	4,772	6,071	2,462	3,609
Goodyear	MPA	2025	292,537	283,648	277,239	6,409	8,889	3,500	5,389
Goodyear	MPA	2030	386,470	375,433	367,550	7,883	11,037	4,242	6,795
Goodyear	MPA	2035	472,540	459,726	450,506	9,220	12,814	4,795	8,019
Goodyear	MPA	2040	580,629	565,533	554,694	10,839	15,096	5,392	9,704
Guadalupe	088	1990	5,663	5,458	5,432	26	205	185	20
Guadalupe	088	1995	5,751	5,535	5,509	26	216	194	22
Guadalupe	088	2000	5,921	5,655	5,629	26	266	241	25
Guadalupe	088	2005	6,080	5,784	5,758	26	296	268	28
Guadalupe	088	2010	6,099	5,796	5,770	26	303	275	28
Guadalupe	088	2015	6,252	5,942	5,916	26	310	279	31
Guadalupe	088	2020	6,254	5,943	5,917	26	311	280	31
Guadalupe	088	2025	6,407	6,092	6,066	26	315	281	34
Guadalupe	088	2030	6,553	6,235	6,209	26	318	282	36
Guadalupe	088	2035	6,682	6,361	6,335	26	321	283	38
Guadalupe	088	2040	6,786	6,463	6,437	26	323	283	40
Guadalupe	MPA	1990	5,663	5,458	5,432	26	205	185	20
Guadalupe	MPA	1995	5,751	5,535	5,509	26	216	194	22
Guadalupe	MPA	2000	5,921	5,655	5,629	26	266	241	25
Guadalupe	MPA	2005	6,080	5,784	5,758	26	296	268	28
Guadalupe	MPA	2010	6,099	5,796	5,770	26	303	275	28
Guadalupe	MPA	2015	6,252	5,942	5,916	26	310	279	31
Guadalupe	MPA	2020	6,254	5,943	5,917	26	311	280	31
Guadalupe	MPA	2025	6,407	6,092	6,066	26	315	281	34
Guadalupe	MPA	2030	6,553	6,235	6,209	26	318	282	36
Guadalupe	MPA	2035	6,682	6,361	6,335	26	321	283	38
Guadalupe	MPA	2040	6,786	6,463	6,437	26	323	283	40

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Litchfield Park	054	1990	3,599	3,312	3,305	7	287	254	33
Litchfield Park	054	1995	3,819	3,522	3,514	8	297	260	37
Litchfield Park	054	2000	5,647	5,302	5,265	37	345	267	78
Litchfield Park	054	2005	10,867	10,395	10,275	120	472	291	181
Litchfield Park	054	2010	11,380	10,849	10,725	124	531	340	191
Litchfield Park	054	2015	11,611	11,068	10,942	126	543	347	196
Litchfield Park	054	2020	11,753	11,205	11,076	129	548	349	199
Litchfield Park	054	2025	11,852	11,302	11,171	131	550	349	201
Litchfield Park	054	2030	11,976	11,424	11,291	133	552	350	202
Litchfield Park	054	2035	12,161	11,605	11,471	134	556	351	205
Litchfield Park	054	2040	12,400	11,840	11,704	136	560	352	208
Litchfield Park	MPA	1990	3,599	3,312	3,305	7	287	254	33
Litchfield Park	MPA	1995	3,819	3,522	3,514	8	297	260	37
Litchfield Park	MPA	2000	5,647	5,302	5,265	37	345	267	78
Litchfield Park	MPA	2005	10,867	10,395	10,275	120	472	291	181
Litchfield Park	MPA	2010	11,380	10,849	10,725	124	531	340	191
Litchfield Park	MPA	2015	11,611	11,068	10,942	126	543	347	196
Litchfield Park	MPA	2020	11,753	11,205	11,076	129	548	349	199
Litchfield Park	MPA	2025	11,852	11,302	11,171	131	550	349	201
Litchfield Park	MPA	2030	11,976	11,424	11,291	133	552	350	202
Litchfield Park	MPA	2035	12,161	11,605	11,471	134	556	351	205
Litchfield Park	MPA	2040	12,400	11,840	11,704	136	560	352	208
Mesa	074	1990	122,124	117,512	116,737	775	4,612	1,705	2,907
Mesa	074	1995	125,559	120,807	119,993	814	4,752	1,775	2,977
Mesa	074	2000	128,409	123,543	122,705	838	4,866	1,832	3,034
Mesa	074	2005	130,550	125,602	124,744	858	4,948	1,879	3,069
Mesa	074	2010	132,486	127,455	126,580	875	5,031	1,929	3,102
Mesa	074	2015	134,420	129,309	128,420	889	5,111	1,973	3,138
Mesa	074	2020	136,464	131,272	130,374	898	5,192	2,020	3,172
Mesa	074	2025	138,708	133,429	132,519	910	5,279	2,073	3,206
Mesa	074	2030	141,120	135,752	134,831	921	5,368	2,127	3,241
Mesa	074	2035	143,420	137,983	137,056	927	5,437	2,167	3,270
Mesa	074	2040	145,286	139,792	138,850	942	5,494	2,197	3,297

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Mesa	075	1990	34,009	33,550	33,550	0	459	5	454
Mesa	075	1995	42,379	41,718	41,600	118	661	29	632
Mesa	075	2000	47,966	47,143	46,960	183	823	65	758
Mesa	075	2005	49,284	48,428	48,237	191	856	73	783
Mesa	075	2010	49,913	49,038	48,844	194	875	80	795
Mesa	075	2015	50,207	49,325	49,129	196	882	84	798
Mesa	075	2020	50,518	49,616	49,418	198	902	101	801
Mesa	075	2025	50,806	49,881	49,683	198	925	121	804
Mesa	075	2030	51,104	50,170	49,971	199	934	126	808
Mesa	075	2035	51,787	50,837	50,637	200	950	133	817
Mesa	075	2040	52,080	51,124	50,924	200	956	135	821
Mesa	076	1990	29,543	28,150	27,944	206	1,393	11	1,382
Mesa	076	1995	37,220	35,658	35,366	292	1,562	26	1,536
Mesa	076	2000	48,751	46,885	46,431	454	1,866	70	1,796
Mesa	076	2005	53,576	51,572	51,064	508	2,004	111	1,893
Mesa	076	2010	56,331	54,243	53,710	533	2,088	141	1,947
Mesa	076	2015	57,384	55,263	54,723	540	2,121	153	1,968
Mesa	076	2020	59,684	57,510	56,948	562	2,174	164	2,010
Mesa	076	2025	61,555	59,313	58,737	576	2,242	201	2,041
Mesa	076	2030	63,239	60,869	60,286	583	2,370	306	2,064
Mesa	076	2035	64,522	62,054	61,469	585	2,468	387	2,081
Mesa	076	2040	65,264	62,736	62,148	588	2,528	437	2,091
Mesa	077	1990	13,534	12,541	12,533	8	993	0	993
Mesa	077	1995	16,767	15,698	15,690	8	1,069	4	1,065
Mesa	077	2000	34,290	32,776	32,512	264	1,514	56	1,458
Mesa	077	2005	47,473	45,663	45,209	454	1,810	90	1,720
Mesa	077	2010	54,069	52,112	51,571	541	1,957	107	1,850
Mesa	077	2015	56,739	54,718	54,147	571	2,021	119	1,902
Mesa	077	2020	58,994	56,916	56,320	596	2,078	133	1,945
Mesa	077	2025	60,461	58,354	57,751	603	2,107	138	1,969
Mesa	077	2030	62,082	59,946	59,334	612	2,136	142	1,994
Mesa	077	2035	64,094	61,921	61,300	621	2,173	147	2,026
Mesa	077	2040	66,121	63,883	63,258	625	2,238	181	2,057

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Mesa	080	1990	47,671	40,657	40,562	95	7,014	294	6,720
Mesa	080	1995	50,247	43,189	43,073	116	7,058	294	6,764
Mesa	080	2000	53,298	46,164	46,013	151	7,134	302	6,832
Mesa	080	2005	54,302	47,144	46,987	157	7,158	306	6,852
Mesa	080	2010	54,880	47,710	47,546	164	7,170	309	6,861
Mesa	080	2015	55,272	48,093	47,926	167	7,179	311	6,868
Mesa	080	2020	55,635	48,449	48,278	171	7,186	314	6,872
Mesa	080	2025	56,073	48,879	48,704	175	7,194	317	6,877
Mesa	080	2030	56,543	49,343	49,164	179	7,200	317	6,883
Mesa	080	2035	57,083	49,877	49,695	182	7,206	317	6,889
Mesa	080	2040	57,406	50,194	50,007	187	7,212	318	6,894
Mesa	081	1990	33,391	22,720	21,937	783	10,671	739	9,932
Mesa	081	1995	34,708	24,006	23,214	792	10,702	746	9,956
Mesa	081	2000	37,854	26,952	26,119	833	10,902	879	10,023
Mesa	081	2005	40,948	29,873	29,005	868	11,075	994	10,081
Mesa	081	2010	42,282	30,968	30,089	879	11,314	1,212	10,102
Mesa	081	2015	43,417	31,668	30,778	890	11,749	1,635	10,114
Mesa	081	2020	44,187	32,126	31,227	899	12,061	1,939	10,122
Mesa	081	2025	45,023	32,790	31,883	907	12,233	2,102	10,131
Mesa	081	2030	45,765	33,496	32,583	913	12,269	2,130	10,139
Mesa	081	2035	46,421	34,013	33,093	920	12,408	2,264	10,144
Mesa	081	2040	47,206	34,568	33,641	927	12,638	2,485	10,153
Mesa	082	1990	21,769	18,798	18,780	18	2,971	101	2,870
Mesa	082	1995	22,551	19,565	19,547	18	2,986	101	2,885
Mesa	082	2000	30,146	26,943	26,829	114	3,203	150	3,053
Mesa	082	2005	31,832	28,570	28,442	128	3,262	176	3,086
Mesa	082	2010	33,984	30,653	30,499	154	3,331	206	3,125
Mesa	082	2015	35,721	32,330	32,161	169	3,391	232	3,159
Mesa	082	2020	39,610	36,063	35,854	209	3,547	317	3,230
Mesa	082	2025	44,459	40,718	40,457	261	3,741	435	3,306
Mesa	082	2030	47,051	43,214	42,951	263	3,837	493	3,344
Mesa	082	2035	48,560	44,673	44,408	265	3,887	523	3,364
Mesa	082	2040	49,797	45,884	45,617	267	3,913	530	3,383

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

				Resident Population			Non-Resident Population		
MPA	Dist	Year	Total Population	Total	In Households	Group Quarters	Total	Transient	Seasonal
Mesa	090	1990	46,768	44,901	44,637	264	1,867	1,364	503
Mesa	090	1995	48,993	47,028	46,748	280	1,965	1,414	551
Mesa	090	2000	50,056	47,869	47,588	281	2,187	1,617	570
Mesa	090	2005	50,907	48,543	48,262	281	2,364	1,782	582
Mesa	090	2010	51,758	49,198	48,917	281	2,560	1,966	594
Mesa	090	2015	52,590	49,833	49,552	281	2,757	2,151	606
Mesa	090	2020	53,449	50,488	50,207	281	2,961	2,344	617
Mesa	090	2025	54,374	51,207	50,925	282	3,167	2,539	628
Mesa	090	2030	55,325	51,991	51,709	282	3,334	2,697	637
Mesa	090	2035	56,146	52,665	52,383	282	3,481	2,835	646
Mesa	090	2040	56,931	53,316	53,034	282	3,615	2,959	656
Mesa	099	1990	2,490	2,490	2,176	314	0	0	0
Mesa	099	1995	2,490	2,490	2,176	314	0	0	0
Mesa	099	2000	2,490	2,490	2,176	314	0	0	0
Mesa	099	2005	2,490	2,490	2,176	314	0	0	0
Mesa	099	2010	2,490	2,490	2,176	314	0	0	0
Mesa	099	2015	2,490	2,490	2,176	314	0	0	0
Mesa	099	2020	2,490	2,490	2,176	314	0	0	0
Mesa	099	2025	2,490	2,490	2,176	314	0	0	0
Mesa	099	2030	2,490	2,490	2,176	314	0	0	0
Mesa	099	2035	2,490	2,490	2,176	314	0	0	0
Mesa	099	2040	2,490	2,490	2,176	314	0	0	0
Mesa	100	1990	2,192	2,123	2,107	16	69	14	55
Mesa	100	1995	4,420	4,302	4,286	16	118	14	104
Mesa	100	2000	13,813	13,408	13,246	162	405	91	314
Mesa	100	2005	21,984	21,370	21,088	282	614	138	476
Mesa	100	2010	28,607	27,834	27,456	378	773	165	608
Mesa	100	2015	33,050	32,163	31,726	437	887	190	697
Mesa	100	2020	43,303	42,182	41,602	580	1,121	234	887
Mesa	100	2025	52,448	51,141	50,429	712	1,307	269	1,038
Mesa	100	2030	56,026	54,645	53,888	757	1,381	288	1,093
Mesa	100	2035	58,849	57,414	56,650	764	1,435	301	1,134
Mesa	100	2040	60,964	59,489	58,717	772	1,475	308	1,167

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

				Resident Population			Non-Resident Population		
MPA	Dist	Year	Total Population	Total	In Households	Group Quarters	Total	Transient	Seasonal
Mesa	MPA	1990	353,491	323,442	320,963	2,479	30,049	4,233	25,816
Mesa	MPA	1995	385,334	354,461	351,693	2,768	30,873	4,403	26,470
Mesa	MPA	2000	447,073	414,173	410,579	3,594	32,900	5,062	27,838
Mesa	MPA	2005	483,346	449,255	445,214	4,041	34,091	5,549	28,542
Mesa	MPA	2010	506,800	471,701	467,388	4,313	35,099	6,115	28,984
Mesa	MPA	2015	521,290	485,192	480,738	4,454	36,098	6,848	29,250
Mesa	MPA	2020	544,334	507,112	502,404	4,708	37,222	7,566	29,656
Mesa	MPA	2025	566,397	528,202	523,264	4,938	38,195	8,195	30,000
Mesa	MPA	2030	580,745	541,916	536,893	5,023	38,829	8,626	30,203
Mesa	MPA	2035	593,372	553,927	548,867	5,060	39,445	9,074	30,371
Mesa	MPA	2040	603,545	563,476	558,372	5,104	40,069	9,550	30,519
Paradise Valley	050	1990	14,626	12,259	12,259	0	2,367	2,239	128
Paradise Valley	050	1995	16,255	13,811	13,792	19	2,444	2,286	158
Paradise Valley	050	2000	16,582	14,054	14,028	26	2,528	2,366	162
Paradise Valley	050	2005	16,785	14,187	14,152	35	2,598	2,434	164
Paradise Valley	050	2010	16,958	14,288	14,245	43	2,670	2,505	165
Paradise Valley	050	2015	17,058	14,352	14,301	51	2,706	2,541	165
Paradise Valley	050	2020	17,127	14,405	14,348	57	2,722	2,557	165
Paradise Valley	050	2025	17,181	14,458	14,396	62	2,723	2,558	165
Paradise Valley	050	2030	17,286	14,563	14,494	69	2,723	2,558	165
Paradise Valley	050	2035	17,407	14,684	14,609	75	2,723	2,558	165
Paradise Valley	050	2040	17,539	14,815	14,735	80	2,724	2,558	166
Paradise Valley	MPA	1990	14,626	12,259	12,259	0	2,367	2,239	128
Paradise Valley	MPA	1995	16,255	13,811	13,792	19	2,444	2,286	158
Paradise Valley	MPA	2000	16,582	14,054	14,028	26	2,528	2,366	162
Paradise Valley	MPA	2005	16,785	14,187	14,152	35	2,598	2,434	164
Paradise Valley	MPA	2010	16,958	14,288	14,245	43	2,670	2,505	165
Paradise Valley	MPA	2015	17,058	14,352	14,301	51	2,706	2,541	165
Paradise Valley	MPA	2020	17,127	14,405	14,348	57	2,722	2,557	165
Paradise Valley	MPA	2025	17,181	14,458	14,396	62	2,723	2,558	165
Paradise Valley	MPA	2030	17,286	14,563	14,494	69	2,723	2,558	165
Paradise Valley	MPA	2035	17,407	14,684	14,609	75	2,723	2,558	165
Paradise Valley	MPA	2040	17,539	14,815	14,735	80	2,724	2,558	166

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population: Total	Resident Population: In Households	Resident Population: Group Quarters	Non-Resident Population: Total	Non-Resident Population: Transient	Non-Resident Population: Seasonal
Peoria	013	1990	7,951	7,831	7,567	264	120	70	50
Peoria	013	1995	17,538	17,136	16,731	405	402	148	254
Peoria	013	2000	34,722	33,830	33,166	664	892	252	640
Peoria	013	2005	59,140	57,568	56,543	1,025	1,572	451	1,121
Peoria	013	2010	78,566	76,313	75,013	1,300	2,253	747	1,506
Peoria	013	2015	85,878	83,259	81,867	1,392	2,619	969	1,650
Peoria	013	2020	92,262	89,386	87,918	1,468	2,876	1,110	1,766
Peoria	013	2025	96,950	93,913	92,384	1,529	3,037	1,196	1,841
Peoria	013	2030	102,436	99,212	97,618	1,594	3,224	1,304	1,920
Peoria	013	2035	107,321	103,980	102,346	1,634	3,341	1,350	1,991
Peoria	013	2040	110,836	107,412	105,764	1,648	3,424	1,378	2,046
Peoria	029	1990	46,649	45,994	45,417	577	655	205	450
Peoria	029	1995	69,420	67,982	67,071	911	1,438	515	923
Peoria	029	2000	79,002	76,752	75,721	1,031	2,250	1,125	1,125
Peoria	029	2005	82,858	80,173	79,109	1,064	2,685	1,491	1,194
Peoria	029	2010	85,045	82,065	80,989	1,076	2,980	1,749	1,231
Peoria	029	2015	86,258	82,952	81,866	1,086	3,306	2,058	1,248
Peoria	029	2020	87,283	83,677	82,584	1,093	3,606	2,347	1,259
Peoria	029	2025	88,311	84,389	83,288	1,101	3,922	2,653	1,269
Peoria	029	2030	89,542	85,230	84,121	1,109	4,312	3,031	1,281
Peoria	029	2035	91,396	86,659	85,541	1,118	4,737	3,436	1,301
Peoria	029	2040	93,231	88,042	86,918	1,124	5,189	3,866	1,323
Peoria	MPA	1990	54,600	53,825	52,984	841	775	275	500
Peoria	MPA	1995	86,958	85,118	83,802	1,316	1,840	663	1,177
Peoria	MPA	2000	113,724	110,582	108,887	1,695	3,142	1,377	1,765
Peoria	MPA	2005	141,998	137,741	135,652	2,089	4,257	1,942	2,315
Peoria	MPA	2010	163,611	158,378	156,002	2,376	5,233	2,496	2,737
Peoria	MPA	2015	172,136	166,211	163,733	2,478	5,925	3,027	2,898
Peoria	MPA	2020	179,545	173,063	170,502	2,561	6,482	3,457	3,025
Peoria	MPA	2025	185,261	178,302	175,672	2,630	6,959	3,849	3,110
Peoria	MPA	2030	191,978	184,442	181,739	2,703	7,536	4,335	3,201
Peoria	MPA	2035	198,717	190,639	187,887	2,752	8,078	4,786	3,292
Peoria	MPA	2040	204,067	195,454	192,682	2,772	8,613	5,244	3,369

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Phoenix	006	1990	2,886	2,871	2,871	0	15	15	0
Phoenix	006	1995	2,932	2,917	2,917	0	15	15	0
Phoenix	006	2000	2,986	2,971	2,971	0	15	15	0
Phoenix	006	2005	3,044	3,029	3,029	0	15	15	0
Phoenix	006	2010	3,107	3,092	3,092	0	15	15	0
Phoenix	006	2015	3,173	3,158	3,158	0	15	15	0
Phoenix	006	2020	4,780	4,734	4,710	24	46	17	29
Phoenix	006	2025	11,147	10,987	10,895	92	160	24	136
Phoenix	006	2030	18,343	18,063	17,935	128	280	34	246
Phoenix	006	2035	23,527	23,166	23,025	141	361	40	321
Phoenix	006	2040	26,101	25,695	25,553	142	406	44	362
Phoenix	014	1990	166	166	166	0	0	0	0
Phoenix	014	1995	172	172	172	0	0	0	0
Phoenix	014	2000	175	175	175	0	0	0	0
Phoenix	014	2005	178	178	178	0	0	0	0
Phoenix	014	2010	4,266	4,151	4,092	59	115	34	81
Phoenix	014	2015	11,810	11,472	11,307	165	338	105	233
Phoenix	014	2020	54,393	52,907	52,135	772	1,486	465	1,021
Phoenix	014	2025	94,056	91,706	90,344	1,362	2,350	670	1,680
Phoenix	014	2030	112,815	110,097	108,506	1,591	2,718	754	1,964
Phoenix	014	2035	129,689	126,628	124,819	1,809	3,061	857	2,204
Phoenix	014	2040	140,008	136,746	134,830	1,916	3,262	897	2,365
Phoenix	015	1990	1,875	1,861	1,861	0	14	0	14
Phoenix	015	1995	2,212	2,198	2,198	0	14	0	14
Phoenix	015	2000	2,329	2,313	2,313	0	16	0	16
Phoenix	015	2005	8,997	8,791	8,693	98	206	58	148
Phoenix	015	2010	30,718	29,932	29,516	416	786	206	580
Phoenix	015	2015	52,211	50,907	50,183	724	1,304	292	1,012
Phoenix	015	2020	59,267	57,803	56,992	811	1,464	321	1,143
Phoenix	015	2025	63,642	62,087	61,224	863	1,555	338	1,217
Phoenix	015	2030	67,409	65,794	64,889	905	1,615	341	1,274
Phoenix	015	2035	69,411	67,743	66,828	915	1,668	366	1,302
Phoenix	015	2040	70,858	69,112	68,188	924	1,746	422	1,324

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Population by District and MPA
Maricopa County
1990 - 2040

