# WATER RESOURCES

This section describes water resources in the Study Area and potential impacts on those resources as a result of the proposed action. See the sections, *Floodplains* and *Waters of the United States*, beginning on pages 4-100 and 4-106, respectively, for discussions of the anticipated impacts.

## AFFECTED ENVIRONMENT

### Surface Water

The Salt and Gila rivers are the major surface water resources in the Study Area (Figure 4-34). The Salt River, located in the central portion of the Western Section of the Study Area, discharges to the Gila River near the northwestern boundary of the Study Area. Flow in the Salt River is seasonal and intermittent, influenced by groundwater withdrawals, treated sewage effluent discharges, diversions for irrigation, return flow from irrigated areas, and occasional floodwater releases from upstream dams.

#### Watershed Description and Flow Characteristics

The proposed action lies within the Gila River watershed, which encompasses an area of approximately 57,900 square miles in Arizona and New Mexico. The basin includes the greater Phoenix metropolitan area and receives water from the Salt and Verde rivers (Figure 4-35). Surface water flow in the basin is limited to periodic releases from upstream reservoirs, wastewater treatment plants (WWTPs), agricultural return flows, “dry” flows from stormwater outfalls (e.g., landscape irrigation runoff), and runoff from storms in the watershed below the reservoirs (ADOT 1989). Streambeds in the greater Phoenix metropolitan area have been left seasonally dry because of surface water diversions into reservoirs located on the Gila, Verde, and Salt rivers.

The Salt River Basin encompasses approximately 5,980 square miles and contains the Roosevelt, Apache, Saguaro, and Canyon reservoirs, with greater than 90 percent of the flow entering the system upstream of Roosevelt Lake. The Salt River Basin is the primary source of domestic and agricultural water for the Phoenix metropolitan area. The Granite Reef Dam and Diversion Structure, located approximately 25 miles east of the Study Area, diverts the majority of flows from the Salt and Verde rivers (including releases from upstream reservoirs) to an extensive canal system. The canal system is funded and owned by Reclamation and operated by SRP for the purposes of delivering water for agricultural and domestic use. Flow characteristics of water in the Salt River vary and are determined by canal diversions and the magnitude of releases from upstream reservoirs, which in turn depend on snow and rainfall conditions in the watershed. Historical records indicate that between 1940 and 1965, the Salt River channel through the Phoenix metropolitan area remained generally dry. Between 1965 and 1992, flows ranged from flood conditions to small releases as a result of increased rainfall in the watershed.

Surface water in the Eastern Section of the Study Area is limited to runoff from storms in the local watershed. Storm runoff from the southern side of the South Mountains discharges to the south through drainage culverts along Pecos Road. This storm runoff conveyance continues to the south through ephemeral washes to Community land.

Development along the southern side of the South Mountains in the Eastern Section of the Study Area consists of residential and commercial uses typical to the region. The City of Phoenix generally requires retention of flows from a 2-hour, 100-year storm (see description, page 4-100). The combination of residential and commercial development and the City of Phoenix stormwater retention requirements has changed stormwater attenuation. Development has increased stormwater flows, but the implementation of the City of Phoenix retention requirements may reduce stormwater flows to levels dissimilar to those of natural conditions, assuming retention facilities were constructed as part of ongoing development.