				Resident Population			Non-Resident Population		
MPA	Dist	Year	Total Population	Total	In Households	Group Quarters	Total	Transient	Seasonal
Phoenix	018	1990	52,575	51,995	51,531	464	580	194	386
Phoenix	018	1995	57,726	57,045	56,540	505	681	208	473
Phoenix	018	2000	66,271	65,346	64,726	620	925	262	663
Phoenix	018	2005	79,656	78,408	77,598	810	1,248	320	928
Phoenix	018	2010	89,047	87,573	86,634	939	1,474	358	1,116
Phoenix	018	2015	93,542	91,944	90,958	986	1,598	393	1,205
Phoenix	018	2020	96,042	94,372	93,356	1,016	1,670	419	1,251
Phoenix	018	2025	98,013	96,218	95,184	1,034	1,795	512	1,283
Phoenix	018	2030	101,553	99,600	98,522	1,078	1,953	620	1,333
Phoenix	018	2035	104,185	102,136	101,034	1,102	2,049	679	1,370
Phoenix	018	2040	106,373	104,259	103,145	1,114	2,114	710	1,404
Phoenix	019	1990	56,461	54,788	54,788	0	1,673	766	907
Phoenix	019	1995	60,489	58,703	58,650	53	1,786	792	994
Phoenix	019	2000	64,028	62,113	62,032	81	1,915	842	1,073
Phoenix	019	2005	66,743	64,737	64,640	97	2,006	878	1,128
Phoenix	019	2010	70,766	68,638	68,502	136	2,128	921	1,207
Phoenix	019	2015	72,924	70,711	70,572	139	2,213	965	1,248
Phoenix	019	2020	74,091	71,795	71,656	139	2,296	1,028	1,268
Phoenix	019	2025	75,452	73,104	72,963	141	2,348	1,059	1,289
Phoenix	019	2030	80,549	78,098	77,900	198	2,451	1,085	1,366
Phoenix	019	2035	88,533	85,945	85,640	305	2,588	1,107	1,481
Phoenix	019	2040	91,912	89,232	88,888	344	2,680	1,147	1,533
Phoenix	020	1990	17,773	17,637	17,614	23	136	10	126
Phoenix	020	1995	25,836	25,454	25,320	134	382	97	285
Phoenix	020	2000	40,529	39,673	39,297	376	856	243	613
Phoenix	020	2005	70,315	68,745	67,903	842	1,570	364	1,206
Phoenix	020	2010	85,055	83,108	82,074	1,034	1,947	445	1,502
Phoenix	020	2015	98,472	96,228	95,019	1,209	2,244	468	1,776
Phoenix	020	2020	106,896	104,474	103,159	1,315	2,422	487	1,935
Phoenix	020	2025	113,592	111,041	109,664	1,377	2,551	502	2,049
Phoenix	020	2030	118,696	116,061	114,660	1,401	2,635	510	2,125
Phoenix	020	2035	128,720	125,930	124,429	1,501	2,790	520	2,270
Phoenix	020	2040	138,868	135,900	134,319	1,581	2,968	540	2,428

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Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Phoenix	031	1990	39,458	39,286	39,227	59	172	146	26
Phoenix	031	1995	39,967	39,782	39,723	59	185	150	35
Phoenix	031	2000	40,714	40,515	40,456	59	199	151	48
Phoenix	031	2005	41,482	41,269	41,209	60	213	152	61
Phoenix	031	2010	42,317	42,088	42,028	60	229	154	75
Phoenix	031	2015	43,181	42,935	42,875	60	246	155	91
Phoenix	031	2020	44,128	43,857	43,797	60	271	166	105
Phoenix	031	2025	45,025	44,733	44,673	60	292	174	118
Phoenix	031	2030	46,011	45,624	45,564	60	387	257	130
Phoenix	031	2035	46,899	46,434	46,374	60	465	326	139
Phoenix	031	2040	47,598	47,097	47,036	61	501	354	147
Phoenix	032	1990	22,775	22,704	22,704	0	71	1	70
Phoenix	032	1995	26,471	26,295	26,252	43	176	27	149
Phoenix	032	2000	27,684	27,465	27,416	49	219	43	176
Phoenix	032	2005	28,381	28,141	28,092	49	240	51	189
Phoenix	032	2010	28,781	28,527	28,477	50	254	57	197
Phoenix	032	2015	29,153	28,886	28,836	50	267	63	204
Phoenix	032	2020	29,335	29,061	29,011	50	274	68	206
Phoenix	032	2025	29,965	29,608	29,558	50	357	141	216
Phoenix	032	2030	30,112	29,722	29,672	50	390	174	216
Phoenix	032	2035	30,297	29,893	29,843	50	404	186	218
Phoenix	032	2040	30,424	29,952	29,902	50	472	253	219
Phoenix	033	1990	52,941	51,125	51,049	76	1,816	1,392	424
Phoenix	033	1995	54,419	52,566	52,471	95	1,853	1,398	455
Phoenix	033	2000	55,391	53,485	53,388	97	1,906	1,432	474
Phoenix	033	2005	56,343	54,404	54,306	98	1,939	1,448	491
Phoenix	033	2010	56,984	55,023	54,923	100	1,961	1,461	500
Phoenix	033	2015	57,703	55,721	55,619	102	1,982	1,470	512
Phoenix	033	2020	58,434	56,435	56,331	104	1,999	1,477	522
Phoenix	033	2025	59,209	57,197	57,093	104	2,012	1,479	533
Phoenix	033	2030	60,060	57,975	57,870	105	2,085	1,542	543
Phoenix	033	2035	60,887	58,755	58,649	106	2,132	1,579	553
Phoenix	033	2040	61,620	59,451	59,344	107	2,169	1,606	563

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population: Total	Resident Population: In Households	Resident Population: Group Quarters	Non-Resident Population: Total	Non-Resident Population: Transient	Non-Resident Population: Seasonal
Phoenix	034	1990	44,529	43,664	43,211	453	865	657	208
Phoenix	034	1995	48,894	47,907	47,387	520	987	683	304
Phoenix	034	2000	50,128	49,106	48,579	527	1,022	690	332
Phoenix	034	2005	51,067	50,023	49,487	536	1,044	694	350
Phoenix	034	2010	51,873	50,812	50,270	542	1,061	697	364
Phoenix	034	2015	52,418	51,343	50,794	549	1,075	702	373
Phoenix	034	2020	53,052	51,964	51,410	554	1,088	705	383
Phoenix	034	2025	54,234	53,123	52,564	559	1,111	708	403
Phoenix	034	2030	55,078	53,952	53,387	565	1,126	710	416
Phoenix	034	2035	55,814	54,674	54,105	569	1,140	714	426
Phoenix	034	2040	56,409	55,262	54,689	573	1,147	714	433
Phoenix	035	1990	51,712	51,581	51,320	261	131	2	129
Phoenix	035	1995	54,489	54,235	53,920	315	254	24	230
Phoenix	035	2000	55,679	55,386	55,068	318	293	37	256
Phoenix	035	2005	56,271	55,960	55,638	322	311	43	268
Phoenix	035	2010	56,749	56,404	56,079	325	345	68	277
Phoenix	035	2015	57,019	56,657	56,328	329	362	80	282
Phoenix	035	2020	57,208	56,834	56,503	331	374	89	285
Phoenix	035	2025	57,634	57,248	56,915	333	386	95	291
Phoenix	035	2030	57,903	57,507	57,172	335	396	102	294
Phoenix	035	2035	58,228	57,824	57,487	337	404	107	297
Phoenix	035	2040	58,416	58,006	57,668	338	410	111	299
Phoenix	036	1990	51,603	51,202	51,044	158	401	294	107
Phoenix	036	1995	57,152	56,620	56,364	256	532	336	196
Phoenix	036	2000	58,659	58,078	57,806	272	581	353	228
Phoenix	036	2005	59,587	58,977	58,697	280	610	367	243
Phoenix	036	2010	60,243	59,611	59,324	287	632	379	253
Phoenix	036	2015	61,083	60,356	60,062	294	727	461	266
Phoenix	036	2020	61,500	60,698	60,398	300	802	533	269
Phoenix	036	2025	61,836	60,990	60,685	305	846	575	271
Phoenix	036	2030	62,639	61,671	61,362	309	968	690	278
Phoenix	036	2035	63,373	62,183	61,869	314	1,190	908	282
Phoenix	036	2040	63,873	62,548	62,228	320	1,325	1,040	285

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Population by District and MPA
Maricopa County
1990 - 2040

				Resident Population			Non-Resident Population		
MPA	Dist	Year	Total Population	Total	In Households	Group Quarters	Total	Transient	Seasonal
Phoenix	047	1990	56,527	55,729	55,323	406	798	689	109
Phoenix	047	1995	57,089	56,281	55,866	415	808	689	119
Phoenix	047	2000	57,822	56,997	56,569	428	825	690	135
Phoenix	047	2005	58,487	57,648	57,208	440	839	691	148
Phoenix	047	2010	59,186	58,334	57,884	450	852	692	160
Phoenix	047	2015	59,947	59,080	58,620	460	867	693	174
Phoenix	047	2020	60,901	60,016	59,547	469	885	694	191
Phoenix	047	2025	61,699	60,801	60,325	476	898	694	204
Phoenix	047	2030	62,567	61,652	61,168	484	915	698	217
Phoenix	047	2035	63,296	62,370	61,880	490	926	699	227
Phoenix	047	2040	63,973	63,020	62,520	500	953	716	237
Phoenix	048	1990	45,197	44,743	44,122	621	454	284	170
Phoenix	048	1995	45,834	45,368	44,730	638	466	287	179
Phoenix	048	2000	46,802	46,318	45,658	660	484	287	197
Phoenix	048	2005	48,327	47,785	47,099	686	542	319	223
Phoenix	048	2010	50,871	50,199	49,489	710	672	401	271
Phoenix	048	2015	53,564	52,738	52,009	729	826	503	323
Phoenix	048	2020	54,987	54,032	53,288	744	955	610	345
Phoenix	048	2025	56,438	55,335	54,575	760	1,103	738	365
Phoenix	048	2030	57,857	56,599	55,824	775	1,258	877	381
Phoenix	048	2035	59,081	57,707	56,917	790	1,374	980	394
Phoenix	048	2040	60,114	58,624	57,820	804	1,490	1,083	407
Phoenix	049	1990	29,471	28,534	28,126	408	937	715	222
Phoenix	049	1995	31,176	30,190	29,767	423	986	731	255
Phoenix	049	2000	31,938	30,895	30,467	428	1,043	772	271
Phoenix	049	2005	32,634	31,537	31,102	435	1,097	813	284
Phoenix	049	2010	33,395	32,217	31,776	441	1,178	880	298
Phoenix	049	2015	34,226	32,907	32,462	445	1,319	1,008	311
Phoenix	049	2020	35,315	33,836	33,387	449	1,479	1,152	327
Phoenix	049	2025	36,230	34,590	34,136	454	1,640	1,299	341
Phoenix	049	2030	37,337	35,589	35,133	456	1,748	1,390	358
Phoenix	049	2035	38,031	36,243	35,785	458	1,788	1,419	369
Phoenix	049	2040	38,542	36,733	36,271	462	1,809	1,433	376

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population: Total	Resident Population: In Households	Resident Population: Group Quarters	Non-Resident Population: Total	Non-Resident Population: Transient	Non-Resident Population: Seasonal
Phoenix	055	1990	36,240	36,187	36,170	17	53	4	49
Phoenix	055	1995	44,331	44,034	43,903	131	297	69	228
Phoenix	055	2000	58,046	57,310	56,972	338	736	202	534
Phoenix	055	2005	64,231	63,289	62,866	423	942	284	658
Phoenix	055	2010	65,991	64,987	64,549	438	1,004	311	693
Phoenix	055	2015	67,049	65,987	65,546	441	1,062	349	713
Phoenix	055	2020	67,718	66,625	66,178	447	1,093	369	724
Phoenix	055	2025	68,316	67,207	66,755	452	1,109	376	733
Phoenix	055	2030	69,316	68,163	67,708	455	1,153	407	746
Phoenix	055	2035	71,545	70,286	69,828	458	1,259	482	777
Phoenix	055	2040	72,377	71,078	70,616	462	1,299	511	788
Phoenix	056	1990	67,456	67,211	67,173	38	245	165	80
Phoenix	056	1995	71,424	71,066	70,978	88	358	189	169
Phoenix	056	2000	75,870	75,373	75,237	136	497	228	269
Phoenix	056	2005	79,296	78,663	78,496	167	633	297	336
Phoenix	056	2010	80,972	80,283	80,113	170	689	318	371
Phoenix	056	2015	82,329	81,555	81,383	172	774	375	399
Phoenix	056	2020	83,505	82,682	82,509	173	823	402	421
Phoenix	056	2025	84,599	83,748	83,573	175	851	412	439
Phoenix	056	2030	85,597	84,727	84,551	176	870	416	454
Phoenix	056	2035	86,660	85,769	85,592	177	891	422	469
Phoenix	056	2040	87,442	86,523	86,342	181	919	438	481
Phoenix	057	1990	50,127	49,419	49,344	75	708	372	336
Phoenix	057	1995	51,298	50,565	50,474	91	733	374	359
Phoenix	057	2000	51,808	51,061	50,964	97	747	378	369
Phoenix	057	2005	52,281	51,522	51,420	102	759	380	379
Phoenix	057	2010	52,692	51,893	51,786	107	799	413	386
Phoenix	057	2015	53,114	52,298	52,188	110	816	423	393
Phoenix	057	2020	53,510	52,681	52,568	113	829	430	399
Phoenix	057	2025	53,948	53,108	52,992	116	840	434	406
Phoenix	057	2030	54,368	53,520	53,400	120	848	436	412
Phoenix	057	2035	54,895	54,037	53,915	122	858	440	418
Phoenix	057	2040	55,427	54,561	54,437	124	866	440	426

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Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Phoenix	058	1990	58,339	56,523	55,448	1,075	1,816	1,455	361
Phoenix	058	1995	58,542	56,697	56,091	606	1,845	1,471	374
Phoenix	058	2000	59,937	58,068	57,422	646	1,869	1,471	398
Phoenix	058	2005	62,086	60,178	59,491	687	1,908	1,471	437
Phoenix	058	2010	63,950	62,011	61,285	726	1,939	1,471	468
Phoenix	058	2015	66,265	64,283	63,527	756	1,982	1,478	504
Phoenix	058	2020	67,858	65,851	65,071	780	2,007	1,482	525
Phoenix	058	2025	69,534	67,505	66,699	806	2,029	1,483	546
Phoenix	058	2030	71,222	69,171	68,336	835	2,051	1,487	564
Phoenix	058	2035	72,663	70,596	69,737	859	2,067	1,488	579
Phoenix	058	2040	73,885	71,806	70,923	883	2,079	1,488	591
Phoenix	059	1990	55,426	54,521	53,823	698	905	566	339
Phoenix	059	1995	56,786	55,759	55,054	705	1,027	667	360
Phoenix	059	2000	59,051	57,898	57,187	711	1,153	746	407
Phoenix	059	2005	60,951	59,681	58,960	721	1,270	830	440
Phoenix	059	2010	63,718	62,342	61,616	726	1,376	885	491
Phoenix	059	2015	66,274	64,549	63,662	887	1,725	1,196	529
Phoenix	059	2020	67,901	66,102	65,210	892	1,799	1,246	553
Phoenix	059	2025	69,547	67,664	66,768	896	1,883	1,307	576
Phoenix	059	2030	71,204	69,236	68,336	900	1,968	1,370	598
Phoenix	059	2035	72,668	70,635	69,730	905	2,033	1,415	618
Phoenix	059	2040	73,905	71,810	70,899	911	2,095	1,459	636
Phoenix	063	1990	28,998	25,081	21,103	3,978	3,917	3,772	145
Phoenix	063	1995	30,092	25,842	21,790	4,052	4,250	4,087	163
Phoenix	063	2000	32,013	27,617	23,472	4,145	4,396	4,199	197
Phoenix	063	2005	33,838	29,284	25,034	4,250	4,554	4,330	224
Phoenix	063	2010	35,716	30,979	26,637	4,342	4,737	4,484	253
Phoenix	063	2015	37,371	32,465	28,044	4,421	4,906	4,628	278
Phoenix	063	2020	38,851	33,823	29,336	4,487	5,028	4,730	298
Phoenix	063	2025	39,989	34,902	30,342	4,560	5,087	4,776	311
Phoenix	063	2030	41,142	35,996	31,365	4,631	5,146	4,822	324
Phoenix	063	2035	42,202	37,001	32,300	4,701	5,201	4,866	335
Phoenix	063	2040	43,168	37,880	33,120	4,760	5,288	4,942	346

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Phoenix	064	1990	32,086	31,036	30,558	478	1,050	880	170
Phoenix	064	1995	32,818	31,674	31,179	495	1,144	933	211
Phoenix	064	2000	35,001	33,785	33,286	499	1,216	957	259
Phoenix	064	2005	35,762	34,529	34,025	504	1,233	960	273
Phoenix	064	2010	36,498	35,251	34,743	508	1,247	963	284
Phoenix	064	2015	37,197	35,935	35,424	511	1,262	965	297
Phoenix	064	2020	37,936	36,661	36,147	514	1,275	967	308
Phoenix	064	2025	39,438	38,132	37,614	518	1,306	975	331
Phoenix	064	2030	40,315	38,995	38,475	520	1,320	976	344
Phoenix	064	2035	41,117	39,779	39,258	521	1,338	984	354
Phoenix	064	2040	41,765	40,412	39,889	523	1,353	990	363
Phoenix	069	1990	2,474	2,466	2,413	53	8	0	8
Phoenix	069	1995	2,527	2,519	2,466	53	8	0	8
Phoenix	069	2000	2,861	2,842	2,758	84	19	8	11
Phoenix	069	2005	4,418	4,356	4,232	124	62	22	40
Phoenix	069	2010	19,470	19,031	18,618	413	439	99	340
Phoenix	069	2015	59,383	57,954	56,896	1,058	1,429	288	1,141
Phoenix	069	2020	93,785	91,559	89,986	1,573	2,226	447	1,779
Phoenix	069	2025	124,359	121,516	119,472	2,044	2,843	557	2,286
Phoenix	069	2030	134,264	131,247	129,043	2,204	3,017	582	2,435
Phoenix	069	2035	140,297	137,181	134,882	2,299	3,116	595	2,521
Phoenix	069	2040	143,922	140,739	138,405	2,334	3,183	604	2,579
Phoenix	070	1990	11,736	11,644	9,748	1,896	92	24	68
Phoenix	070	1995	11,894	11,796	9,882	1,914	98	25	73
Phoenix	070	2000	12,751	12,628	10,683	1,945	123	32	91
Phoenix	070	2005	13,073	12,945	10,973	1,972	128	33	95
Phoenix	070	2010	13,317	13,185	11,188	1,997	132	34	98
Phoenix	070	2015	13,532	13,397	11,380	2,017	135	34	101
Phoenix	070	2020	13,736	13,599	11,564	2,035	137	34	103
Phoenix	070	2025	14,009	13,869	11,815	2,054	140	34	106
Phoenix	070	2030	14,318	14,173	12,097	2,076	145	35	110
Phoenix	070	2035	14,623	14,473	12,376	2,097	150	36	114
Phoenix	070	2040	14,915	14,760	12,645	2,115	155	36	119

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Phoenix	071	1990	15,695	15,628	15,486	142	67	29	38
Phoenix	071	1995	15,853	15,781	15,620	161	72	31	41
Phoenix	071	2000	16,252	16,175	16,009	166	77	32	45
Phoenix	071	2005	17,806	17,702	17,532	170	104	32	72
Phoenix	071	2010	18,254	18,147	17,973	174	107	32	75
Phoenix	071	2015	18,677	18,569	18,391	178	108	32	76
Phoenix	071	2020	19,104	18,994	18,813	181	110	33	77
Phoenix	071	2025	19,530	19,419	19,237	182	111	33	78
Phoenix	071	2030	19,956	19,844	19,659	185	112	33	79
Phoenix	071	2035	20,307	20,194	20,008	186	113	33	80
Phoenix	071	2040	20,610	20,496	20,306	190	114	33	81
Phoenix	072	1990	24,947	20,349	17,896	2,453	4,598	4,515	83
Phoenix	072	1995	25,292	20,676	18,184	2,492	4,616	4,529	87
Phoenix	072	2000	25,955	21,313	18,773	2,540	4,642	4,546	96
Phoenix	072	2005	26,553	21,891	19,296	2,595	4,662	4,561	101
Phoenix	072	2010	26,994	22,302	19,657	2,645	4,692	4,589	103
Phoenix	072	2015	27,721	22,983	20,299	2,684	4,738	4,627	111
Phoenix	072	2020	28,148	23,391	20,671	2,720	4,757	4,644	113
Phoenix	072	2025	28,770	23,992	21,233	2,759	4,778	4,660	118
Phoenix	072	2030	29,336	24,541	21,742	2,799	4,795	4,674	121
Phoenix	072	2035	29,900	25,089	22,253	2,836	4,811	4,686	125
Phoenix	072	2040	30,367	25,540	22,669	2,871	4,827	4,698	129
Phoenix	078	1990	25,348	25,273	24,836	437	75	2	73
Phoenix	078	1995	25,664	25,574	25,131	443	90	11	79
Phoenix	078	2000	26,339	26,192	25,740	452	147	57	90
Phoenix	078	2005	26,835	26,665	26,204	461	170	74	96
Phoenix	078	2010	27,196	27,008	26,540	468	188	88	100
Phoenix	078	2015	27,747	27,536	27,060	476	211	101	110
Phoenix	078	2020	28,329	28,100	27,617	483	229	112	117
Phoenix	078	2025	28,896	28,645	28,159	486	251	128	123
Phoenix	078	2030	29,546	29,274	28,781	493	272	142	130
Phoenix	078	2035	30,171	29,882	29,386	496	289	152	137
Phoenix	078	2040	30,567	30,263	29,763	500	304	162	142