#### Surface Water Quality

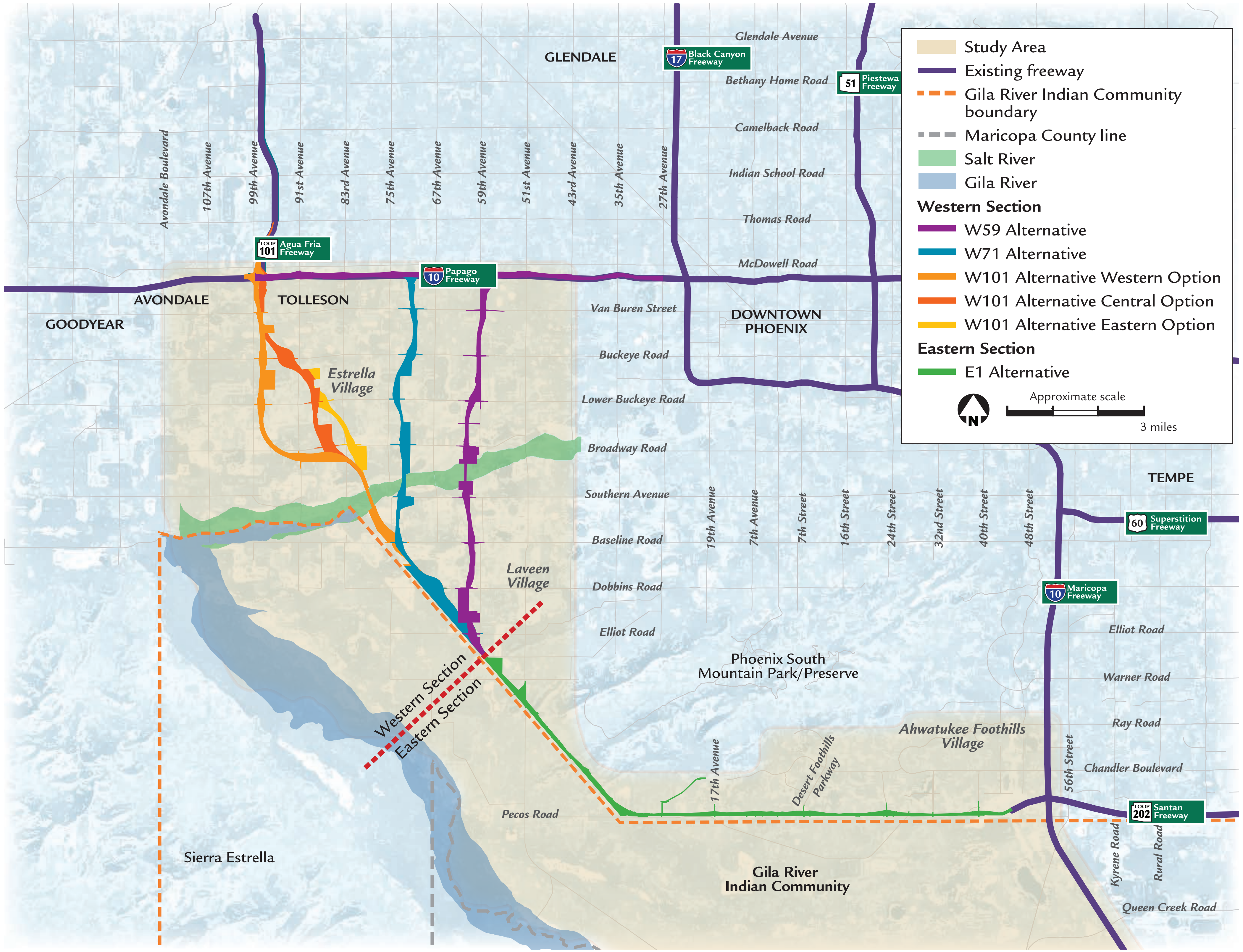
“Water quality limited waters” are water bodies assessed by ADEQ as having impaired quality and that need more than existing technology and permit controls to achieve or maintain water quality standards for intended uses in accordance with Section 303(d) of the Clean Water Act (CWA). The CWA Section 303(d) list identifies those waters that are impaired and the pollutant(s) causing impairment (ADEQ 2011). Several reaches of the Salt and Gila rivers are on the Section 303(d) list, including that portion of the Salt River in the Study Area.

The quality of the water in the Salt and Gila rivers is influenced by several factors. Total dissolved solids are the major constituent associated with degraded water quality. Sources of total dissolved solids in the Salt River may be traced to saline springs, mining operations, agricultural practices (including irrigation return flows), and other watershed activities associated with nonpoint source pollution (ADEQ 2011). Intermittent runoff from the existing road system in the Study Area is conveyed to the Salt River by storm drain facilities or washes or through percolation into the ground in areas not served by storm drains. Road runoff water quality may be impaired by suspended and dissolved contaminants from the road surface that contribute to degradation of surface water quality.

The Flood Control District of Maricopa County (FCDMC) has interconnected and shared drainage systems with the municipalities in the county, and stormwater discharges from nearly all its facilities have the potential to reach the Salt/Gila River system. Because of the shared drainage systems, FCDMC has been working with municipalities, EPA, and ADEQ to comply with the National Pollutant Discharge Elimination System and Arizona Pollutant Discharge Elimination System (AZPDES) regulations. Where possible, FCDMC has negotiated with multiple municipalities to locate, identify, and eliminate pollutants associated with regulated discharges. FCDMC also collects stormwater quality data for National Pollutant Discharge Elimination System permit compliance and inclusion in the FCDMC Regional Stormwater Quality database. As a result of collaboration with the municipalities on permit requirements, FCDMC operates a network of stormwater quality monitoring stations throughout Maricopa County. Sources of impacts on surface water quality in the Study Area include:

- nonpoint source pollution
- drainage from the southern side of the South Mountains near Ahwatukee Foothills Village

**Figure 4-34** Major Surface Water Resources




*The Salt and Gila rivers are the main water features in the Study Area. Portions of the Salt River have been subject to restoration projects in recent years (see the section,* Waters of the United States*, beginning on page 4-108, regarding these projects).*

- Gila Drain discharges
- sand and gravel pit mining operations within and upstream of the Study Area

The Southeast Valley Regional Drainage System (SEVRDS) is part of a large watershed that drains the eastern portion of Maricopa County, including the area from Chandler to the Gila Drain. The Gila Drain discharges into the Gila River on Community land, west of Maricopa Road, near the Lone Butte Wastewater Treatment Facility. A stormwater detention facility provides treatment of stormwater to remove suspended sediment, nutrients, and other pollutants.

EPA has authorized ADEQ to operate the National Pollutant Discharge Elimination System and satisfy the requirements of Section 402 of the CWA at the State level. ADEQ implements the AZPDES permit program, regulating activities on nontribal lands resulting in the discharge of pollutants into jurisdictional waters. For most construction projects the program is regulated through the Construction General Permit. To satisfy Section 402 requirements, ADOT and its contractors file a Notice of Intent for coverage under the Construction General Permit with ADEQ and prepare and implement a Stormwater Pollution Prevention Plan (SWPPP) to prevent erosion and the discharge of pollutants during construction. After construction is complete and the site is stabilized, ADOT and its contractors would file a Notice of Termination with ADEQ indicating that coverage under the Construction General Permit is no longer needed.

Municipal separate storm sewer systems (MS4s) convey stormwater runoff through drains, streets, and open channels, directly discharging untreated stormwater into retention basins, washes, rivers, or lakes.

Municipalities operating MS4s within local urbanized areas designated by EPA or ADEQ are required to obtain individual discharge permits under AZPDES authority. Large MS4s in the study area are operated by ADOT, Glendale, and Phoenix, which implement individual permits within the Study Area. Small MS4s in the Study Area are operated by Chandler, Goodyear, Tolleson, and Avondale.

ADOT's MS4 permit authorizes the discharge of stormwater and other discharges to jurisdictional waters for three elements:

- Activities associated with the MS4 operated by ADOT. ADOT is implementing a Statewide Stormwater Management Program to address operation of its MS4 facilities (i.e., culverts, outfalls); it includes best management practices (BMPs) development and implementation and monitoring of outfalls following storms.
- Activities associated with construction—from the commencement of construction activities until final stabilization—that are initiated and controlled by ADOT. Construction project activities are addressed similar to the Construction General Permit with implementation of a SWPPP and filing of Notices of Intent and Notices of Termination with ADOT and other MS4s having jurisdiction; however, ADOT has specific guidance for erosion control plans and SWPPPs.
- Facilities associated with industrial and maintenance activities owned and operated by ADOT (ADEQ 2008).