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population: Total	Resident Population: In Households	Resident Population: Group Quarters	Non-Resident Population: Total	Non-Resident Population: Transient	Non-Resident Population: Seasonal
Phoenix	086	1990	20,994	20,973	20,889	84	21	0	21
Phoenix	086	1995	21,605	21,576	21,491	85	29	0	29
Phoenix	086	2000	34,839	34,481	34,192	289	358	35	323
Phoenix	086	2005	45,015	44,422	43,994	428	593	68	525
Phoenix	086	2010	64,443	63,380	62,663	717	1,063	149	914
Phoenix	086	2015	85,899	84,302	83,270	1,032	1,597	250	1,347
Phoenix	086	2020	94,625	92,833	91,679	1,154	1,792	284	1,508
Phoenix	086	2025	97,074	95,230	94,064	1,166	1,844	297	1,547
Phoenix	086	2030	99,152	97,269	96,089	1,180	1,883	305	1,578
Phoenix	086	2035	101,912	99,976	98,784	1,192	1,936	315	1,621
Phoenix	086	2040	103,582	101,613	100,409	1,204	1,969	320	1,649
Phoenix	087	1990	34,744	34,489	33,905	584	255	171	84
Phoenix	087	1995	36,187	35,875	35,280	595	312	199	113
Phoenix	087	2000	41,256	40,747	40,083	664	509	287	222
Phoenix	087	2005	42,588	42,006	41,328	678	582	337	245
Phoenix	087	2010	43,312	42,692	42,002	690	620	362	258
Phoenix	087	2015	43,969	43,274	42,573	701	695	427	268
Phoenix	087	2020	44,213	43,493	42,783	710	720	449	271
Phoenix	087	2025	44,551	43,818	43,098	720	733	459	274
Phoenix	087	2030	45,006	44,261	43,532	729	745	467	278
Phoenix	087	2035	45,415	44,636	43,900	736	779	498	281
Phoenix	087	2040	45,700	44,915	44,170	745	785	500	285
Phoenix	094	1990	32,525	31,894	31,893	1	631	235	396
Phoenix	094	1995	62,849	61,476	61,014	462	1,373	351	1,022
Phoenix	094	2000	68,239	66,707	66,183	524	1,532	390	1,142
Phoenix	094	2005	71,677	70,064	69,511	553	1,613	400	1,213
Phoenix	094	2010	74,851	73,160	72,580	580	1,691	412	1,279
Phoenix	094	2015	78,306	76,512	75,896	616	1,794	447	1,347
Phoenix	094	2020	79,715	77,874	77,254	620	1,841	468	1,373
Phoenix	094	2025	81,084	79,206	78,586	620	1,878	483	1,395
Phoenix	094	2030	81,984	80,080	79,457	623	1,904	495	1,409
Phoenix	094	2035	82,770	80,834	80,210	624	1,936	516	1,420
Phoenix	094	2040	83,337	81,386	80,761	625	1,951	523	1,428

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Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Phoenix	MPA	1990	1,023,084	1,000,580	985,642	14,938	22,504	17,355	5,149
Phoenix	MPA	1995	1,112,020	1,086,643	1,070,814	15,829	25,377	18,373	7,004
Phoenix	MPA	2000	1,201,353	1,173,033	1,155,882	17,151	28,320	19,385	8,935
Phoenix	MPA	2005	1,297,922	1,266,829	1,248,241	18,588	31,093	20,292	10,801
Phoenix	MPA	2010	1,410,732	1,376,360	1,356,110	20,250	34,372	21,378	12,994
Phoenix	MPA	2015	1,545,259	1,506,642	1,484,341	22,301	38,617	22,993	15,624
Phoenix	MPA	2020	1,669,263	1,627,086	1,603,066	24,020	42,177	24,328	17,849
Phoenix	MPA	2025	1,781,816	1,736,729	1,711,205	25,524	45,087	25,422	19,665
Phoenix	MPA	2030	1,855,655	1,808,501	1,782,135	26,366	47,154	26,431	20,723
Phoenix	MPA	2035	1,927,116	1,877,999	1,850,843	27,156	49,117	27,415	21,702
Phoenix	MPA	2040	1,976,058	1,925,419	1,897,755	27,664	50,639	28,214	22,425
Queen Creek	116	1990	3,236	3,198	3,036	162	38	0	38
Queen Creek	116	1995	3,385	3,347	3,185	162	38	0	38
Queen Creek	116	2000	3,546	3,507	3,345	162	39	0	39
Queen Creek	116	2005	3,728	3,688	3,526	162	40	0	40
Queen Creek	116	2010	3,924	3,877	3,715	162	47	6	41
Queen Creek	116	2015	4,156	4,067	3,905	162	89	47	42
Queen Creek	116	2020	17,178	16,777	16,424	353	401	120	281
Queen Creek	116	2025	31,844	31,135	30,560	575	709	187	522
Queen Creek	116	2030	44,964	44,001	43,222	779	963	247	716
Queen Creek	116	2035	56,255	55,088	54,130	958	1,167	293	874
Queen Creek	116	2040	63,888	62,568	61,494	1,074	1,320	328	992
Queen Creek	MPA	1990	3,236	3,198	3,036	162	38	0	38
Queen Creek	MPA	1995	3,385	3,347	3,185	162	38	0	38
Queen Creek	MPA	2000	3,546	3,507	3,345	162	39	0	39
Queen Creek	MPA	2005	3,728	3,688	3,526	162	40	0	40
Queen Creek	MPA	2010	3,924	3,877	3,715	162	47	6	41
Queen Creek	MPA	2015	4,156	4,067	3,905	162	89	47	42
Queen Creek	MPA	2020	17,178	16,777	16,424	353	401	120	281
Queen Creek	MPA	2025	31,844	31,135	30,560	575	709	187	522
Queen Creek	MPA	2030	44,964	44,001	43,222	779	963	247	716
Queen Creek	MPA	2035	56,255	55,088	54,130	958	1,167	293	874
Queen Creek	MPA	2040	63,888	62,568	61,494	1,074	1,320	328	992

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Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Scottsdale	009	1990	3,065	2,746	2,736	10	319	287	32
Scottsdale	009	1995	3,558	3,217	3,207	10	341	301	40
Scottsdale	009	2000	3,702	3,345	3,335	10	357	315	42
Scottsdale	009	2005	7,785	7,328	7,318	10	457	335	122
Scottsdale	009	2010	17,202	16,506	16,436	70	696	385	311
Scottsdale	009	2015	23,544	22,671	22,453	218	873	436	437
Scottsdale	009	2020	26,798	25,828	25,515	313	970	474	496
Scottsdale	009	2025	34,987	33,808	33,408	400	1,179	547	632
Scottsdale	009	2030	42,169	40,794	40,294	500	1,375	636	739
Scottsdale	009	2035	47,099	45,592	45,033	559	1,507	698	809
Scottsdale	009	2040	50,168	48,565	47,974	591	1,603	746	857
Scottsdale	021	1990	2,331	2,201	2,197	4	130	23	107
Scottsdale	021	1995	4,507	4,304	4,267	37	203	52	151
Scottsdale	021	2000	4,957	4,725	4,688	37	232	72	160
Scottsdale	021	2005	6,226	5,918	5,870	48	308	125	183
Scottsdale	021	2010	11,684	11,200	11,073	127	484	194	290
Scottsdale	021	2015	13,969	13,380	13,227	153	589	253	336
Scottsdale	021	2020	18,553	17,779	17,564	215	774	356	418
Scottsdale	021	2025	26,013	25,006	24,679	327	1,007	466	541
Scottsdale	021	2030	29,309	28,214	27,836	378	1,095	505	590
Scottsdale	021	2035	31,216	30,075	29,676	399	1,141	524	617
Scottsdale	021	2040	33,089	31,832	31,415	417	1,257	612	645
Scottsdale	022	1990	1,349	777	777	0	572	560	12
Scottsdale	022	1995	6,195	5,478	5,413	65	717	599	118
Scottsdale	022	2000	9,607	8,775	8,682	93	832	637	195
Scottsdale	022	2005	25,896	24,440	24,104	336	1,456	940	516
Scottsdale	022	2010	39,277	37,330	36,794	536	1,947	1,166	781
Scottsdale	022	2015	49,688	47,406	46,735	671	2,282	1,292	990
Scottsdale	022	2020	54,368	51,939	51,208	731	2,429	1,354	1,075
Scottsdale	022	2025	56,074	53,605	52,865	740	2,469	1,367	1,102
Scottsdale	022	2030	57,304	54,805	54,058	747	2,499	1,379	1,120
Scottsdale	022	2035	58,360	55,832	55,078	754	2,528	1,393	1,135
Scottsdale	022	2040	60,331	57,764	57,001	763	2,567	1,402	1,165

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Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population: Total	Resident Population: In Households	Resident Population: Group Quarters	Non-Resident Population: Total	Non-Resident Population: Transient	Non-Resident Population: Seasonal
Scottsdale	037	1990	9,676	9,466	9,385	81	210	160	50
Scottsdale	037	1995	10,247	9,979	9,896	83	268	212	56
Scottsdale	037	2000	10,388	10,085	9,999	86	303	246	57
Scottsdale	037	2005	10,545	10,167	10,078	89	378	320	58
Scottsdale	037	2010	10,633	10,231	10,138	93	402	343	59
Scottsdale	037	2015	10,772	10,356	10,260	96	416	355	61
Scottsdale	037	2020	10,836	10,404	10,307	97	432	370	62
Scottsdale	037	2025	10,942	10,459	10,360	99	483	420	63
Scottsdale	037	2030	11,067	10,556	10,455	101	511	447	64
Scottsdale	037	2035	11,260	10,730	10,628	102	530	464	66
Scottsdale	037	2040	11,371	10,832	10,728	104	539	472	67
Scottsdale	038	1990	26,540	26,286	26,029	257	254	43	211
Scottsdale	038	1995	46,290	45,471	44,916	555	819	197	622
Scottsdale	038	2000	50,946	49,798	49,189	609	1,148	424	724
Scottsdale	038	2005	58,447	56,923	56,236	687	1,524	653	871
Scottsdale	038	2010	62,103	60,203	59,481	722	1,900	960	940
Scottsdale	038	2015	63,441	61,259	60,532	727	2,182	1,222	960
Scottsdale	038	2020	64,539	62,099	61,369	730	2,440	1,465	975
Scottsdale	038	2025	65,489	62,864	62,130	734	2,625	1,637	988
Scottsdale	038	2030	66,288	63,502	62,764	738	2,786	1,787	999
Scottsdale	038	2035	67,368	64,474	63,735	739	2,894	1,882	1,012
Scottsdale	038	2040	68,086	65,076	64,335	741	3,010	1,989	1,021
Scottsdale	051	1990	35,276	31,283	31,277	6	3,993	2,162	1,831
Scottsdale	051	1995	37,810	33,731	33,703	28	4,079	2,199	1,880
Scottsdale	051	2000	38,832	34,496	34,468	28	4,336	2,438	1,898
Scottsdale	051	2005	39,482	35,064	35,036	28	4,418	2,507	1,911
Scottsdale	051	2010	40,003	35,545	35,517	28	4,458	2,538	1,920
Scottsdale	051	2015	40,490	35,988	35,960	28	4,502	2,573	1,929
Scottsdale	051	2020	41,036	36,503	36,475	28	4,533	2,595	1,938
Scottsdale	051	2025	41,467	36,915	36,887	28	4,552	2,607	1,945
Scottsdale	051	2030	41,955	37,385	37,357	28	4,570	2,619	1,951
Scottsdale	051	2035	42,322	37,739	37,711	28	4,583	2,628	1,955
Scottsdale	051	2040	42,602	38,012	37,984	28	4,590	2,631	1,959

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Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Scottsdale	060	1990	64,171	59,693	58,956	737	4,478	2,028	2,450
Scottsdale	060	1995	65,224	60,664	59,915	749	4,560	2,091	2,469
Scottsdale	060	2000	66,682	62,067	61,302	765	4,615	2,115	2,500
Scottsdale	060	2005	68,098	63,432	62,650	782	4,666	2,140	2,526
Scottsdale	060	2010	69,847	65,103	64,307	796	4,744	2,186	2,558
Scottsdale	060	2015	71,362	66,538	65,730	808	4,824	2,240	2,584
Scottsdale	060	2020	73,111	68,210	67,391	819	4,901	2,287	2,614
Scottsdale	060	2025	74,987	70,018	69,188	830	4,969	2,324	2,645
Scottsdale	060	2030	76,950	71,909	71,067	842	5,041	2,368	2,673
Scottsdale	060	2035	78,666	73,541	72,690	851	5,125	2,427	2,698
Scottsdale	060	2040	80,097	74,908	74,048	860	5,189	2,470	2,719
Scottsdale	MPA	1990	142,408	132,452	131,357	1,095	9,956	5,263	4,693
Scottsdale	MPA	1995	173,831	162,844	161,317	1,527	10,987	5,651	5,336
Scottsdale	MPA	2000	185,114	173,291	171,663	1,628	11,823	6,247	5,576
Scottsdale	MPA	2005	216,479	203,272	201,292	1,980	13,207	7,020	6,187
Scottsdale	MPA	2010	250,749	236,118	233,746	2,372	14,631	7,772	6,859
Scottsdale	MPA	2015	273,266	257,598	254,897	2,701	15,668	8,371	7,297
Scottsdale	MPA	2020	289,241	272,762	269,829	2,933	16,479	8,901	7,578
Scottsdale	MPA	2025	309,959	292,675	289,517	3,158	17,284	9,368	7,916
Scottsdale	MPA	2030	325,042	307,165	303,831	3,334	17,877	9,741	8,136
Scottsdale	MPA	2035	336,291	317,983	314,551	3,432	18,308	10,016	8,292
Scottsdale	MPA	2040	345,744	326,989	323,485	3,504	18,755	10,322	8,433
Surprise	010	1990	106	67	67	0	39	0	39
Surprise	010	1995	122	82	82	0	40	0	40
Surprise	010	2000	130	89	89	0	41	0	41
Surprise	010	2005	138	96	96	0	42	0	42
Surprise	010	2010	147	104	104	0	43	0	43
Surprise	010	2015	157	113	113	0	44	0	44
Surprise	010	2020	167	122	122	0	45	0	45
Surprise	010	2025	177	131	131	0	46	0	46
Surprise	010	2030	186	139	139	0	47	0	47
Surprise	010	2035	195	147	147	0	48	0	48
Surprise	010	2040	202	153	153	0	49	0	49

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Surprise	011	1990	2,078	2,078	2,078	0	0	0	0
Surprise	011	1995	2,103	2,103	2,103	0	0	0	0
Surprise	011	2000	2,140	2,140	2,140	0	0	0	0
Surprise	011	2005	2,179	2,179	2,179	0	0	0	0
Surprise	011	2010	2,222	2,222	2,222	0	0	0	0
Surprise	011	2015	2,267	2,267	2,267	0	0	0	0
Surprise	011	2020	2,314	2,314	2,314	0	0	0	0
Surprise	011	2025	6,911	6,825	6,756	69	86	10	76
Surprise	011	2030	24,469	24,076	23,737	339	393	53	340
Surprise	011	2035	39,690	39,046	38,470	576	644	87	557
Surprise	011	2040	47,610	46,823	46,037	786	787	108	679
Surprise	024	1990	1,961	1,944	1,842	102	17	2	15
Surprise	024	1995	3,051	3,009	2,907	102	42	4	38
Surprise	024	2000	4,924	4,827	4,705	122	97	17	80
Surprise	024	2005	8,368	8,178	8,008	170	190	43	147
Surprise	024	2010	12,718	12,412	12,183	229	306	75	231
Surprise	024	2015	15,123	14,732	14,476	256	391	114	277
Surprise	024	2020	22,507	21,857	21,495	362	650	238	412
Surprise	024	2025	42,040	40,849	40,204	645	1,191	457	734
Surprise	024	2030	86,211	84,078	82,782	1,296	2,133	736	1,397
Surprise	024	2035	147,306	143,955	141,728	2,227	3,351	1,082	2,269
Surprise	024	2040	221,740	216,861	213,546	3,315	4,879	1,448	3,431
Surprise	025	1990	5,079	5,051	4,906	145	28	25	3
Surprise	025	1995	5,159	5,130	4,985	145	29	25	4
Surprise	025	2000	6,720	6,656	6,486	170	64	25	39
Surprise	025	2005	8,563	8,460	8,266	194	103	27	76
Surprise	025	2010	8,937	8,826	8,630	196	111	28	83
Surprise	025	2015	9,164	9,048	8,852	196	116	28	88
Surprise	025	2020	9,348	9,227	9,030	197	121	29	92
Surprise	025	2025	9,514	9,390	9,193	197	124	29	95
Surprise	025	2030	9,724	9,597	9,399	198	127	29	98
Surprise	025	2035	10,127	9,994	9,796	198	133	29	104
Surprise	025	2040	10,707	10,564	10,365	199	143	30	113

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Surprise	MPA	1990	9,224	9,140	8,893	247	84	27	57
Surprise	MPA	1995	10,435	10,324	10,077	247	111	29	82
Surprise	MPA	2000	13,914	13,712	13,420	292	202	42	160
Surprise	MPA	2005	19,248	18,913	18,549	364	335	70	265
Surprise	MPA	2010	24,024	23,564	23,139	425	460	103	357
Surprise	MPA	2015	26,711	26,160	25,708	452	551	142	409
Surprise	MPA	2020	34,336	33,520	32,961	559	816	267	549
Surprise	MPA	2025	58,642	57,195	56,284	911	1,447	496	951
Surprise	MPA	2030	120,590	117,890	116,057	1,833	2,700	818	1,882
Surprise	MPA	2035	197,318	193,142	190,141	3,001	4,176	1,198	2,978
Surprise	MPA	2040	280,259	274,401	270,101	4,300	5,858	1,586	4,272
Tempe	073	1990	51,849	49,222	44,809	4,413	2,627	1,894	733
Tempe	073	1995	56,604	53,791	49,241	4,550	2,813	1,990	823
Tempe	073	2000	59,014	56,078	51,394	4,684	2,936	2,069	867
Tempe	073	2005	60,941	57,922	53,096	4,826	3,019	2,121	898
Tempe	073	2010	62,522	59,400	54,442	4,958	3,122	2,200	922
Tempe	073	2015	64,053	60,779	55,716	5,063	3,274	2,331	943
Tempe	073	2020	65,729	62,303	57,150	5,153	3,426	2,460	966
Tempe	073	2025	67,641	64,098	58,845	5,253	3,543	2,551	992
Tempe	073	2030	69,346	65,733	60,378	5,355	3,613	2,603	1,010
Tempe	073	2035	70,915	67,221	61,764	5,457	3,694	2,668	1,026
Tempe	073	2040	72,306	68,499	62,949	5,550	3,807	2,765	1,042
Tempe	079	1990	51,093	47,846	47,703	143	3,247	934	2,313
Tempe	079	1995	54,633	51,283	51,100	183	3,350	963	2,387
Tempe	079	2000	56,305	52,869	52,682	187	3,436	1,014	2,422
Tempe	079	2005	57,518	53,907	53,716	191	3,611	1,170	2,441
Tempe	079	2010	58,665	54,886	54,692	194	3,779	1,319	2,460
Tempe	079	2015	59,658	55,737	55,541	196	3,921	1,446	2,475
Tempe	079	2020	60,819	56,779	56,582	197	4,040	1,547	2,493
Tempe	079	2025	62,028	57,892	57,692	200	4,136	1,625	2,511
Tempe	079	2030	63,295	59,070	58,868	202	4,225	1,696	2,529
Tempe	079	2035	64,429	60,166	59,961	205	4,263	1,720	2,543
Tempe	079	2040	65,376	61,090	60,883	207	4,286	1,729	2,557

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Tempe	089	1990	46,750	45,616	45,518	98	1,134	909	225
Tempe	089	1995	56,240	53,448	53,259	189	2,792	2,409	383
Tempe	089	2000	60,384	56,691	56,471	220	3,693	3,237	456
Tempe	089	2005	62,502	58,333	58,111	222	4,169	3,680	489
Tempe	089	2010	64,012	59,472	59,246	226	4,540	4,029	511
Tempe	089	2015	65,144	60,313	60,086	227	4,831	4,303	528
Tempe	089	2020	66,340	61,221	60,992	229	5,119	4,576	543
Tempe	089	2025	67,653	62,265	62,035	230	5,388	4,828	560
Tempe	089	2030	68,725	63,087	62,855	232	5,638	5,067	571
Tempe	089	2035	69,887	64,027	63,793	234	5,860	5,276	584
Tempe	089	2040	71,003	64,956	64,722	234	6,047	5,448	599
Tempe	MPA	1990	149,692	142,684	138,030	4,654	7,008	3,737	3,271
Tempe	MPA	1995	167,477	158,522	153,600	4,922	8,955	5,362	3,593
Tempe	MPA	2000	175,703	165,638	160,547	5,091	10,065	6,320	3,745
Tempe	MPA	2005	180,961	170,162	164,923	5,239	10,799	6,971	3,828
Tempe	MPA	2010	185,199	173,758	168,380	5,378	11,441	7,548	3,893
Tempe	MPA	2015	188,855	176,829	171,343	5,486	12,026	8,080	3,946
Tempe	MPA	2020	192,888	180,303	174,724	5,579	12,585	8,583	4,002
Tempe	MPA	2025	197,322	184,255	178,572	5,683	13,067	9,004	4,063
Tempe	MPA	2030	201,366	187,890	182,101	5,789	13,476	9,366	4,110
Tempe	MPA	2035	205,231	191,414	185,518	5,896	13,817	9,664	4,153
Tempe	MPA	2040	208,685	194,545	188,554	5,991	14,140	9,942	4,198
Tolleson	062	1990	4,492	4,445	4,445	0	47	1	46
Tolleson	062	1995	4,606	4,522	4,522	0	84	36	48
Tolleson	062	2000	5,916	5,706	5,688	18	210	135	75
Tolleson	062	2005	11,767	11,347	11,241	106	420	230	190
Tolleson	062	2010	16,015	15,443	15,282	161	572	299	273
Tolleson	062	2015	17,470	16,820	16,644	176	650	349	301
Tolleson	062	2020	18,146	17,448	17,268	180	698	384	314
Tolleson	062	2025	18,644	17,896	17,714	182	748	427	321
Tolleson	062	2030	19,033	18,256	18,072	184	777	450	327
Tolleson	062	2035	19,352	18,541	18,356	185	811	479	332
Tolleson	062	2040	19,922	19,044	18,858	186	878	537	341