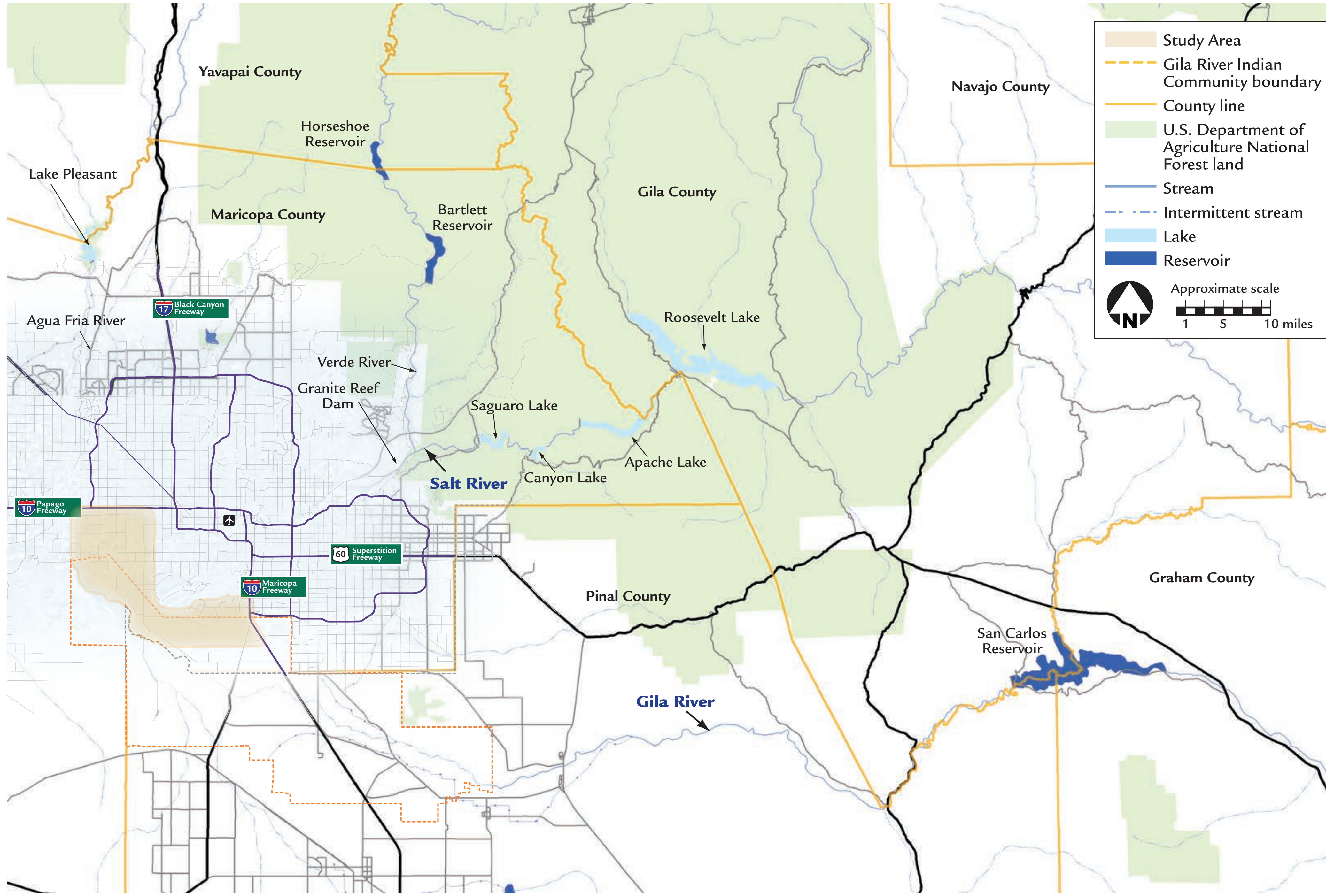
## Groundwater

### Groundwater Setting and Development

Groundwater is a source of public water supply in Arizona. In 1995, groundwater withdrawal in the Phoenix Active Management Area (AMA) supplied 39 percent of the total consumption of 2.29 million acre-feet (Arizona Department of Water Resources [ADWR] 1999). About 64 percent of the groundwater withdrawal was used for agriculture. The remainder was used for public water supply, industrial, domestic, and other purposes. Rapid population growth has resulted in the retirement of agricultural land and the conversion of agricultural groundwater supplies to urban uses. The availability of a suitable quality and quantity of water has influenced the development of cities and reduced the amount of agricultural land.

Issues created by groundwater overdraft include decreased water levels in aquifers and increased well drilling