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

MPA	Dist	Year	Total Population	Resident Population Total	Resident Population In Households	Resident Population Group Quarters	Non-Resident Population Total	Non-Resident Population Transient	Non-Resident Population Seasonal
Tolleson	MPA	1990	4,492	4,445	4,445	0	47	1	46
Tolleson	MPA	1995	4,606	4,522	4,522	0	84	36	48
Tolleson	MPA	2000	5,916	5,706	5,688	18	210	135	75
Tolleson	MPA	2005	11,767	11,347	11,241	106	420	230	190
Tolleson	MPA	2010	16,015	15,443	15,282	161	572	299	273
Tolleson	MPA	2015	17,470	16,820	16,644	176	650	349	301
Tolleson	MPA	2020	18,146	17,448	17,268	180	698	384	314
Tolleson	MPA	2025	18,644	17,896	17,714	182	748	427	321
Tolleson	MPA	2030	19,033	18,256	18,072	184	777	450	327
Tolleson	MPA	2035	19,352	18,541	18,356	185	811	479	332
Tolleson	MPA	2040	19,922	19,044	18,858	186	878	537	341
Wickenburg	001	1990	6,699	6,049	5,749	300	650	513	137
Wickenburg	001	1995	7,821	7,051	6,751	300	770	608	162
Wickenburg	001	2000	9,136	8,215	7,915	300	921	727	194
Wickenburg	001	2005	10,521	9,458	9,158	300	1,063	839	224
Wickenburg	001	2010	12,055	10,834	10,534	300	1,221	964	257
Wickenburg	001	2015	13,749	12,353	12,053	300	1,396	1,102	294
Wickenburg	001	2020	15,549	13,980	13,680	300	1,569	1,239	330
Wickenburg	001	2025	17,400	15,670	15,370	300	1,730	1,366	364
Wickenburg	001	2030	19,271	17,393	17,093	300	1,878	1,483	395
Wickenburg	001	2035	21,124	19,108	18,808	300	2,016	1,592	424
Wickenburg	001	2040	22,908	20,749	20,449	300	2,159	1,705	454
Wickenburg	MPA	1990	6,699	6,049	5,749	300	650	513	137
Wickenburg	MPA	1995	7,821	7,051	6,751	300	770	608	162
Wickenburg	MPA	2000	9,136	8,215	7,915	300	921	727	194
Wickenburg	MPA	2005	10,521	9,458	9,158	300	1,063	839	224
Wickenburg	MPA	2010	12,055	10,834	10,534	300	1,221	964	257
Wickenburg	MPA	2015	13,749	12,353	12,053	300	1,396	1,102	294
Wickenburg	MPA	2020	15,549	13,980	13,680	300	1,569	1,239	330
Wickenburg	MPA	2025	17,400	15,670	15,370	300	1,730	1,366	364
Wickenburg	MPA	2030	19,271	17,393	17,093	300	1,878	1,483	395
Wickenburg	MPA	2035	21,124	19,108	18,808	300	2,016	1,592	424
Wickenburg	MPA	2040	22,908	20,749	20,449	300	2,159	1,705	454

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

				Resident Population			Non-Resident Population		
MPA	Dist	Year	Total Population	Total	In Households	Group Quarters	Total	Transient	Seasonal
Youngtown	027	1990	2,795	2,555	2,329	226	240	227	13
Youngtown	027	1995	2,843	2,602	2,371	231	241	227	14
Youngtown	027	2000	2,883	2,641	2,403	238	242	227	15
Youngtown	027	2005	3,019	2,774	2,529	245	245	227	18
Youngtown	027	2010	3,046	2,799	2,547	252	247	229	18
Youngtown	027	2015	3,058	2,810	2,553	257	248	230	18
Youngtown	027	2020	3,068	2,819	2,556	263	249	231	18
Youngtown	027	2025	3,075	2,825	2,557	268	250	232	18
Youngtown	027	2030	3,082	2,832	2,558	274	250	232	18
Youngtown	027	2035	3,086	2,836	2,558	278	250	232	18
Youngtown	027	2040	3,090	2,840	2,558	282	250	232	18
Youngtown	MPA	1990	2,795	2,555	2,329	226	240	227	13
Youngtown	MPA	1995	2,843	2,602	2,371	231	241	227	14
Youngtown	MPA	2000	2,883	2,641	2,403	238	242	227	15
Youngtown	MPA	2005	3,019	2,774	2,529	245	245	227	18
Youngtown	MPA	2010	3,046	2,799	2,547	252	247	229	18
Youngtown	MPA	2015	3,058	2,810	2,553	257	248	230	18
Youngtown	MPA	2020	3,068	2,819	2,556	263	249	231	18
Youngtown	MPA	2025	3,075	2,825	2,557	268	250	232	18
Youngtown	MPA	2030	3,082	2,832	2,558	274	250	232	18
Youngtown	MPA	2035	3,086	2,836	2,558	278	250	232	18
Youngtown	MPA	2040	3,090	2,840	2,558	282	250	232	18

(Please refer to notes at the end of the table)

Population by District and MPA
Maricopa County
1990 - 2040

				Resident Population			Non-Resident Population		
MPA	Dist	Year	Total Population	Total	In Households	Group Quarters	Total	Transient	Seasonal
Maricopa County Grand Total		1990	2,213,695	2,130,400	2,097,090	33,310	83,295	36,718	46,577
Maricopa County Grand Total		1995	2,525,672	2,430,975	2,393,627	37,348	94,697	41,790	52,907
Maricopa County Grand Total		2000	2,876,063	2,767,400	2,724,991	42,409	108,663	48,041	60,622
Maricopa County Grand Total		2005	3,234,575	3,113,325	3,065,745	47,580	121,250	53,633	67,617
Maricopa County Grand Total		2010	3,619,378	3,484,400	3,431,277	53,123	134,978	59,803	75,175
Maricopa County Grand Total		2015	4,031,477	3,881,750	3,822,535	59,215	149,727	66,419	83,308
Maricopa County Grand Total		2020	4,458,968	4,295,075	4,229,690	65,385	163,893	72,799	91,094
Maricopa County Grand Total		2025	4,890,314	4,713,650	4,642,068	71,582	176,664	78,504	98,160
Maricopa County Grand Total		2030	5,319,252	5,131,000	5,053,313	77,687	188,252	83,724	104,528
Maricopa County Grand Total		2035	5,738,181	5,538,975	5,455,373	83,602	199,206	88,480	110,726
Maricopa County Grand Total		2040	6,133,564	5,922,950	5,833,682	89,268	210,614	93,182	117,432

Notes:

1) These projections were prepared to be consistent with the April 1, 1990 Census.

2) These projections have been prepared by MAG to be consistent with new County Control Totals developed by DES as required by Executive Order 88-10.

3) The methodology for preparing these projections is based on a model developed in 1989 and does not reflect recent changes in economic conditions.

4) The projection model was based on adopted land use plans.

5) The projections were determined by adding known changes to date for the 1990 to 1995 projections and by using the same distribution of the change in population in succeeding five year intervals from 1995 to 2040 as had been adopted by the Regional Council in November, 1989.

6) These projections will be superseded when more complete Census data are available, and when MAG develops a new socioeconomic projections model, which will draw upon the Census data as input.

7) These projections should be used with caution. They are subject to fluctuation as a result of recent changes in economic conditions.

8) Totals may not add due to rounding.

Resident population data approved by Maricopa Association of Governments Regional Council, January 1992.
Non-resident population data approved by Maricopa Association of Governments Regional Council, November 1989.

APPENDIX C

Designated Management Agency Resolutions

JLS:jhw

RESOLUTION NO. 4335

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MESA, MARICOPA COUNTY, ARIZONA, AGREEING TO PARTICIPATE IN THE MARICOPA COUNTY AREA WASTEWATER TREATMENT MANAGEMENT SYSTEM.

WHEREAS, the City of Mesa is aware that Provisions of the Clean Water Act (Public Laws 92-500 and 95-217) Section 208 require development of an Areawide Water Quality Management Plan, and, further, require the Governor of Arizona and the U.S. Environmental Protection Agency, Region IX Administrator to designate official management agency(s) to carry out appropriate sections of the plan; and

WHEREAS, the Maricopa Association of Governments (MAG) has been designated by the Governor of Arizona, and the U.S. Environmental Protection Agency, Region IX Administrator to prepare the Areawide Water Quality Management Plan for the Maricopa County area in accordance with the provisions of Section 208; and

WHEREAS, the Regional Council of the Maricopa Association of Governments (MAG) has approved a Water Quality Management Plan and a Wastewater Treatment Management System for the Maricopa County area.

NOW, THEREFORE, BE IT RESOLVED BY THE MAYOR AND CITY COUNCIL OF THE CITY OF MESA, MARICOPA COUNTY, ARIZONA, that the City of Mesa agrees to carry out the appropriate duties and responsibilities identified in the Waste Treatment Management System Report approved by the MAG Regional Council on March 15, 1978.

PASSED AND ADOPTED by the Mayor and City Council of the City of Mesa, Maricopa County, Arizona, this 8th day of January, 1979.

APPROVED:

Wayne Pomeroy

Mayor

ATTEST:

Dorothe Dona

City Clerk

RESOLUTION

DESIGNATING MEMBERSHIP OF SUBREGIONAL OPERATING GROUPS AND LEAD AGENCIES FOR THE MARICOPA COUNTY AREAWIDE WASTEWATER MANAGEMENT PROGRAM

WHEREAS, the Maricopa Association of Governments (MAG) has been designated by the Governor of Arizona, and the U.S. Environmental Protection Agency, Region IX Administrator to prepare the Areawide Water Quality Management Plan for the Maricopa County area in accordance with the provisions of Clean Water Act (Public Laws 92500 and 95217) Section 208, and;

WHEREAS, the Regional Council of the Maricopa Association of Governments (MAG) has approved a Water Quality Management Plan and a Wastewater Treatment Management System for the Maricopa County area,

NOW, THEREFORE BE IT RESOLVED THAT THE REGIONAL COUNCIL OF THE MARICOPA ASSOCIATION OF GOVERNMENTS designates the following members of Subregional Operating Groups and lead agencies for the Maricopa County Areawide Wastewater Management Program:

Multi-Member SROGs	Lead Agency
Peoria/Tolleson	Tolleson
Multi-Cities (Phoenix, Mesa, Tempe, Scottsdale, Glendale, Youngtown, Gilbert)	Phoenix
Single Member SROGs	
Buckeye	Buckeye
Gila Bend	Gila Bend
Gilbert	Gilbert
Chandler	Chandler
Wickenburg	Wickenburg

APPROVED THIS 17TH DAY OF JANUARY, 1979.

Charles S. Salem

Chairman

RESOLUTION

DESIGNATING MEMBERSHIP OF SUBREGIONAL OPERATING GROUPS AND LEAD AGENCIES FOR THE MARICOPA COUNTY AREAWIDE WASTEWATER MANAGEMENT PROGRAM

WHEREAS, the Maricopa Association of Governments (MAG) has been designated by the Governor of Arizona, and the U.S. Environmental Protection Agency, Region IX Administrator to prepare the Areawide Water Quality Management Plan for the Maricopa County area in accordance with the provisions of Clean Water Act (Public Laws 92500 and 95217) Section 208, and;

WHEREAS, the Regional Council of the Maricopa Association of Governments (MAG) has approved a Water Quality Management Plan and a Wastewater Treatment Management System for the Maricopa County area,

NOW, THEREFORE BE IT RESOLVED THAT THE REGIONAL COUNCIL OF THE MARICOPA ASSOCIATION OF GOVERNMENTS designates the following members of Subregional Operating Groups and lead agencies for the Maricopa County Areawide Wastewater Management Program:

<u>Multi-Member SROGs</u>	<u>Lead Agency</u>
Peoria/Tolleson	Tolleson
Multi-Cities (Phoenix, Mesa, Tempe, Scottsdale, Glendale, Youngtown, Gilbert)	Phoenix
<u>Single Member SROGs</u>	
Buckeye	Buckeye
Gila Bend	Gila Bend
Gilbert	Gilbert
Chandler	Chandler
Wickenburg	Wickenburg

APPROVED THIS 17TH DAY OF JANUARY, 1979.

Charles L. Salem

Chairman

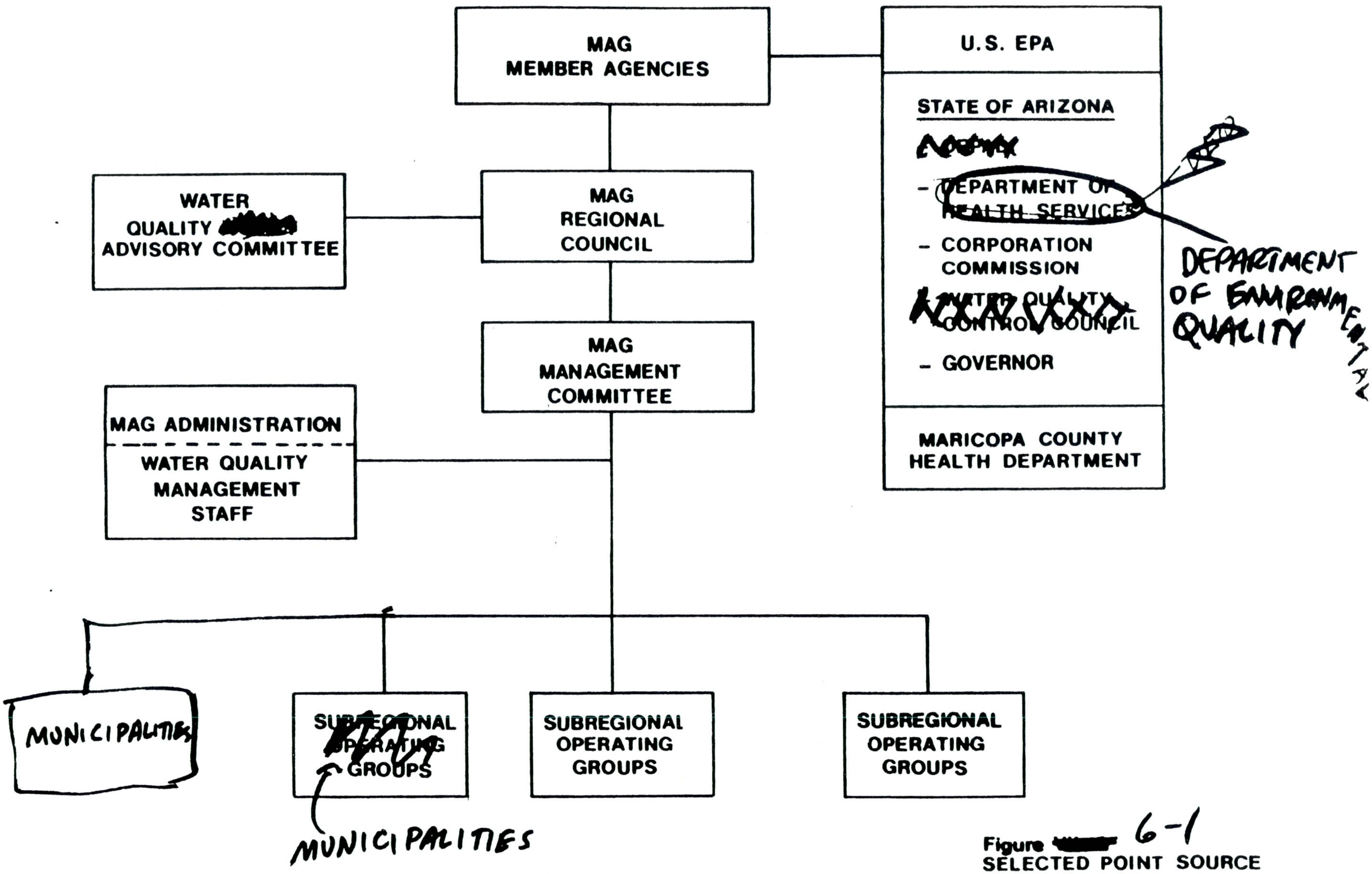


Figure [redacted] 6-1
SELECTED POINT SOURCE
MANAGEMENT PLAN

CITY OF TEMPE

Home of Arizona State University

P.O. Box 5002 Tempe, Arizona 85281 (602) 967-2001

Office of the
Mayor and City Manager

January 12, 1979

MAG Regional Council
1820 W. Washington Street
Phoenix, Arizona 85007

Gentlemen:

On January 11, 1979, the Mayor and City Council of the City of Tempe, Arizona adopted the Areawide Wastewater Treatment Management System in Resolution #1521.

In order to implement the adopted management system, the MAG Regional Council is hereby requested to designate the City of Tempe, Arizona as a member of the Multi-City Sub-Regional Operating Group. It is further requested that the City of Phoenix be designated as the Lead Agency of the Multi-City Sub-Regional Operating Group.

Sincerely,

Harry E. Mitchell
Mayor

cjr

RESOLUTION NO. 1521

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF TEMPE, ARIZONA, AGREEING TO PARTICIPATE IN THE MARICOPA COUNTY AREA WASTEWATER TREATMENT MANAGEMENT SYSTEM.

* *

WHEREAS, the City of Tempe is aware that Provisions of the Clean Water Act (Public Laws 92-500 and 95-217) Section 208 require development of an Areawide Water Quality Management Plan, and, further, require the Governor of Arizona and the U. S. Environmental Protection Agency, Region IX Administrator to designate official management agency(s) to carry out appropriate sections of the plan, and;

WHEREAS, the Maricopa Association of Governments (MAG) has been designated by the Governor of Arizona, and the U. S. Environmental Protection Agency, Region IX Administrator to prepare the Areawide Water Quality Management Plan for the Maricopa County area in accordance with the provisions of Section 208, and;

WHEREAS, the Regional Council of the Maricopa Association of Governments (MAG) has approved a Water Quality Management Plan and a Wastewater Treatment Management System for the Maricopa County area.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF TEMPE, ARIZONA, as follows:

That the City of Tempe agrees to carry out the appropriate duties and responsibilities identified in the Waste Treatment Management System Report approved by the MAG Regional Council on March 15, 1978.

PASSED AND ADOPTED BY THE CITY COUNCIL OF THE CITY OF TEMPE, ARIZONA, this 11th day of January, 1979.

Harry E. Mitchell
MAYOR

ATTEST:

Pauline S. Templeton
City Clerk

APPROVED AS TO FORM:

David R. Merkel
City Attorney

Office of the Mayor and City Council

January 3, 1979

MAG Regional Council
Maricopa Association of Governments
1820 West Washington
Phoenix, Arizona 85007

Dear Council Members:

On January 2, 1979, the Mayor and Council of the City of Scottsdale adopted the Areawide Wastewater Treatment Management System in Resolution #1900.

In order to implement the adopted management system, the MAG Regional Council is hereby requested to designate the City of Scottsdale as a member of the Multi-City Sub-Regional Operating Group. It is further requested that the City of Phoenix be designated as the Lead Agency of the Multi-City Sub-Regional Operating Group.

Sincerely,

William C. Jenkins

William C. Jenkins
Mayor

WCJ:mb

JAN 1979

Enclosure - Resolution #1900

3939 CIVIC CENTER PLAZA ▪ SCOTTSDALE, ARIZONA 85251 ▪ PHONE (602) 994-2521

RESOLUTION NO. 1900

A RESOLUTION OF THE COUNCIL OF THE CITY OF SCOTTSDALE, MARICOPA COUNTY, ARIZONA, DECLARING ITS INTENTION TO PARTICIPATE IN THE MARICOPA COUNTY AREA WASTEWATER TREATMENT MANAGEMENT SYSTEM.

WHEREAS, the City of Scottsdale is aware that Provisions of the Clean Water Act (Public Laws 92-500 and 95-217) Section 208 require development of an Areawide Water Quality Management Plan, and, further, require the Governor of Arizona and the U. S. Environmental Protection Agency, Region IX Administrator to designate official management agency(s) to carry out appropriate sections of the plan, and;

WHEREAS, the Maricopa Association of Governments (MAG) has been designated by the Governor of Arizona, and the U. S. Environmental Protection Agency, Region IX Administrator to prepare the Areawide Water Quality Management Plan for the Maricopa County area in accordance with the provisions of Section 208, and;

WHEREAS, the Regional Council of the Maricopa Association of Governments (MAG) has approved a Water Quality Management Plan and a Wastewater Treatment Management System for the Maricopa County area,

NOW, THEREFORE BE IT RESOLVED that the Mayor and City Council of Scottsdale agree to carry out the appropriate duties and responsibilities identified in the Waste Treatment Management System Report approved by the MAG Regional Council on March 15, 1978.

PASSED AND ADOPTED by the Council of the City of Scottsdale, this 2nd day of January, 1979.

William C. Jenkins

William C. Jenkins, Mayor

ATTEST:

Fern Anderson Nell

CITY OF AVONDALE

PHONE 932-2400

CITY HALL 525 NORTH CENTRAL AVENUE · AVONDALE, ARIZONA 85323

LETTER TO MAG REGIONAL COUNCIL

On April 3, 1979, the Mayor and Council of the City of Avondale adopted the Areawide Wastewater Treatment Management System in Resolution No. 317.

In order to implement the adopted management system, the MAG Regional Council is hereby requested to designate the City of Avondale as member of the Avondale/Goodyear Sub-Regional Operating Group. It is further requested that the Town of Goodyear be designated as the Lead Agency for the Avondale/Goodyear Sub-Regional Operating Group.

Cordially,

Vice-Mayor Riefkohl

RESOLUTION No. 317

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF AVONDALE, ARIZONA, AGREEING TO PARTICIPATE IN THE MARICOPA COUNTY AREA WASTEWATER TREATMENT MANAGEMENT SYSTEM AND DECLARING AN EMERGENCY.

WHEREAS, the City of Avondale is aware that Provisions of the Clean Water Act (Public Laws 92-500 and 95-217) Section 208 require development of an Areawide Water Quality Management Plan, and further, require the Governor of Arizona and the U.S. Environmental Protection Agency, Region IX Administrator to designate official management agency (s) to carry out appropriate sections of the plan, and;

WHEREAS, the Maricopa Association of Governments (MAG) has been designated by the Governor of Arizona, and the U.S. Environmental Protection Agency, Region IX Administrator to prepare the Areawide Water Quality Management Plan for the Maricopa County area in accordance with the provisions of Section 208, and;

WHEREAS, the Regional Council of the Maricopa Association of Governments (MAG) has approved a Water Quality Management Plan and a Wastewater Treatment Management System for the Maricopa County area.

NOW, THEREFORE, BE IT RESOLVED THAT the City Council of the City of Avondale agrees to carry out the appropriate duties and responsibilities identified in the Waste Treatment Management System Report approved by MAG Regional Council on March 15, 1978.

This Resolution is adopted in reliance on the fact that the information contained in the letters dated March 6, 1979 and March 16, 1979, from Mark Frank 208 Water Quality Management Program Coordinator, to Mr. Carlos V. Palma, City Manager, City of Avondale, does, correctly state the position of MAG Regional Council with respect to the El Mirage interceptor and the possible staging of the construction of the various components of the system. Copies of said letters are attached to and made a part of this Resolution.

Whereas, the immediate operation of this Resolution is necessary for the health, peace and safety of the City of Avondale, an emergency is hereby declared to exist which is created by the necessity of providing continued Wastewater Treatment for the City, and this Resolution shall be in full force and effect from and after this date.

PASSED AND ADOPTED by the City Council of the City of Avondale this 3rd day of April, 1979.

APPROVED by the Vice-Mayor this 3rd day of April, 1979.

VICE-MAYOR

ATTEST:

CITY CLERK

RESOLUTION NO. 15113

A RESOLUTION INDICATING THE WILLINGNESS OF THE CITY OF PHOENIX TO CARRY OUT THE RESPONSIBILITIES DESIGNATED IN THE MAG WATER QUALITY MANAGEMENT PLAN; AND DECLARING AN EMERGENCY.

WHEREAS, the City of Phoenix, Arizona, is aware that Provisions of the Clean Water Act (Public Laws 92-500 and 95-217), Section 208, require development of an Areawide Water Quality Management Plan and, further, require the Governor of Arizona and the U. S. Environmental Protection Agency, Region IX Administrator, to designate official management agency(s) to carry out appropriate sections of the plan, and

WHEREAS, the Maricopa Association of Governments (MAG) has been designated by the Governor of Arizona, and the U. S. Environmental Protection Agency, Region IX Administrator, to prepare the Areawide Water Quality Management Plan for the Maricopa County area in accordance with the provisions of Section 208, and

WHEREAS, the Regional Council of the Maricopa Association of Governments (MAG) has approved a Water Quality Management Plan and a Wastewater Treatment Management System for the Maricopa County area,

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF PHOENIX as follows:

SECTION 1. That the Mayor and Council of the City of Phoenix hereby indicate the willingness of the City of Phoenix to proceed to carry out the appropriate responsibilities for which it has been designated in the Wastewater Treatment

Management System Report approved by the MAG Regional Council on March 15, 1978.

SECTION 2. WHEREAS, the immediate operation of the provisions of this resolution is necessary for the preservation of the public peace, health and safety, an EMERGENCY is hereby declared to exist, and this resolution shall be in full force and effect from and after its passage by the Council as required by the City Charter and is hereby exempted from the referendum clause of said Charter.

PASSED by the Council of the City of Phoenix this 9 day of January, 1979.

Margaret T. Hance
MAYOR

ATTEST:

______________________ City Clerk

APPROVED AS TO FORM:

______________________ ACTING City Attorney

REVIEWED BY:

______________________ ACTING City Manager

STATE OF ARIZONA }
COUNTY OF MARICOPA } SS

I, BEULAH BRADLEY, DEPUTY City Clerk of the City of Phoenix, County of Maricopa, State of Arizona, do hereby certify and attest the foregoing to be a full, true and correct copy of Resolution No. 15113 of the City of Phoenix, Arizona, as adopted by the City Council of the City of Phoenix at a regular Meeting held on the 9 day of JANUARY, 1979, all as appears of record in my office.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the official seal of the City of Phoenix to be affixed hereunto this 10TH day of JANUARY 1979.

Beulah Bradley
DEPUTY City Clerk

Town Of Buckeye

P. O. Box 157
Buckeye, Arizona 85326

Telephone (602) 386-4691
Phoenix Line 935-4532

JAN 5 1979

January 2, 1979

MAG Regional Council
1820 West Washington
Phoenix, Arizona 85007

Gentlemen:

On December 19, 1978, the Mayor and Council of the Town of Buckeye adopted the Areawide Wastewater Treatment Management System in Resolution No. 10-78.

In order to implement the adopted management system, the MAG Regional Council is hereby requested to designate the Town of Buckeye as a single member Sub-Regional Operating Group and Lead Agency.

Sincerely,

John B. Hawley
Mayor

City of Glendale

7022 NORTH 58TH DRIVE • P. O. BOX 1556 • GLENDALE, ARIZONA 85311 • (602) ~~XXX-XXXX~~ 931-5400

January 23, 1979

Maricopa Association of Governments
Regional Council
1820 West Washington
Phoenix, AZ 85007

Attention: Ken Driggs

On January 9, 1979, the Mayor and Council of the City of Glendale adopted the Areawide Wastewater Treatment Management System in Resolution No. 1862 New Series.

In order to implement the adopted management system, the MAG Regional Council is hereby requested to designate the City of Glendale as member of the Multi-Cities Sub-Regional Operating Group. It is further requested that City of Phoenix be designated as the Lead Agency of the Multi-Cities Sub-Regional Operating Group.

Sincerely,

S F Van de Putte

S. F. Van de Putte
City Manager

cc: Marvin Andrews

attachments

JAN 25 1979

RESOLUTION NO. 1862 NEW SERIES

A RESOLUTION OF THE COUNCIL OF THE CITY OF GLENDALE, MARICOPA COUNTY, ARIZONA, AGREEING TO PARTICIPATE IN THE MARICOPA COUNTY AREA WASTEWATER TREATMENT MANAGEMENT SYSTEM

WHEREAS, the City of Glendale is aware that provisions of the Clean Water Act (Public Laws 92-500 and 95-217) Section 208 require development of an Areawide Water Quality Management Plan, and, further, require the Governor of Arizona and the U. S. Environmental Protection Agency, Region IX Administrator to designate official management agency(s) to carry out appropriate sections of the plan; and

WHEREAS, the Maricopa Association of Governments (MAG) has been designated by the Governor of Arizona, and the U. S. Environmental Protection Agency, Region IX Administrator to prepare the Areawide Water Quality Management Plan for the Maricopa County area in accordance with the provisions of Section 208; and

WHEREAS, the Regional Council of the Maricopa Association of Governments (MAG) has approved a Water Quality Management Plan and a Wastewater Treatment Management System for the Maricopa County area,

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF GLENDALE as follows:

SECTION 1. That the City of Glendale agrees to carry out the appropriate duties and responsibilities identified in the Waste Treatment Management System Report approved by the Maricopa Association of Governments (MAG) Regional Council on the 15th day of March, 1978.

PASSED, ADOPTED AND APPROVED by the Mayor and Council of the City of Glendale, Maricopa County, Arizona, this 9th day of January, 1979.

J. STERLING RIDGE
MAYOR

ATTEST:

IRENE WITTER
City Clerk

(SEAL)

APPROVED AS TO FORM:

THOMAS A. McCARTHY, JR.
Assistant City Attorney

REVIEWED BY:

S. F. VAN de PUTTE

CITY OF GLENDALE, ARIZONA

COUNCIL COMMUNICATION

CC NO.: 1978/79 - 179

DATE 1/5/79

TO: Honorable Mayor and Council

FROM: City Manager

SUBJECT: 208 AREAWIDE WASTEWATER TREATMENT MANAGEMENT SYSTEM

SUMMARY

I have attached for your review a document entitled, "Maricopa Association of Governments Water Quality Management Program." The contents of this report have been discussed with you as each segment has been prepared. This management system has been developed under the provisions of the Clean Water Act of Public Laws 92-500 and 95-217, and in compliance with these laws, all of the cities participating in the Areawide Wastewater Treatment Management System must pass a resolution agreeing to participate in said management program. We have prepared a resolution authorizing this participation.

The second part of the 208 program is a letter requesting designation of a Sub-regional Operating Group and a lead agency to implement the system. This Sub-regional Operating Group (SROG) will include Mesa, Tempe, Scottsdale, Youngtown, Gilbert, Glendale and Phoenix, with the latter being designated as the lead agency. A copy of the form letter to be utilized is attached.

RECOMMENDED ACTION

Passage of the resolution agreeing to participate in the Maricopa County Area Wastewater Treatment Management System, motion authorizing our membership in the Sub-regional Operating Group, and designating Phoenix as the lead agency.

S. F. Van de Putte

S. F. VAN DE PUTTE
CITY MANAGER

E X C E R P T

FROM THE MINUTES OF A REGULAR MEETING OF THE COUNCIL OF THE CITY OF GLENDALE, MARICOPA COUNTY, ARIZONA, HELD AT 7:30 P.M., TUESDAY, THE 9th DAY OF January, 1979.

VOLUME 1978/79 PAGE 125

208 Areawide Wastewater Treatment Management System

The City Manager had submitted to Council a document for review entitled Maricopa Association of Governments Water Quality Management Program. The Manager stated this management system has been developed under the provisions of the Clean Water Act of Public Laws 92-500 and 95-217, and in compliance with these laws each participating city in the Areawide Wastewater Treatment Management System is required to pass a resolution authorizing such participation.

The City Manager stated a motion authorizing the City's membership in the Sub-regional Operating Group and designating a Lead Agency for the Multi-Cities (SROG) Group is also required in letter form.

Resolution No. 1862 New Series was read by number and title only, it being A RESOLUTION OF THE COUNCIL OF THE CITY OF GLENDALE, MARICOPA COUNTY, ARIZONA, AGREEING TO PARTICIPATE IN THE MARICOPA COUNTY AREA WASTEWATER TREATMENT MANAGEMENT SYSTEM.

Motion by Heatwole, seconded by Asdell, to pass, adopt and approve Resolution No. 1862 New Series and authorize and direct the Mayor to sign the same. Motion carried unanimously.

TOWN OF YOUNGTOWN

12028 CLUBHOUSE SQUARE
YOUNGTOWN, ARIZONA 85363

[illegible] 933-8286

January 18, 1979

On January 18, 1979, the Mayor and Common Council of the Town of Youngtown, Arizona adopted the Areawide Wastwater Treatment Management System in Resolution No. 2047.

In order to implement the adopted management system, the MAG Regional Council if hereby requested to designate the Town of Youngtown as member of the Multi-Member Sub-Regional Operating Group. It is further requested that the City of Phoenix be designated as the Lead Agency of the Multi Member Sub-Regional Operating Group.

Cordially,

Norman B. Shrenk

Norman B. Shrenk, Mayor

JAN

RESOLUTION NO. 2047

A RESOLUTION OF THE MAYOR AND COMMON COUNCIL OF THE TOWN OF YOUNGTOWN, ARIZONA, AGREEING TO PARTICIPATE IN THE MARICOPA COUNTY AREA WASTEWATER TREATMENT MANAGEMENT SYSTEM.

WHEREAS, the Town of Youngtown is aware that Provisions of the Clean Water Act (Public Laws 92-500 and 95-217) Section 208 require development of an Areawide Water Quality Management Plan, and further, require the Governor of Arizona and the U.S. Environmental Protection Agency, Region IX, Administrator to designate official management agency(s) to carry out appropriate sections of the plan, and;

WHEREAS, the Maricopa Association of Governments has been designated by the Governor of Arizona and the U.S. Environmental Protection Agency, Region IX Administrator to prepare the Area Wide Water Qualtiy Management Plan for the Maricopa County Area in accordance with the provisions of Section 208, and:

WHEREAS, the Regional Council of the Maricopa Association of Governments has approved a Water Quality Management Plan and a Wasterwater Treatment Management System for the Maricopa County Area.

NOW THEREFORE, BE IT RESOLVED THAT THE Mayor and Common Council of the Town of Youngtown, Arizona agrees to carry out the appropriate duties and responsibilities identified in the Waste Treatment Management System Report approved by the Maricopa Association of Governments Regional Council on March 15, 1978.

WHEREAS, it is necessary for the preservation of the public peace, health and safety of the Town of Youngtown, Arizona, an emergency is hereby declared to exist and this resolution shall be effective immediately upon its passage and adoption and approval of the Mayor and Common Council of the Town of Youngtown, Arizoan.

PASSED AND ADOPTED, by the Mayor and Common Council of the Town of Youngtown, on this 18th day of January 1979.

APPROVED THIS 18th day of January 1979 by the affirmative vote of three-fourths of the members of the Common Council of the Town of Youngtown, Arizona.

Norman B. Shrenk, Mayor

ATTEST:

Lux B. Cayton, Town Clerk

TOWN of GILBERT
P.O. BOX 837 • GILBERT, ARIZONA 85234

January 17, 1979

MAG Regional Council
1820 West Washington Street
Phoenix, Arizona 85007

On January 16, 1979, the Mayor and Council of the Town of Gilbert adopted the Areawide Wastewater Treatment Management System, in Resolution No. 328.

In order to implement the adopted management system, the MAG Regional Council is hereby requested to designate the Town of Gilbert as a single member Sub-Regional Operating Group and Lead Agency.

In addition, the MAG Regional Council is hereby requested to designate the Town of Gilbert as a member of the Multi-Cities Sub-Regional Operating Group. It is further requested that the City of Phoenix be designated as the Lead Agency of the Multi-City Sub-Regional Operating Group.

Cordially,

TOWN OF GILBERT

Edward Lane

Edward Lane,
Mayor

lo

RESOLUTION NO. 328

AGREEMENT TO PARTICIPATE IN THE MARICOPA COUNTY AREA WASTEWATER TREATMENT MANAGEMENT SYSTEM

WHEREAS, the Town of Gilbert is aware that provisions of the Clean Water Act (Public Laws 92-500 and 95-217) Section 208 require development of an Areawide Water Quality Management Plan; and, further, require the Governor of Arizona and the U. S. Environmental Protection Agency, Region IX Administrator to designate official management agency(ies) to carry out appropriate sections of the plan; and,

WHEREAS, the Maricopa Association of Governments (MAG) has been designated by the Governor of Arizona, and the U. S. Environmental Protection Agency, Region IX Administrator to prepare the Areawide Water Quality Management Plan for the Maricopa County area in accordance with the provisions of Section 208; and,

WHEREAS, the Regional Council of the Maricopa Association of Governments (MAG) has approved a Water Quality Management Plan and a Wastewater Treatment Management System for the Maricopa County area.

NOW, THEREFORE, BE IT RESOLVED THAT THE MAYOR AND TOWN COUNCIL of Gilbert, Arizona, agrees to carry out the appropriate duties and responsibilities identified in the Waste Treatment Management System Report approved by the MAG Regional Council on March 15, 1978.

APPROVED this 16 day of January, 1979.

TOWN OF GILBERT

By Edward W. Lane
Mayor

ATTEST:

Liz Oldenkamp
Town Clerk

CITY OF PEORIA

MARICOPA COUNTY, ARIZONA

8355 W. PEORIA AVENUE
POST OFFICE BOX 38
PEORIA, ARIZONA 85345

DEPARTMENT: Mayor

MAG Regional Council
1820 W. Washington
Phoenix, Arizona

Gentlemen:

On December 26, 1978, the Mayor and Council of the City of Peoria, Arizona, adopted the Areawide Wastewater Treatment Management System in Resolution No. 78-40.

In order to implement the adopted management system, the MAG Regional Council [illegible] requested to designate the City of Peoria, Arizona, as a [illegible]ber of the Peoria-Tolleson Sub-Regional Operating Group. [illegible] further requ[illegible]ty of Tolleson, Arizona, be designated as the [illegible] Peoria-Tolleson Sub-Regional Operating Group.

Very truly yours,

CITY OF PEORIA

Robert K. [illegible]

RKH:cmw

RESOLUTION NO. 78-40

A RESOLUTION OF THE COUNCIL OF THE CITY OF PEORIA, ARIZONA, AGREEING TO PARTICIPATE IN THE MARICOPA COUNTY AREA WASTEWATER TREATMENT MANAGEMENT SYSTEM, AND DECLARING AN EMERGENCY.

BE IT RESOLVED BY THE MAYOR AND COUNCIL OF THE CITY OF PEORIA, ARIZONA:

WHEREAS, the City of Peoria, Arizona, is aware that Provisions of the Clean Water Act (Public Laws 92-500 and 95-217) Section 208 require development of an Areawide Water Quality Management Plan, and, further, require the Governor of Arizona and the U. S. Environmental Protection Agency, Region IX Administrator to designate official management agency(s) to carry out appropriate sections of the plan; and

WHEREAS, the Maricopa Association of Governments (MAG) has been designated by the Governor of Arizona, and the U. S. Environmental Protection Agency, Region IX Administrator, to prepare the Areawide Water Quality Management Plan for the Maricopa County area in accordance with the provisions of Section 208; and

WHEREAS, the Regional Council of the Maricopa Association of Governments (MAG) has approved a Water Quality Management Plan and a Wastewater Treatment Management System for the Maricopa County area.

NOW, THEREFORE, BE IT RESOLVED THAT THE MAYOR AND CITY COUNCIL OF PEORIA, ARIZONA, agree to carry out the appropriate duties and responsibilities identified in the Waste Treatment Management System Report approved by the MAG Regional Council on March 15, 1978.

WHEREAS, the immediate operation of the provisions of this Resolution is necessary for the preservation of the public peace, health and safety, an EMERGENCY is hereby declared to exist, and this Resolution shall be in full force and effect from and after its passage by the Council.

PASSED AND ADOPTED by the Mayor and Council of the City of Peoria, Arizona, this 26th day of December, 1978.

Mayor

ATTEST:

City Clerk

City of TOLLESON

9555 WEST VAN BUREN — TOLLESON, ARIZONA 85353
TELEPHONE: 936-1161 · 936-1871

OFFICE OF CITY MANAGER

January 12, 1979

Charles Salem, Chairman
MAG Regional Council
1820 W. Washintgon Street
Phoenix, Arizona 85007

Dear Mr. Salem:

You will please find enclosed two documents relating to the MAG 208 Water Quality Program which were approved at the Tolleson City COuncil Meeting on January 9, 1979.

First, the resolution (No. 330) agreeing to participate in the Maricopa County Area Wastewater Treatment Management System has been signed by the Mayor.

Second, is the letter designating the City of Tolleson as a member of the Tolleson Sub-Regional Operating Group.

If you have any questions, please do not hesitate to contact me.

Sincerely,

David M. Mansfield

David M. Mansfield
City Manager

DMM/lml

Enclosure

The CITY of TOLLESON

OFFICE OF THE MAYOR

January 12, 1979

MAG Regional Council
1820 W. Washington Street
Phoenix, Arizona 85007

Dear Councilmembers:

On January 9, 1979, the Mayor and Council of the City of Tolleson adopted the Areawide Wastewater Treatment Management System in Resolution No. 330.

In order to implement the adopted management system, the MAG Regional Council is hereby requested to designate the City of Tolleson as member of the Tolleson Sub-Regional Operating Group. It is further requested that City of Tolleson be designated as the Lead Agency of the Tolleson Sub-Regional Operating Group.

Cordially,

Mario J. Herrera

Mario J. Herrera, Mayor
City of Tolleson

MJH/lml

RESOLUTION 330

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF TOLLESON, MARICOPA COUNTY, ARIZONA, AGREEING TO PARTICIPATE IN THE MARICOPA COUNTY AREA WASTEWATER TREATMENT MANAGEMENT SYSTEM.

WHEREAS, the City of Tolleson is aware that Provisions of the Clean Water Act (Public Laws 92-500 and 95-217) Section 208 require development of an Areawide Water Quality Management Plan, and, further, require the Governor of Arizona and the U.S. Environmental Protection Agency, Region IX Administrator to designate official management agency(s) to carry out appropriate sections of the plan, and;

WHEREAS, the Maricopa Association of Governments (MAG) has been designated by the Governor of Arizona and the U.S. Environmental Protection Agency, Region IX Administrator to prepare the Areawide Water Quality Managemet Plan for the Maricopa County area.

WHEREAS, the Regional Council of the Maricopa Association of Governments (MAG) has approved a Water Quality Management Plan and a Wastewater Treatment Management System for the Maricopa County area.

NOW, THEREFORE, BE IT RESOLVED THAT THE MAYOR AND CITY COUNCIL, of Tolleson agrees to carry out the appropriate duties and responsibilities identified in the Waste Treatment Management System Report approved by the MAG Regional Council on March 15, 1978.

PASSED AND ADOPTED by the Mayor and Council of the City of Tolleson, Arizona, this 9th day of January, 1979.

APPROVED this 9th day of January, 1979.

Mario J. Herrera, Mayor

ATTEST:

Esther Angulo

Esther Angulo, City Clerk

APPROVED AS TO FORM:

Donald J. Kerney, City Attorney

TOWN OF GOODYEAR ARIZONA INCORPORATED 1946 • 119 North Litchfield Road

MAYOR
Charles H. Salem
VICE-MAYOR
John E. Winter
COUNCIL MEMBERS
Chauncey B. Coor
Barbara W LaPrade
John N. Maxwell
Kenneth J. Thomas
Ilo Gregory
TOWN MANAGER
E.W. Kleinschmidt
TOWN ATTORNEY
F Britton Burns
932-3910
932-3911
932-1220

March 12, 1979

MAG REGIONAL COUNCIL
1820 W. Washington
Phoenix, AZ 85007

Dear Councilmembers:

On March 12, 1979, the Mayor and Council of the Town of Goodyear, adopted the Areawide Wastewater Treatment Management System in Resolution No. 155.

In order to implement the adopted management system, the MAG Regional Council is hereby requested to designate the Town of Goodyear as a member of the Avondale/Goodyear Sub-Regional Operating Group. It is further requested that the Town of Goodyear be designated as the Lead Agency of the Avondale/Goodyear Sub-Regional Operating Group.

Cordially,

Charles H. Salem

CHARLES H. SALEM,
Mayor

MAR 1979

RESOLUTION NO. 155

RESOLUTION AGREEING TO PARTICIPATE IN THE MARICOPA COUNTY AREA WASTEWATER TREATMENT MANAGEMENT SYSTEM.

WHEREAS the Town of Goodyear is aware that Provisions of Clean Water Act (Public Laws 92-500 and 95-217) Section 208 require development of an Areawide Water Quality Management Plan, and, further, require the Governor of Arizona and the U. S. Environmental Protection Agency, Region IX Administrator to designate official management agency (s) to carry out appropriate sections of the plan, and;

WHEREAS the Maricopa Association of Governments (MAG) has been designated by the Governor of Arizona, and the U. S. Environmental Protection Agency, Region IX Administrator to prepare the Areawide Water Quality Management Plan for the Maricopa County area in accordance with the provisions of Section 208, and;

WHEREAS the Regional Council of the Maricopa Association of Governments (MAG) has approved a Water Quality Management Plan and a Wastewater Treatment Management System for the Maricopa County area.

NOW, THEREFORE BE IT RESOLVED THAT THE MAYOR AND TOWN COUNCIL, OF THE TOWN OF GOODYEAR agree to carry out the appropriate duties and responsibilities identified in the Waste Treatment Management System Report approved by the MAG Regional Council on March 15, 1978.

APPROVED THIS 8th day of January 1979

Charles H. Salem

CHARLES H. SALEM, MAYOR

ATTEST:

Jean Bailey

JEAN BAILEY, TOWN CLERK

After recording, return to:
Douglas A. Jorden, Town Attorney
6401 E. Lincoln Dr.
Paradise Valley, AZ 85253

RESOLUTION 289

A RESOLUTION OF THE MAYOR AND COMMON COUNCIL OF THE TOWN OF PARADISE VALLEY, ARIZONA, AGREEING TO PARTICIPATE IN THE MARICOPA COUNTY AREA WASTEWATER TREATMENT MANAGEMENT SYSTEM

WHEREAS, the Town of Paradise Valley is aware that Provisions of the Clean Water Act (Public Laws 92-500 and 95-217) Section 208 require development of an Areawide Water Quality Management Plan, and, further, require the Governor of Arizona and the U.S. Environmental Protection Agency, Region IX Administrator to designate official management agency(s) to carry out appropriate sections of the plan, and;

WHEREAS, the Maricopa Association of Governments (MAG) has been designated by the Governor of Arizona, and the U. S. Environmental Protection Agency, Region IX Administrator to prepare the Areawide Water Quality Management Plan for the Maricopa County area in accordance with the provisions of Se[illegible]n 208, and;

WHEREAS, the Regional Council of the Maricopa Association of Governments (MAG) has approved a Water Quality Management Plan and Wastewater Treatment Management System for the Maricopa County area.

NOW, THEREFORE, BE IT RESOLVED by the Mayor and Common Council of the Town of Paradise Valley, Arizona, that the Town of Paradise Valley agrees to carry out the appropriate duties and responsibilities identified in the Wastewater Treatment Management System Report approved by the MAG Regional Council on March 15, 1978.

PASSED AND ADOPTED by the Mayor and Common Council of the Town of Paradise Valley, Arizona, this 25th day of January, 1979.

Barbara vonAmmon
Barbara vonAmmon, Mayor

ATTEST:

Mary Ann Brines
Mary Ann Brines, Town Clerk

APPROVED AS TO FORM:

Douglas A. Jorden
Douglas A. Jorden, Town Attorney

CITY OF PHOENIX • OFFICE OF THE MAYOR

MARGARET T. HANCE
MAYOR

January 9, 1979

Mayor Charles Salem, President
MAG Regional Council
Mayor of Goodyear
1820 West Washington
Phoenix, AZ 85007

Dear ~~Mayor Salem:~~ Charlie:

On January 9, 1979, the Mayor and Council of the City of Phoenix adopted the Areawide Wastewater Treatment Management System in Resolution #15113.

In order to implement the adopted management system, the MAG Regional Council is hereby requested to designate the City of Phoenix as a member of the Multi-City Sub-Regional Operating Group. It is further requested that the City of Phoenix be designated as the Lead Agency of the Multi-City Sub-Regional Operating Group.

Cordially,

Margie

Margaret T. Hance
MAYOR

RESOLUTION NO. 99

A RESOLUTION OF THE TOWN OF SURPRISE AGREEING TO PARTICIPATE IN THE MARICOPA COUNTY AREA WASTEWATER TREATMENT MANAGEMENT SYSTEM.

WHEREAS the Town of Surprise is aware that Provisions of the Clean Water Act (Public Laws 92-500 and 95-217) Section 208 require development of an Areawide Water Quality Management Plan, and further, require the Governor of Arizona and the U.S. Environmental Protection Agency, Region IX Administrator to designate official management agency(s) to carry out appropriate sections of the plan, and;

WHEREAS the Maricopa Association of Governments (MAG) has been designated by the Governor of Arizona, and the U.S. Environmental Protection Agency, Region IX Administrator to prepare the Areawide Water Quality Management Plan for the Maricopa County area in accordance with the provisions of Section 208, and;

WHEREAS the Regional Council of the Maricopa Association of Governments (MAG) has approved a Water Quality Managment Plan and a Wastewater Treatment Management System for the Maricopa County area,

NOW, THEREFORE BE IT RESOLVED THAT THE Mayor and Common Council of the Town of Surprise agree to carry out the appropriate duties and responsibilities identified in the Waste Treatment Management System Report approved by the MAG Regional Council on March 15, 1978.

Approved this 11th day of January, 1979.

George Cumbie
MAYOR

ATTEST:

Lorena Luttrell
TOWN CLERK

APPROVED AS TO FORM:

TOWN ATTORNEY

SAMPLE RESOLUTION #173

RESOLUTION: AGREEING TO PARTICIPATE IN THE MARICOPA COUNTY AREA WASTEWATER TREATMENT MANAGEMENT SYSTEM

WHEREAS the (City), (Town), of El Mirage is aware that Provisions of the Clean Water Act (Public Laws 92-500 and 95-217) Section 208 require development of an Areawide Water Quality Management Plan, and, further, require the Governor of Arizona and the U.S. Environmental Protection Agency, Region IX Administrator to designate official management agency(s) to carry out appropriate sections of the plan, and;

WHEREAS the Maricopa Association of Governments (MAG) has been designated by the Governor of Arizona, and the U.S. Environmental Protection Agency, Region IX Administrator to prepare the Areawide Water Quality Management Plan for the Maricopa County area in accordance with the provisions of Section 208, and;

WHEREAS the Regional Council of the Maricopa Association of Governments (MAG) has approved a Water Qualtiy Management Plan and a Wastewater Treatment Management System for the Maricopa County area.

NOW, THEREFORE BE IT RESOLVED THAT THE (MAYOR AND TOWN COUNCIL), (MAYOR AND CITY COUNCIL), of El Mirage agrees to carry out the appropriate duties and responsibilities identified in the Waste Treatment Management System Report approved by the MAG Regional Council on March 15, 1978.

Approved this [illegible] day of [illegible] 19 [illegible]

[illegible signature] [illegible signature]

MARICOPA ASSOCIATION OF GOVERNMENTS 12/13/78

Office of The Mayor

MESA

WAYNE C. POMEROY

January 16, 1979

MAG REGIONAL COUNCIL
Maricopa Association of
Governments
1820 West Washington
Phoenix, Arizona 85007

Dear Council Members:

On January 8, 1979, the Mayor and Council of the City of Mesa adopted the Areawide Wastewater Treatment Management System in Resolution #4335.

In order to implement the adopted management system, the MAG Regional Council is hereby requested to designate the City of Mesa as a member of the Multi-City Sub-Regional Operating Group. It is further requested the the City of Phoenix be designated as the Lead Agency of the Multi-City Sub-Regional Operating Group.

Sincerely,

Wayne C. Pomeroy

WAYNE C. POMEROY
Mayor

WCP:mw

JAN 1

CITY OF MESA, ARIZONA • 55 NORTH CENTER STREET • P. O. BOX 1466 • 85201 • (602) 834-2388

Certificate of CITY CLERK

MESA

I, DORTHE M. DANA, THE DULY APPOINTED AND QUALIFIED CITY CLERK OF THE CITY OF MESA, MARICOPA COUNTY, ARIZONA, DO HEREBY CERTIFY THAT THE ATTACHED COPY OF RESOLUTION NO. 4335, ENTITLED:

RESOLUTION NO. 4335

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MESA, MARICOPA COUNTY, ARIZONA, AGREEING TO PARTICIPATE IN THE MARICOPA COUNTY AREA WASTEWATER TREATMENT MANAGEMENT SYSTEM

IS A TRUE, CORRECT AND COMPARED COPY OF THE ORIGINAL OF RECORD, AND ON FILE IN THE OFFICE OF THE CITY CLERK OF THE CITY OF MESA, ARIZONA.

IN WITNESS WHEREOF, I HAVE HEREUNTO SET MY HAND AND SEAL OF THE CITY OF MESA, MARICOPA COUNTY, STATE OF ARIZONA, THIS 9th DAY OF January, 19 79.

Dorthe Dana

DORTHE M. DANA, CITY CLERK

RESOLUTION NO. 101

A RESOLUTION OF THE MAYOR AND COMMON COUNCIL OF THE TOWN OF GUADALUPE, MARICOPA COUNTY, ARIZONA AGREEING TO PARTICIPATE IN THE MARICOPA COUNTY AREA WASTEWATER TREATMENT MANAGEMENT SYSTEM.

WHEREAS the Town of Guadalupe, Arizona is aware that Provisions of the Clean Water Act (Public Laws 92-500 and 95-217) Section 208 require development of an Areawide Water Quality Management Plan, and, further, require the Governor of Arizona and the U.S. Environmental Protection Agency, Region IX Administrator to designate official management agency(s) to carry out appropriate sections of the plan, and;

WHEREAS the Maricopa Association of Governments (MAG) has been designated by the Governor of Arizona, and the U.S. Environmental Protection Agency, Region IX Administrator to prepare the Areawide Water Quality Management Plan for the Maricopa County area in accordance with the provisions of Section 208, and;

WHEREAS the Regional Council of the Maricopa Association of Governments (MAG) has approved a Water Quality Management Plan and a Wastewater Treatment Management System for the Maricopa County area.

NOW, THEREFORE BE IT RESOLVED THAT THE MAYOR AND TOWN COUNCIL, of the Town of Guadalupe, Arizona agree to carry out the appropriate duties and responsibilities identified in the Waste Treatment Management system Report approved by the MAG Regional Council on March 15, 1978.

PASSED AND ADOPTED BY the Counicl of the Town of Guadalupe, Arizona this 11th day of January, 1979.

Frank T. Castro Sr.
Mayor

ATTEST:

Francisco M. Ordo
Town Clerk

APPROVED AS TO FORM:

Jerry Levine
Town Attorney

RESOLUTION NO. 135

RESOLUTION AGREEING TO PARTICIPATE IN THE MARICOPA COUNTY AREA WASTEWATER TREATMENT MANAGEMENT SYSTEM.

WHEREAS the Town of Goodyear is aware that Provisions of Clean Water Act (Public Laws 92-500 and 95-217) Section 208 require development of an Areawide Water Quality Management Plan, and, further, require the Governor of Arizona and the U. S. Environmental Protection Agency, Region IX Administrator to designate official management agency (s) to carry out appropriate sections of the plan, and;

WHEREAS the Maricopa Association of Governments (MAG) has been designated by the Governor of Arizona, and the U. S. Environmental Protection Agency, Region IX Administrator to prepare the Areawide Water Quality Management Plan for the Maricopa County area in accordance with the provisions of Section 208, and;

WHEREAS the Regional Council of the Maricopa Association of Governments (MAG) has approved a Water Quality Management Plan and a Wastewater Treatment Management System for the Maricopa County area.

NOW, THEREFORE BE IT RESOLVED THAT THE MAYOR AND TOWN COUNCIL, OF THE TOWN OF GOODYEAR agree to carry out the appropriate duties and responsibilities identified in the Waste Treatment Management System Report approved by the MAG Regional Council on March 15, 1978.

APPROVED THIS 8th day of January 1979

Charles H. Salem

CHARLES H. SALEM, MAYOR

ATTEST:

Jean Bailey

JEAN BAILEY, TOWN CLERK

TOWN OF WICKENBURG

P.O. BOX 1269 – WICKENBURG, ARIZONA 85358
TELEPHONE: (602) 684-5451

January 19, 1979

Maricopa Association of Governments
1820 W. Washington
Phoenix, Arizona

Dear Bill:

On December 28, 1978, the Mayor and Common Council of the Town of Wickenburg, Arizona adopted the Areawide Wastewater Treatment Management System in Resolution 643.

In order to implement the adopted management system, the MAG Regional Council is hereby requested to designate the Town of Wickenburg, Arizona as a single member Sub-Regional Operating Group and Lead Agency.

Cordially,

Richard C. Stone
Mayor

RESOLUTION NUMBER 693

A RESOLUTION OF THE TOWN OF WICKENBURG AGREEING TO PARTICIPATE IN THE MARICOPA COUNTY AREA WASTEWATER TREATMENT MANAGEMENT SYSTEM.

WHEREAS: The Town of Wickenburg is aware that Provisions of the Clean Water Act (Public Laws 92-500 and 95-217) Section 208 require development of an Areawide Water Quality Management Plan, and, further, require the Governor of Arizona and the U.S. Environmental Protection Agency, Region IX Administrator to designate official management agencys to carry out appropriate sections of the plan, and;

WHEREAS: The Maricopa Association of Governments (MAG) has been designated by the Governor of Arizona, and the U.S. Environmental Protection Agency, Region IX Administrator to prepare the Areawide Water Quality Management Plan for the Maricopa County area in accordance with the provisions of Section 208, and;

WHEREAS: The Regional Council of the Maricopa Association of Governments (MAG) has approved a Water Quality Management Plan and a Wastewater Treatment Management System for the Maricopa County area.

NOW, THEREFORE BE IT RESOLVED THAT THE MAYOR AND COMMON COUNCIL OF THE TOWN OF WICKENBURG, ARIZONA, agrees to carry out the appropriate duties and responsibilities identified in the Waste Treatment Management System Report approved by the MAG Regional Council on March 15, 1978.

PASSED AND ADOPTED BY THE MAYOR AND COMMON COUNCIL OF THE TOWN OF WICKENBURG, ARIZONA, this 28th day of December, 1978.

TOWN OF WICKENBURG

Richard C. Stone

RICHARD C. STONE, MAYOR

ATTEST:

MARVIN E. MILLSAP, TOWN CLERK

APPROVED AS TO FORM:

Alice Albright

DIDDY & WRIGHT, TOWN ATTORNEYS

a. Identify projects for inclusion in the Areawide Waste Treatment Management Plan.

b. Operate the treatment plants and pump stations to insure compliance with NPDES (National Pollution Discharge Eliminations System) permits and water quality criteria.

c. Maintain plants and pump stations in operable condition and good appearance.

d. Insure adequately trained and certified staff for plant operation.

e. Conduct monitoring program for treatment facilities for compliance with permits and reuse needs.

f. Conduct monitoring program for community and industrial discharges to the system.

g. Review monitoring data to insure compliance with applicable EPA and State of Arizona standards.

h. Coordinate with U.S. Environmental Protection Agency and State Department of Health Services and Maricopa County Health Department on monitoring and enforcement provisions.

i. Work with Maricopa Association of Governments members and staff to insure uniformity in integration of the various wastewater management functions.

j. Refuse to receive wastes from agencies, or subdivisions not in compliance with the adopted Areawide Waste Treatment Management Plan.

Resolution No. 10-78

k. Assure that each participating community pay its proportionate share of treatment costs.

Approved this 19th day of December 1978.

John B. Hawley
Mayor

ATTEST:

Steven L. Thompson
Town Manager / Clerk

Municipal Building

City of Chandler

OFFICE OF THE MAYOR

200 E Commonwealth Avenue
Chandler, Arizona 85224

January 12, 1979

Charles H. Salem, Mayor, Goodyear
Chairman, Maricopa Assn. of Governments
Regional Council
1820 West Washington
Phoenix, AZ 85007

Dear Mayor Salem:

On January 11, 1979, the Mayor and Council of the City of Chandler adopted the Areawide Wastewater Treatment Management System in Resolution #809.

In order to implement the adopted management system, the MAG Regional Council is hereby requested to designate the City of Chandler as a single member Sub-Regional Operating Group and Lead Agency.

Cordially,

Kenneth Thomas
Mayor

RESOLUTION NO. 809

CITY OF CHANDLER PARTICIPATION

COUNTY AREA WASTEWATER TREATMENT MANAGEMENT SYSTEM

WHEREAS the City of Chandler is aware that Provisions of the Clean Water Act (Public Laws 92-500 and 92-217) Section 208 require development of an Areawide Water Quality Management Plan, and, further, require the Governor of Arizona and the U.S. Environmental Protection Agency, Region IX Administrator to designate official management agency(s) to carry out appropriate sections of the plan, and;

WHEREAS the Maricopa Association of Governments (MAG) has been designated by the Governor of Arizona, and the U.S. Environmental Protection Agency, Region IX Administrator to prepare the Areawide Water Quality Management Plan for the Maricopa County area in accordance with the provisions of Section 208, and;

WHEREAS the Regional Council of the Maricopa Association of Governments (MAG) has approved a Water Quality Management Plan and a Wastewater Treatment Management System for the Maricopa County area.

NOW, THEREFORE BE IT RESOLVED that the City Council of the City of Chandler agrees to carry out the appropriate duties and responsibilities identified in the Waste Treatment Management System Report approved by the MAG Regional Council on March 15, 1978.

PASSED AND APPROVED by the City Council of the City of Chandler, this 11th day of January, 1979.

MAYOR

ATTEST: Helen McCain

CITY CLERK

C E R T I F I C A T I O N

I HEREBY CERTIFY that the above and foregoing Resolution No. 809 was duly passed and adopted by the City Council of the City of Chandler, Arizona, at a regular meeting held on the 11th day of January, 1979, and that a quorum was present thereat.

Helen McCain

CITY CLERK

TOWN OF GILA BEND

P. O. DRAWER I GILA BEND, ARIZONA, 85337 TELEPHONE 602-683-2435

January 10, 1979

Regional Council
Maricopa Association of Governments
1820 West Washington Street
Phoenix, AZ 85007

Gentlemen:

On 9 January 1979, the Mayor and Council of the Town of Gila Bend adopted the Areawide Wastewater Treatment Management System in Resolution No. 185, copy enclosed.

In order to implement the adopted management system, the MAG Regional Council is hereby requested to designate the Town of Gila Bend as a single member Sub-Regional Operating Group and Lead Agency.

Cordially,

Jerry C. Roberson

Jerry C. Roberson
Mayor

JCR:DCH:dh
Enclosure

RESOLUTION NO. 185

RESOLUTION: AGREEING TO PARTICIPATE IN THE MARICOPA COUNTY AREA WASTEWATER TREATMENT MANAGEMENT SYSTEM

WHEREAS the Town of Gila Bend, Maricopa County, Arizona, is aware that Provisions of the Clean Water Act (Public Laws 92-500 and 95-217) Section 208 require development of an Areawide Water Quality Management Plan, and, further, require the Governor of Arizona and the U.S. Environmental Protection Agency, Region IX Administrator to designate official management agency(s) to carry out appropriate sections of the plan, and;

WHEREAS the Maricopa Association of Governments (MAG) has been designated by the Governor of Arizona, and the U.S. Environmental Protection Agency, Region IX Administrator to prepare the Areawide Water Quality Management Plan for the Maricopa County area in accordance with the provisions of Section 208, and;

WHEREAS the Regional Council of the Maricopa County Association of Governments (MAG) has approved a Water Quality Management Plan and a Wastewater Treatment Management System for the Maricopa County area.

NOW, THEREFORE BE IT RESOLVED THAT THE MAYOR AND TOWN COUNCIL, of the Town of Gila Bend agrees to carry out the appropriate duties and responsibilities identified in the Waste Treatment Management System Report approved by the MAG Regional Council on March 15, 1978.

Approved this 9th day of January 1979.

Jerry C. Roberson

Jerry C. Roberson, Mayor

ATTEST

David C. Haynes

David C. Haynes, Town Clerk

RESOLUTION NO. 10-78

RESOLUTION AGREEING TO PARTICIPATE IN THE MARICOPA COUNTY AREA WASTE TREATMENT MANAGEMENT SYSTEM.

WHEREAS, the Town of Buckeye is aware that provisions of the Federal Water Pollution Control Act of 1972, (Public Law 92-500) Section 208 require development of an Areawide Waste Treatment Management Plan and, further, require the State of Arizona Water Quality Control Council, the Governor of Arizona and the U.S. Environmental Protection Agency, Region IX administrator to designate official management agency(s) to carry out appropriate sections of the law, and;

WHEREAS, the Maricopa Association of Governments (MAG) has been designated by the Governor of Arizona and the U.S. Environmental Protection Agency Region IX Administrator as the agency responsible for preparing the Areawide Waste Treatment Management Plan in accordance with provisions of Section 208 of Public Law 92-500, and:

WHEREAS, the Regional Council of the Maricopa Association of Governments (MAG) has approved a Waste Treatment Management System Plan for the Maricopa County Area, and;

WHEREAS THE Maricopa Association of Governments (MAG) was formed by local governments of the Maricopa County Area to study area-wide problems and facilitate the development of solutions to joint and interrelated problems.

NOW, THEREFORE BE IT RESOLVED THAT THE MAYOR AND TOWN COUNCIL OF THE TOWN OF BUCKEYE hereby:

1. Request the Maricopa Association of Governments to undertake the following duties and responsibilities for the Maricopa County Area:

   a. Adopt and assure implementation of the Areawide Waste Treatment Management Plan.

b. Assure the effective management of waste treatment works and related facilities in conformance with the plan.

c. Assure in implementation of an Areawide Waste Treatment Management Plan that each participating community pay its proportionate share of treatment costs.

d. Adopt construction priorities for Waste Treatment facilities for the region and make recommendations to the State of Arizona.

e. Adopt an annual update of the Waste Treatment Management Plan.

f. Arbitrate disagreements among local governments or private agencies for non-compliance with the adopted Waste Treatment Management Plan.

g. Make recommendations to the State of Arizona and U.S. EPA on water quality and reuse standards and regulations.

h. Authorize Subregional Operating Groups, designate members of each group and approve selection of "Lead Agency."

i. Approve industrial waste standards for the Region.

j. Coordinate public information programs on waste treatment management.

k. Coordinate communication between local governments and private agencies with U.S. EPA and State of Arizona agencies regarding Waste Treatment Management.

2. Reguest the MAG Regional Council to designate the Town of Buckeye as the single member of the Sub-Regional Operating Group.

3. Agree to carry out the following duties and responsibilities as the Sub-Regional Operating Group.

APPENDIX D

Arizona Department of Environment Quality

Arizona Water Quality Assessment 1992 - excerpts

D. Middle Gila River Basin

The Middle Gila River Basin (MAP 11) encompasses an area of approximately 12,150 square miles, and includes the Phoenix metropolitan area. Almost two-thirds of the State's population resides in this basin. The historical land use in the Middle Gila Basin was agricultural; however, in the metropolitan area agriculture has been displaced by 30 years of almost exponential population growth. Surface water diversions in the Gila River and the Salt River for agricultural and urban uses have left the streambeds in the Phoenix area dry. The basin receives limited rainfall. Surface water flow in this basin is attributable to releases from upstream impoundments, effluent from wastewater treatment plants, and/or agricultural return flows.

The Arizona Department of Health Services released a report in 1991 entitled "Risk Assessment for Recreational Usage of the Painted Rocks Borrow Pit Lake at Gila Bend, Arizona". This report indicated that excess lifetime cancer risk could result from long-term consumption of fish from this impoundment and upstream along Gila River. As a result, a fish consumption advisory was issued on October 3, 1991, warning people not to eat fish, turtles, crayfish or other aquatic organisms from portions of the Salt and Gila rivers. Camping, boating, fishing, other recreational uses and public access have been prohibited since the Painted Rocks Lake State Park was closed in January, 1989. Management of the area has reverted to the U.S. Army Corps of Engineers and the Bureau of Land Management through actions by the State Parks Board. These two federal agencies are considering proposals to reopen the lake facilities to the public.

Portions of the federal Superfund site located at Phoenix's 19th Avenue Landfill are located within the 100-year floodplain of the Salt River. Flooding in 1979 raised the water table, filled several disposal pits, breached several dikes, and washed refuse into the river. Refuse in the landfill contains volatile organic compounds and pesticides; the soil contains VOCs, polychlorinated biphenyls (PCBs), and pesticides; the groundwater contains VOCs, heavy metals, and beta radiation; and excessive methane gas is being produced. Earthen berms have been constructed to mitigate further surface water contamination. Cleanup of this site is to begin as soon as the design phase is completed (EPA, Sept. 1990).

In the spring of 1992, the Salt River flooded and inundated a landfill on the Salt River Indian Reservation, that served several cities in the Phoenix metropolitan area. This resulted in degradation of the Salt River. This event was not considered during this assessment, because it occurred after the period of record for this report (Water Year 1991).

The U.S. Army Corps of Engineers initiated a feasibility study, known as Tres Rios, for seven miles of the Salt and Gila rivers below the 91st Avenue Wastewater Treatment Plant. The project considers flood control benefits of supplying water to a created wetland that would serve as a water improvement treatment technique.

Surface water (McKellips Lake) within the Indian Bend Wash federal Superfund site is contaminated by VOCs. In this 12 square mile Superfund site, VOCs, cyanide, acids, and heavy metals from several industrial facilities have contaminated soils. Groundwater is contaminated with VOCs, boron, methane, chloroform, lead and zinc. Further studies are taking place and cleanup activities are being planned (EPA, Sept. 1990).

Total dissolved solids exceed 1000 mg/l on the Gila River below San Carlos Reservoir. At a downstream monitoring station, near the Gila River Indian Community, TDS ranged between 7160-9090 mg/l in 1990. Elevated salts and high boron are attributed to the agricultural return flows from Broadacres Farm on the Gila Indian Reservation near St. Johns. Broadacres Farm utilizes City of Chandler effluent and shallow saline groundwater to irrigate saline soils. The high levels of TDS did not affect the assessment of this reach, because it is not protected for Agricultural Irrigation or Domestic Water Source uses; nonetheless, this contamination may contribute to downstream irrigation limitations.

The Gibson Mine is located on a ridge separating the Salt River Basin and Middle Gila River Basin. mine produced high grade copper ore between 1906-1918, until the underground workings apparently collapsed. Since then the mine has been operated sporadically to produce copper from the ore dumps. Loadstar Minerals, Inc. filed a notice of disposal at the Gibson Mine site with ADEQ in July of 1988, and began operating two leaching activities. One is the leaching of waste ore dumps; the other is the leaching of ores *in situ* through the mine workings, down 500 feet into collection tanks at the base of an old mine tunnel. Four impoundments, with plastic liners resting on sand, hold various precipitation liquids. In response to a complaint, investigations by ADEQ revealed that mining operations at this facility are contaminating streams in both watersheds. Samples taken along a tributary of Mineral Creek revealed that designated uses would be impaired by cadmium, copper, zinc, manganese and low pH. (See also the Gibson Mine discussion in the Salt River Basin.)

Three separate ponds with leachate solution overflowed during heavy rains in 1990 at ASARCO's Ray Mine along Mineral Creek. All ponds containing leachate solution were protected by a back-up holding ponds; however, as a result of heavy rainfall, the back-up system also overflowed. An 18 mile long plume, contaminated with copper, phosphorus, sulfates, and suspended solids, flowed into the Gila River.

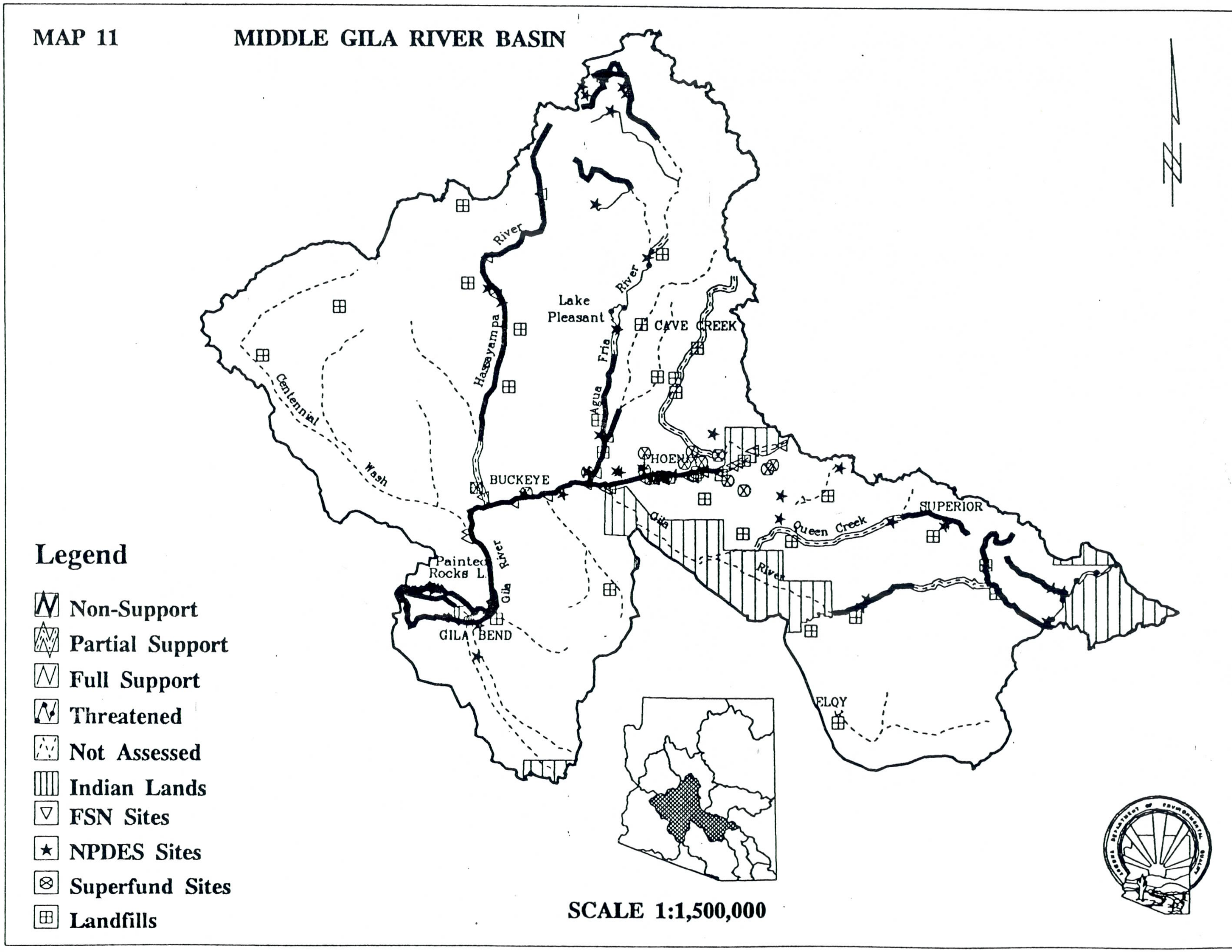
Abandoned mines have contaminated surface water, groundwater and streambed sediments in several locations in this watershed. The abandoned Phoenix and Maricopa Mines and other operations along Cave Creek have discharged ore and tailings into this ephemeral wash, as evidenced by elevated chromium and lead in sediment samples. Surface water monitoring along Turkey Creek (a tributary of the Agua Fria River) at Golden Belt Mine exhibited contamination by arsenic, cadmium, copper, cyanide, lead and mercury. Monitoring results from the Agua Fria River headwaters indicated the following mining contamination: copper and mercury near Arizona Victory Mine, copper and zinc at Walker Mine, mercury at Knapp Gulch, copper at Transcendent Mine, and cyanide, sulfate, arsenic, boron, cadmium, chromium, copper, manganese, lead, zinc, and TDS at McCabe/Gladstone Mine. Water quality monitoring along the headwaters of the Hassayampa River indicated the following additional water quality problems: cadmium, copper, and zinc, and low pH values at Senator Mine and Cash Mine, mercury and low dissolved oxygen at Holiday Girl Mine, and turbidity at Wagoner mine. Samples taken near the confluence of the French and Zonia Gulches below the Zonia Mine indicated soil contamination by chromium, copper and lead. Spring water samples at Zonia Mine were polluted with cadmium, copper, fluoride, manganese, mercury, zinc, sulfate, and TDS, and had a low pH.

Results of water quality monitoring conducted at Lynx Lake (headwaters of the Agua Fria River) in 1978 (Sommerfeld, et al., 1979) indicated that mining wastes were being transported into this lake. Subsequent monitoring data have not been reported for Lynx Lake. Mine drainage is also a threat to Lake Pleasant further downstream. Lake Pleasant is being renovated to create a primary drinking water reservoir for the Phoenix metropolitan area.

An ADEQ hazardous materials investigation of auto shredder materials in the ephemeral New River streambed revealed sediment adulteration by cadmium and lead.

Groundwater and soil have been reported as contaminated with VOCs at Luke Air Force Base (near the Aqua Fria River). Surface drainage canals receiving oily wastes, a sewage treatment plant effluent canal, and an abandoned surface impoundment are being investigated at this site (EPA, 1990). Luke Air Force Base has also been in non-compliance with the NPDES permit for many years. Since 1990, discharge limitations have been frequently exceeded for boron, phenols, ammonia, metals, biological oxygen demand, soluble solids, toxicity, sulfide, and fecal coliform.

Several other NPDES permits are chronically in non-compliance in this watershed (see **APPENDIX C**). Toxic monitoring in the Salt River by the City of Phoenix in 1989 indicated several toxics that exceeded water quality standards. Priority pollutant data on water, fish, and sediment were collected annually along the lower Salt River and the middle Gila River at different locations for more than 10 years. However, this data has not yet been interpreted.


MAP 11
MIDDLE GILA RIVER BASIN
Hassayampa River
Lake Pleasant
Agua Fria River
CAVE CREEK
Centennial Wash
BUCKEYE
PHOENIX
SUPERIOR
Queen Creek
Gila River
Painted Rocks L.
GILA BEND
ELOY
Legend
Non-Support
Partial Support
Full Support
Threatened
Not Assessed
Indian Lands
FSN Sites
NPDES Sites
Superfund Sites
Landfills
SCALE 1:1,500,000

RIVERS ASSESSMENT: MIDDLE GILA RIVER BASIN (All size units in miles)

Rivers Assessed: 41 **Monitored:** 10 **Evaluated:** 31

DESIGNATED USE SUPPORT SUMMARY

DEGREE OF SUPPORT	ASSESSMENT BASIS		
	Evaluated	Monitored	Total
Full Supported	47.3		47.3
Threatened	27.0	4.1	31.1
Partial Support	152.7		152.7
Not Supported	254.3	177.1	431.4
Total Size Assessed	481.3	181.2	662.5

USE SUPPORT SUMMARY

USE	FULL SUPPORT	THREATENED	PARTIAL SUPPORT	NOT SUPPORTED
Overall	47.3	31.1	152.7	431.4
Aquatic Life	47.3	31.1	152.7	402.6
Swimming	14.5	31.1	16.3	67.3
Drinking			43.2	17.1
AG-Irrigation	132.9	4.1	116.8	255.2
AG-Livestock	140.9	14.7	64.8	215.4
Incidental Human Contact	35.9		70.1	222.8
Effluent Dominated Water			44.6	

305(b) RELATIVE ASSESSMENT OF SOURCES

SOURCE CATEGORIES	IMPACT
Hydromodification	296.0
Agriculture	294.8
Resource Extraction	229.8
Municipal Point Source	168.9
Urban Runoff/Storm sewers	165.9
Industrial Point Source	69.1
Land Disposal	102.2
Source Unknown	35.8
Construction	8.1
Silviculture	1.2

305(b) RELATIVE ASSESSMENT OF CAUSES

CAUSE CATEGORIES	IMPACT
Metals	356.0
Turbidity	172.2
Suspended Solids	116.9
Pesticides	145.3
Salinity/TDS	94.8
Priority Organics	89.7
Dissolved Oxygen	74.1
Nutrients	54.2
Un-ionized Ammonia	43.2
pH	31.5
Pathogens	21.6

LAKES ASSESSMENT: MIDDLE GILA RIVER BASIN (All size units in acres)

Lakes Assessed: 22 Monitored: 3 Evaluated: 3

DESIGNATED USE SUPPORT SUMMARY

DEGREE OF SUPPORT	ASSESSMENT BASIS		
	Evaluated	Monitored	Total
Full Supported			
Threatened		1,027	1,027
Partial Support	55		55
Not Supported	30	689	719
Total Size Assessed	85	1,716	1,801

305(b) RELATIVE ASSESSMENT OF SOURCES

SOURCE CATEGORIES	IMPACT
Resource Extraction	1,595
Hydromodification	225
Source Unknown	195
Urban Runoff/Storm Sewers	176
Industrial Point Sources	170
Municipal Point Source	170
Agriculture	170
Land Disposal	6

USE SUPPORT SUMMARY

USE	FULL SUPPORT	THREATENED	PARTIAL SUPPORT	NOT SUPPORTED
Overall		1,027	55	719
Aquatic Life		1,027	55	719
Swimming		1,027	55	513
Drinking	55			
AG-Irrigation	55	1,540		176
AG-Livestock	55	1,540		176
Incidental Human Contact	25			181

305(b) RELATIVE ASSESSMENT OF CAUSES

CAUSE CATEGORIES	IMPACT
Suspended Solids	513
Metals	225
Priority Organics	176
Nonpriority Organics	170
Pesticides	170
Salinity/TDS	170
Dissolved Oxygen	170
Siltation	55
pH	55
Un-ionized Ammonia	25
Nutrients	6
Noxious Aquatic Plants	6

MIDDLE GILA RIVER BASIN

WATERBODY NAME AND LOCATION DESCRIPTION	WATERBODY NUMBER	MILES OR ACRES	MONITORED OR EVALUATED	USE SUPPORT STATUS	COMMENTS
Gila River, San Carlos-Dripping Spr	AZ15050100-010	16.4 M	E	Threat	Off Gila on Mescal Creek: BLM 1 sample 1990 - (few parameters) no exceedence. 1988 NPS Assessment indicated DO, turbidity, metals and bacteria a problem.
Gila River, Dripping Spr-San Pedro	AZ15050100-009	10.6 M	E	Threat	ADEQ 1 sample (1990 background for Ray Mine spill): no exceedance. NPS Assessment (1988): copper is believed a problem below Dripping Springs. (TDS, NO3, PO4, and Hg have been problems in past).
Gila River, San Pedro-Mineral Cr.	AZ15050100-008	18.2 M	E	Non-support	NPDES permit: Winkleman POTW: non-support metals, nutrients, settleable and suspended solids. Kearny POTW: full compliance. (San Pedro confluence). ADEQ 3 samples Ray Mine spill: non-support due to copper; partial support due to TDS. USGS (Kelvin) 1 sample: TDS 1140 mg/l.
Gila River, Mineral Cr-Donnelly W	AZ15050100-007	14.3 M	E	Partial	ADEQ investigation of Ray Mine spill (WQMS 212.147): 3 samples (1990) Cu exceedance (8 times the standard) from Mineral Ck. Ambient TDS 1070-1080 mg/l.
Gila River, Donnelly Wash-Box O	AZ15050100-005	2.0 M	E	Non-support	See comments for AZ15050100-007 & 008.
Gila River, Box O Wash-Queen Cr	AZ15050100-003	49.5 M	E	Non-support	NPDES permits (2). Az. Sierra WWTP (Florence): non-support due to SSS, STS, metals, BOC pH and fecal coliform. Florence POTW: ok. (below Hayden, Az) 1990 ADEQ 1 sample: Ray Mine Spill (WQMS-212.147): TDS 1050 mg/l. See AZ15050100-007 & -008.
Gila River, Queen Cr-Santa Cruz	AZ15050100-002	23.7 M			Indian Lands - not assessed.
Gila River, Santa Cruz Wash-Salt R	AZ15050100-001	13.0 M			Indian Lands: not assessed. ADEQ (upstream of Salt), 11 samples: Non-support due to DO, turbidity. (Boron 1460-1860 mg/l, Se, SO3, and TDS high.)
Gila River, Salt River-Aqua Fria River	AZ15070101-015	3.6 M	M	Non-support	ADEQ (downstream of Salt), monitoring (1990-1991) 16 samples: non-support due to mercury. [TDS 1400-2280, occassional DO and pH violations.] Monitoring on Gila above Salt confluence on Indian Lands (1990-91): 14 samples indicated non-support due to DO and turbidity and extremely high TDS. See Painted Rocks Lake.
Gila River, Agua Fria-Waterman Wash	AZ15070101-014	12.2 M	E	Non-support	See comments for AZ15070101-007 and Painted Rocks Lake (AZL15070101-1010). AMCOR-Estrella WTP not contructed.

MIDDLE GILA RIVER BASIN (continued)

WATERBODY NAME AND LOCATION DESCRIPTION	WATERBODY NUMBER	MILES OR ACRES	MONITORED OR EVALUATED	USE SUPPORT STATUS	COMMENTS
Gila River, Waterman-Hassayampa	AZ15070101-010	12.4 M	E	Non-support	NPDES permits (2). Buckeye POTW: non-support due to metals. For comments for AZ15070101-007 & -015 and Painted Rocks Lake (AZL15070101-1010).
Gila River, Hassayampa-15070101-016	AZ15070101-009	0.6 M	E	Non-support	See comments for AZ15070101-007 & -015 and Painted Rocks Lake (AZL15070101-1010).
Gila River, 15070101-016-Centennial	AZ15070101-008	9.9 M	E	Non-support	See comments for AZ15070101-007 & -015 and Painted Rocks Lake (AZL15070101-1010).
Gila River, Centennial-15070101-006	AZ15070101-007	5.9 M	M	Non-support	(Gillespie Dam) USGS, 24 samples 1989-90: Non-support: Boron and TDS. Current Coop Study. See comments for Painted Rock Borrow Pit Lake (AZL15070101-1010)(FWS,1987) (EPA,1988).
Gila River, 15070101-006-Sand Tank	AZ15070101-005	13.5 M	E	Non-support	NPDES permit USAF - Luke AFB at Gila Bend: full support. See comments for AZ15070101-001 & -007. See comments for Painted Rocks Lake (AZL15070101-1010).
Gila River, Sand Tank-Sauceda W	AZ15070101-003	5.2 M	E	Non-support	NPDES permit Gila Bend POTW: non-support due to BOD, settleable (STS) and soluable solids (SSS), fecal coliform, and pH. See comments for AZ15070101-001 & -007. See Painted Rocks Lake (AZL15070101-1010).
Gila River, Sauceda-Painted Rock	AZ15070101-001	19.2 M	M	Non-support	Priority pollutant monitoring 1989: mercury exceedance (1 of 1 sample). Organochloride contamination of fish and wildlife (FWS, 1987). Gila and tributaries contaminated by metals, inorganics, organics, organochlorides, & pesticides. (EPA, 1988). See Painted Rocks Lake (AZL15070101-1010).
Dripping Spring Wash, headwaters-Gila River	AZ15050100-011	16.7 M	E	Non-support	NPDES permit Cyprus/Miami Mine at Christmas: non-support due to mercury exceedence.
Mineral Wash (Milky), headwaters-Gila River	AZ15050100-012	17.3 M	M	Non-support	ADEQ investigation of Ray Mine tailings spill (1990): non-support due to copper and ammonia. ADEQ investigation of Gibson Mine: nonsupport due to cadmium, copper, zinc, TDS, pH and manganese.
Queen Creek, headwaters-Witlow Cyn	AZ15050100-014	17.1 M	E	Non-support	NPDES permits (3) in non-compliance. Magma Copper at Superior: non-support due to chlorine, and metals. Queen Valley Sanitary District: non-support due to BOD, fecal coliform, pH, SSS, STS, and nutrients. Superior Sanitary District: partial support due to BOD, SSS, fecal coli, and pH. ADEQ investigated pearlite discharge into Queen Cr.

WATERBODY NAME AND LOCATION DESCRIPTION	WATERBODY NUMBER	MILES OR ACRES	MONITORED OR EVALUATED	USE SUPPORT STATUS	COMMENTS
Queen Creek, Witlow Canyon-Gila River	AZ15050100-013	43.2 M	E	Partial	NPDES permits (3) in full compliance (1990-91). Metals and turbidity due to Superior/Globe mining area.
Salt River, Granite Reef-Gila River	AZ15060106-001	41.9 M	M	Non-support	ADEQ 14 samples 1990-91: Non-support due to mercury. Partial due to low pH and TDS 1050-1450. 1 sample on Tempe Drain (1991): mercury exceeded. Toxic samples by Phoenix indicated several toxics exceeding standards 1989. NPDES permits: (1) Ameron Inc: non-support due to SSS and pH. (2) Anderson Clayton & Co: non-support due to SSS and pH. (3) Phoenix 23rd POTW partial due to SSS and TDS. (4) Phoenix 91st POTW threat due to TDS. (5) Tolleson POTW: non-support due to metals, flow, chlorine, pH, BOD, & phenols. (6) Union Rock & Mat: compliance.
Indian Bend Wash, headwaters-Salt River	AZ15060106-001 off25	20.0 M			Superfund site due to groundwater contamination in this area, may be a threat to surface water. Not enough information to assess.
Cave Creek, hdwtrs-Arizona Canal	AZ15060106-026	70.1 M	E	Partial	USFS 3 samples (1991) in Tonto National Forest: full support. 1990 ADEQ special investigation at Maricopa and Phoenix Mines. 5 soil: elevated chromium & lead. 1988 NPS Assessment indicated urban runoff, construction, inactive mines, and sand and gravel operations as sources.
Agua Fria River, Lynx Creek-Yarber Wash	AZ15070102-031	16.4 M	E	Non-support	NPDES permit: Soft Winds MHP (Dewey) non-support due to fecal coliform SSS, STS, BOD, nutrients, metals and pH. 1988-89 Sample at unpermitted sand and gravel operation: Ba, Cr, Cu, Pb, Mn, and Turbidity.
Agua Fria River, Squaw Ck.-Black Canyon	AZ15070102-020	3.1 M	E	Partial	(Black Canyon City) ADEQ 4 samples at 3 locations 1990: partial support due to mercury (1.6 ug/l). Source may be mines above Rock Springs along reach.
Agua Fria River, Blk Cyn.Ck.-Little Squaw	AZ15070102-019	4.1 M	M	Threat	(Rock Springs) USGS station, 1989-90 12 samples, full compliance (when flow over 31 cfs, then turbidity, F.coli exceedence).
Agua Fria River, Ltl Squaw Ck-Cottonwood	AZ15070102-017	5.5 M	E	Threat	See comments for AZ15070102-019.
Agua Fria River, Cottonwood-L Pleasant	AZ15070102-016	5.9 M	E	Threat	See comments for AZ15070102-019.
Agua Fria River, Top L Pleasant-Humbug	AZ15070102-015	1.0 M			See comments for Pleasant Lake.

MIDDLE GILA RIVER BASIN (continued)

WATERBODY NAME AND LOCATION DESCRIPTION	WATERBODY NUMBER	MILES OR ACRES	MONITORED OR EVALUATED	USE SUPPORT STATUS	COMMENTS
Agua Fria River, Humbug-Lake Pleasant	AZ15070102-014	1.3 M			See comments for AZ15070102-019 & Pleasant Lake.
Agua Fria River, Lake Pleasant	AZ15070102-009	4.4 M			Pleasant Lake. See comments for Pleasant Lake.
Aqua Fria River, Lake Pleasant-Beardsly	AZ15070102-008	5.3 M	E	Partial	NPDES permit: Wadell Dam partial support due to metals.
Aqua Fria River, Beardsly Canal-New River	AZ15070102-007	20.0 M	E	Non-support	NPDES permit for Luke Air Force Base: non-support due to boron, phenols, ammonia, metals, BOD, SSS, toxicity, sulfide, and fecal coliform.
Agua Fria River, New River-Gila River	AZ15070102-001	8.1 M	E	Non-support	NPDES permits (2): Loral Corporation in Litchfield is not supporting uses due to toluene, metals methal-chloride, pH.
Lynx Creek, headwaters-Agua Fria	AZ15070102-033	15.4 M	E	Non-support	ADEQ/USFS investigation of abandoned mines: near Arizona Victory Mine Copper and mercury non-support. Near Walker Mine: copper and zinc non-support. On Knapp Gulch: mercury exceeded. Near Transcendent Mine: copper exceeded. At headwaters, away from mines, no exceedances. Set of 4 Samples 1987: turbidity, copper, & zinc contaminants.
Galena Gulch, hdwt-Agua Fria River	AZ15070102-031 OFF11	5.8 M	M	Non-support	ADEQ investigation of McCabe Mine (1990-91): 16 samples (8 soil and 8 water samples) non-support due to chromium, lead, zinc, arsenic, barium, chromium, cyanide and TDS. At a cistern: chloride, TDS (up to 4500 mg/l) and sulfate (2345 mg/l) exceedances.
Poland Creek, headwaters-Black Canyon	AZ15070102-037	8.4 M	E	Full	USFS 2 samples (1991): full support.
Turkey Creek, headwaters-Poland Creek	AZ15070102-036	18.0 M	M	Non-support	Labat-Anderson samples @ Golden Belt Mine: nonsupport due to arsenic, cadmium, copper, cyanide, lead, and mercury. USFS monitoring elsewhere on reach (3 samples 1991) indicated full support. Off turkey Creek on wildflower Gulch: 2 ADEQ samples (1990), no violations.
Big Bug Creek, headwaters-Aqua Fria	AZ15070102-034	27.5 M	E	Full	ADEQ set of 4 samples (complaint) 1989 above and below a mining operation, all parameters met standards.
New River, Skunk-Aqua Fria River	AZ15070102-002	11.6 M	E	Non-support	ADEQ (1991) hazardous materials investigated auto shredder materials: soil contaminated by cadmium and lead.

MIDDLE GILA RIVER BASIN (continued)

WATERBODY NAME AND LOCATION DESCRIPTION	WATERBODY NUMBER	MILES OR ACRES	MONITORED OR EVALUATED	USE SUPPORT STATUS	COMMENTS
Hassayampa River, headwaters-Blind Indian	AZ15070103-007	25.1 M	E	Non-support	ADEQ/USFS investigation @ Cash & Senator Mines (1986): non-support due to copper, mercury, zinc, pH, & cadmium. Holiday Girl Mine (1990): non-support due to DO and mercury. Off reach ADEQ (@ Zonia Gulch Mile) samples: nonsupport: Cd, Cu, Mn, Hg, pH, TDS, Zn.
Hassayampa River, Blind Indian-Cottonwood	AZ15070103-005	1.2 M	E	Non-support	See comments for AZ15070103-007.
Hassayampa River, Cottonwood-Martinez	AZ15070103-004	25.9 M	M	Non-support	(Box Cyn Dam) ADEQ 12 samples 1990-91: Non-support due to DO, partial due to ammonia & turbidity.
Hassayampa River, Martinez Wash-Sols Wash	AZ15070103-003	1.2 M	E	Non-support	See comments for AZ15070103-004.
Hassayampa River, Sols Wash-Jackrabbit Wash	AZ15070103-002	39.5 M	M	Non-support	ADEQ (Wickenberg) 11 samples in 1990-1991: nonsupport due to dissolved oxygen. (Turbidity only once.) 1988 Coop Study 4 samples: Nonsupport due to DO.
Hassayampa River, Jackrabbit-Gila	AZ15070103-001	14.7 M	E	Non-support	See comments for AZ15070103-002.
Alvord Park Lake	AZL15060106-0050	25.0 A	E	Partial	AGFD 1 sample: ammonia (1988).
Freestone Lake	AZL15050100-0500	5.0 A	E	Non-support	AGFD 3 samples on 2 dates: non-support due to ammonia and pH. (Monitoring resulted in lake not included in Urban Fish program.)
Lake Pleasant	AZL15070102-1100	1,540.0 A	M	Threat (1,040.0 A) Non-support (500.0 A)	AGFD monitoring (1987-89) non-support of upper basin (estimated 1/3 of lake) due to turbidity (12 of 24 samples). Based on chlorophyll a, Lake Pleasant would be mesotrophic, while total phosphorus concentrations and secci depth readings support a classification of eutrophic. (AGFD, 1990). Threatened by upstream mining and a change in water quality from adding CAP water to reservoir.
Lynx Lake	AZL15070102-0860	55.0 A	E	Partial	Lynx Lake is a reservoir on AZ15070102-033. Partial support: metals, acid, sediment based on sampling done by ASU. Sources: mining, sand & gravel.
McKellips Park Lake	AZL15060106-0920	6.0 A	M	Non-support	McKellips Park Lake. Contaminated by TCE from Superfund Site. Algae blooms. Fish kill in 1987. Sources urban runoff and land disposal.

TABLE 11. GROUNDWATER BASIN STATISTICS

PLANNING REGION GROUNDWATER BASIN	GEOGRAPHIC INDICATOR & POPULATION CENTER	LAND AREA (sq. miles)	POPULATION		POPULATION DENSITY (persons/sq.miles)		LAND USE (1985)			POTENTIAL RECOVERABLE GROUNDWATER TO 1200 FEET (1991) (M ac/ft)	PERCENT GROUNDWATER DEMAND (1985) (based on total water demand)
			1990	2000 *	1990	2000 *	Irrigated Acreage	Undeveloped Acreage	Urban Acreage		
STATEWIDE TOTALS FOR ARIZONA		113,776	3,718,017	4,804,144	33	43	1,256,932	70,899,260	410,213	1,995.8	
Active Management Region											
Phoenix AMA	Phoenix	5,646	2,150,565	2,813,239	381	498	421,668	3,103,432	211,600	160.0	59
Pinal AMA	Casa Grande	4,000	68,184	97,988	17	24	240,000	2,319,100	2,500	90.0	83
Prescott AMA	Prescott	485	54,308	73,179	112	151	4,000	374,200	3,000	3.0	94
Tucson AMA	Tucson	4,600	708,133	897,432	154	195	54,300	2,757,200	65,500	71.0	98
	Regional Total	14,731	2,981,190	3,881,838	202	264	719,968	8,553,932,	282,600	324.0	
Upper Colorado River Region											
Big Sandy Basin	Wikieup	1,760	899	1,265			20	1,126,500	80	9.5	100
Bill Williams Basin	Kirkland Junction	3,301	4,096	5,181	1	2	3,540	2,108,900	460	23.0	83
Detrital Valley Basin	Lake Mead	875	876	1,240	1	1		560,300		1.0	100
Hualapai Valley Basin	Red Lake	1,000	19,218	27,068	19	27	100	266,200	4,000	5.0	100
Lake Havasu Basin	Lake Havasu	275	25,685	36,870	93	130		164,200	12,000		6
Lake Mohave Basin	Bullhead City	1,047	31,147	43,660	30	42	12,090	636,810	11,000	1.2	6
Meadview Basin	Meadview	182	169	239	1	1		116,800			100
Peach Springs Basin	Peach Springs	1,435	1.841	2,409	1	1		918,400	300	1.0	100
Sacramento Valley Basin	Kingman	1,403	7,722	10,890	6	8		896,100	1,600	7.0	100
	Regional Total	11,278	91,553	127,822	8	11	15,750	6,794,210	29,340	47.7	
Lower Colorado River Region											
Butler Valley Basin	Butler Valley	295						189,000		12.0	100
Gila Bend Basin	Gila Bend	1,270	3,357	4,078	3	3	41,990	770,200	710	27.6	67
Harquahala Valley Basin/INA	Harquahala Plains	616	609	639	1	1	34,000	360,600		16.5	100
Lower Gila Basin	Luke Air Force Range	7,291	12,256	13,736	2	2	71,428	4,592,200	2,577	143.9	4
McMullen Valley Basin	Salome	667	1,203	1,410	2	2	26,000	421,300		15.1	100
Ranegras Basin	Vicksburg	985	724	853	1	1	4,000	626,260	150	21.7	100
Parker Basin	Parker	2,143	13,219	15,681	6	7	86,800	1,283,700	1,200	14.0	1
San Simon Wash	Sells	2,293	5,694	6,571	2	3	900	1,466,400	500	6.7	100
Tiger Wash Basin		76	6	6				48,800		0.7	100
West Mexican Drainage Bas.	Lukeville	730	164	149				468,800		4.1	100
Yuma Basin	Yuma	750	91,402	109,021	122	145	104,000	363,000	12,000	49.	26
	Regional Total	17,116	128,623	152,043	8	9	369,118	10,590,250	17,137	310.3	

TABLE 13. TYPES OF SUBSTANCES CONTAMINATING GROUNDWATER IN ARIZONA

PARAMETER GROUP	PARAMETER
Major Cations/Anions	Fluoride Dissolved Solids Sulfate
Metals	Arsenic Lead Chromium (Cr^{+3}, Cr^{+6}) Iron Manganese Barium
Nutrients	Nitrate
Volatile Organic Compounds	Trichloroethylene (TCE) Tetrachloroethylene (PCE) Chloroform 1,1,1-trichloroethane (TCA) Methylene chloride Freon-11 1,1-dichloroethylene 1,1-dichloroethane (DCA) 1,2-dichloroethane Vinyl chloride Benzene Toluene Ethylbenzene Xylene
Petroleum Hydrocarbons	Gasoline Diesel Jet Fuel
Pesticides	Ethylene dibromide (EDB) Dibromochloropropane (DBCP)
Radiological	Uranium Radium-226 and 228 Radon
Physical	pH

TABLE 14. A SUMMARY OF MAJOR SOIL/GROUNDWATER CONTAMINATED SITES AND REGULATORY ACTIONS

SITE LOCATION AND NAME	CONTAMINATION PROBLEM	STATUS
Alpine-Apache/Sitgreaves National Forest	Soil contaminated by herbicides including 2,4-D; 2,4,5-T; and 2,4,5-TP (Silvex).	WQARF (vol)-Bioremediation ongoing.
Buckeye-Gila River from Buckeye to Painted Rock Borrow Pit	Pesticides (DBCP and EDB) and metals (selenium and chromium) in groundwater. Pesticides (DDE and toxaphene) in wildlife. Soil contaminated with heavy metals, VOCs, and PCBs.	WQARF-Investigation ongoing.
Casa Grande-Hexcel	Soil contaminated with metals (chromium).	WQARF-Remediation ongoing.
Chandler-G.E. Silicones	Groundwater contaminated with PCE (VOC).	WQARF (vol)-Investigation ongoing. Draft RAP received.
Cottonwood/Jerome-Bitter Creek	Acid mine drainage from abandoned mines. Heavy metals in sediments. Extent of surface or groundwater contamination unknown.	WQARF-Investigation ongoing.
Flagstaff-Woody Mountain well field	Potential contamination of wells due to Navajo Army Depot releases of lead, nickel, chromic acid, phosphoric acid, mercury, and sodium arsenic.	WQARF-Investigation and well monitoring ongoing.
Globe/Miami-Pinal Creek	Groundwater and surface water contaminated with copper, manganese, and excessive pH due to acid mine wastes and tailings.	WQARF-Remediation initiated.
Goodyear-City of Goodyear	TCE and PCE (VOCs) in groundwater due to aerospace industry. Soil contaminated with heavy metals (chromium, cadmium, and copper) as well as TCE, PCE, MEK, and acetone (VOCs).	WQARF-Water well monitoring ongoing.
Goodyear-Goodyear Airport	TCE and PCE (VOCs) in groundwater due to aerospace industry. Soil Contaminated with heavy metals (chromium, cadmium, and copper) as well as TCE, MEK, and acetone (VOCs).	CERCLA-South P.G.A.-interim remediation ongoing, consent decree entered, final remediation design ongoing. North P.G.A.-Unilateral order-remediation design ongoing.
Hassayampa-Hassayampa Landfill	1,1-DCE; 1,1-DCA; 1,1,1-TCA; TCE; PCE, trichlorofluoromethane and trichlorotrifluoromethane (VOCs) in groundwater.	CERCLA-Feasibility study underway.
Fort Hauchuca Military Reservations	BTEX in groundwater and soils.	Remedial investigation.
Kingman-Mohave Co. Airport	Potential contamination of groundwater due to Mohave County maintenance yard and Mohave County Airport releases of acetone, dichlorobenzene, tetrachloroethane, and 1,1,1-trichloroethane (VOCs).	WQARF-Investigation and sampling ongoing.
Luke Air Force Base	Groundwater contaminated with VOCs and pesticides (DBCP). Soil contaminated with 1,1-dichloroethane, benzene, and chloroform (VOCs); heavy metals (lead); and petroleum hydrocarbons.	CERCLA-F.F.A. in place. Remedial investigation completed and awaiting final report.
Mesa-Falcon Field	Pesticides (DBCP) in groundwater.	WQARF-Remediation initiated. Activated carbon treatment plant completed and on-line.
Mesa-Northeast Mesa	TCE and 1,1-DCE (VOCs) in groundwater.	WQARF-Investigation ongoing.

TABLE 14. A SUMMARY OF MAJOR SOIL/GROUNDWATER CONTAMINATED SITES AND REGULATORY ACTIONS (continued)

SITE LOCATION AND NAME	CONTAMINATION PROBLEM	STATUS
Mesa-South Mesa	TCE, PCE, and 1,1-DCE (VOCs) in groundwater.	WQARF-Remediation design ongoing.
Mesa-Motorola	VOCs in groundwater.	WQARF-Remedial action. Negotiation of consent decree.
Navajo Army Depot	Groundwater contaminated with petroleum products, nutrient-related compounds, and metals (zinc).	Received Master Environmental Plan from DOD 8.1991. ADEQ returned comment on its deficiencies.
Nogales-C.G. Conn LTD.	PCE, TCE, DCE, TCA, Chloroform, & vinyl chloride (VOCs) in groundwater.	RCRA-Quarterly monitoring.
Oracle-University of Arizona Page Ranch	VOCs and pesticides in groundwater.	RCRA-Four monitor wells installed.
Payson	VOCs in groundwater from dry cleaning business.	WQARF-Feasibility study and aquifer pump tests ongoing.
Peoria-Honeywell-Peoria	VOCs in groundwater.	WQARF (vol.)-Honeywell work plan received by ADEQ.
Phoenix-American Express	Potential contamination of groundwater with xylene.	WQARF (vol.)-RAP under review.
Phoenix-East Central Area	TCE; 1,1,1-TCA; and PCE (VOCs) in groundwater due to improper disposal of dry cleaning chemicals.	WQARF-Investigation ongoing.
Phoenix-East Wash. Area	VOCs and nitrate in groundwater.	WQARF-Investigation ongoing.
Phoenix-Estes Landfill	VOCs in groundwater.	WQARF (vol.) RAP being developed by City of Phoenix. Containment scenario on-line by March 1992.
Phoenix-Honeywell-Deer Valley	TCE (VOC) in groundwater.	WQARF (vol.)-RAP completed. Pump and treat remediation proposed.
Phoenix-Intel	TCA (VOC) in groundwater from semiconductor industry.	WQARF (vol.)-Investigation. Monitor wells installed.
Phoenix-19th Ave. Landfill	1,1-DCE (VOC) in groundwater.	CERCLA-remedial action ongoing.
Phoenix-Motorola 52nd St.	VOCs in groundwater.	CERCLA-Redrafting final investigation report, feasibility study underway.
Phoenix-Motorola 56th St.	VOCs in groundwater.	WQARF-Stage 4 investigation finished. Remedial action plan being written.
Phoenix-Sky Harbor Airport	TCE; PCE; 1,1-DCE; Trans 1,2-DCE; 1,1,1-TCA; 1,1-DCA benzene and toluene in groundwater.	WQARF-Investigation ongoing.
Phoenix-West Central Area	TCE; PCE; and 1,1-DCE (VOCs) in groundwater.	WQARF-Investigation ongoing.

TABLE 14. A SUMMARY OF MAJOR SOIL/GROUNDWATER CONTAMINATED SITES AND REGULATORY ACTIONS (continued)

SITE LOCATION AND NAME	CONTAMINATION PROBLEM	STATUS
Phoenix-West Van Buren Area	TCE; PCE; 1,1-DCE; and 1,1,1-TCA (VOCs) in groundwater. Soil contaminated with VOCs and toluene.	WQARF-Investigation ongoing.
Safford-Safford Airport	Soil contaminated with pesticides (malathion, parathion, methylparathion, DDT, lindane, and aldrin).	WQARF-Phase II investigation completed. Received and reviewing draft RAP.
Sahuarita-Eagle Picher Mill	Potential contamination of groundwater with heavy metals (lead and cadmium).	WQARF (vol.)-Voluntary cleanup completed. Consent decree in process.
Scottsdale-N. Indian Bend Wash	VOCs in groundwater from electronics and metal plating industries.	*CERCLA-Interim remediation design ongoing.
Scottsdale-S. Indian Bend Wash	VOCs in groundwater. Soil contaminated with VOCs, metals and cyanide.	*CERCLA-Negotiations for final remedy consent decree.
St. David-Apache Powder	Nitrate contamination of groundwater and soil. Soil contaminated with heavy metals (chromium, lead and zinc). Abandoned drums of dinitrotoluene.	CERCLA-Investigation ongoing.
Tempe-Litton/Conner-Garrett	1,1-DCE (VOC) in groundwater.	WQARF (vol.)-Investigation ongoing.
Tucson-Aluminum Dross	Soil contaminated with metals (lead, cadmium, chromium, copper, arsenic, and zinc).	WQARF-Remedial investigation. Using satellite imagery and x-ray fluorescence to discover and map contaminants.
Tucson-Mission Linen	VOCs and diesel in groundwater.	WQARF-Investigation ongoing.
Tucson-Davis Monthan Air Force Base	Heavy metals in upper soils at dross sites; petroleum, VOCs, and pesticides in soils	IRP - Investigations ongoing.
Tucson - Downtown Tucson Diesel	VOCs and diesel in soils and groundwater.	Investigation ongoing.
Tucson-Tucson Airport- Fighter Group AANG 162nd Tactical	TCE (VOC) in groundwater. Soil contaminated with TCE and PCE (VOCs).	CERCLA-Investigation and interim groundwater remediation.
Burr Brown	TCE (VOC) in groundwater from semiconductor industry.	
Hughes Aircraft (USAF Plant No. 44)	1,1,1-TCA; 1,1,2-TCE; and 1,1-DCE (VOCs) and heavy metals (chromium) in groundwater. Soil contaminated with TCE (VOC) and petroleum.	
Tucson-Broadway Area	PCE and TCE (VOCs) in groundwater.	WQARF-Phase 1 remedial investigation rejected. Expect re-submittal in Feb. 1992.
Tucson-Los Reales Landfill	PCE, TCE, trichlorofluoromethane, dichlorofluoromethane, chloroethane, 1,1-DCE, methyl chloride, and 1,1-DCA (VOCs) in groundwater.	WQARF-Phase 1 remedial investigation completed and approved. Inter-governmental agreement being reviewed.
Tucson-Miracle Mile Interchange	TCE, PCE, Freon 12, Freon 11, 1,1-DCE and vinyl chloride (VOCs) in groundwater.	WQARF-Investigation ongoing.

TABLE 14. A SUMMARY OF MAJOR SOIL/GROUNDWATER CONTAMINATED SITES AND REGULATORY ACTIONS (continued)

SITE LOCATION AND NAME	CONTAMINATION PROBLEM	STATUS
Waddell Dam	Site of old landfill containing rusted cans, drums, wire rope, wood, and scrap metal. Soil contaminated with low levels of organochlorine pesticides.	WQARF (vol.)-RAP submitted, contractor selection process ongoing.
Williams A.F.B.	VOCs in groundwater.	CERCLA-F.F.A. signed. Draft feasibility study completed.
Yuma Proving Ground	Petroleum / fuels in soils and groundwater.	IRP - Investigation ongoing.
Yuma-Y.M.C.A.S.	VOCs in groundwater. Soil contaminated with semi-volatile organics and lead.	CERCLA-F.F.A. signed. Investigation ongoing.

CERCLA-Comprehensive Environmental Response, Compensation, & Liability Act; FFA-Federal Facilities Agreement; RAP-Remedial Action Plan; RCRA-Resource Conservation & Recovery Act; WQARF-Water Quality Assurance Revolving Fund; IRP - Installation Restoration Program.