**Figure 4-35** Watersheds in the Region

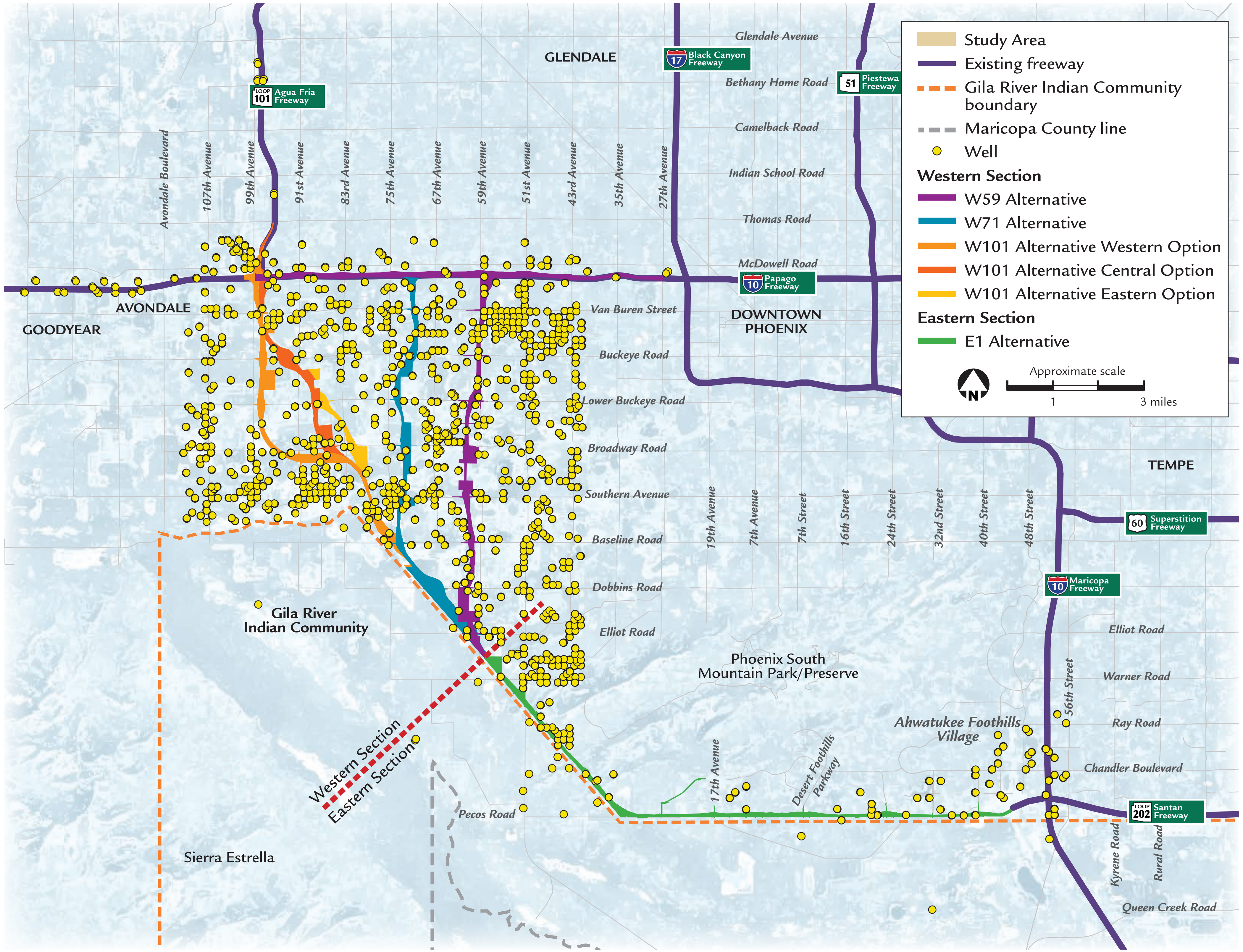



*The Gila River Basin, which includes the drainages of the Salt and Verde rivers, is the primary influence on water resources in the Study Area.*

and pumping costs. Water quality may be an issue if groundwater pumped from greater depths contains more salts and minerals. In areas of severe groundwater depletion, the earth's surface may also subside, causing cracks or fissures that can damage roads, building foundations, and underground infrastructure.

The Study Area is located within two AMAs, each regulated by the State of Arizona through the Groundwater Management Act (ADWR 2011). Most of the Study Area is located in the Phoenix AMA. ADWR administers groundwater use through implementation of five successive management plan periods that will

**Figure 4-36** Study Area Active Groundwater Wells




*Extensive data gathering was undertaken to identify active wells in the Study Area. The wells serve varying purposes, from irrigation supply to drinking water supply.*

result in a safe yield by 2025. *Safe yield* is the amount of groundwater pumped from AMA aquifers on an average annual basis and must not exceed the amount that is naturally or artificially recharged. Such an exceedance would "mine" the resource, i.e., deplete the water resource at an unsustainable rate. Water level declines in one subbasin of the Phoenix AMA can be offset by recharging water in another subbasin of the AMA. A small portion of the Study Area is located within the Pinal AMA. ADWR's management goal for the Pinal AMA is to preserve its agricultural economy for as long as feasible, while considering the need to preserve groundwater for future nonirrigation uses (ADWR 2011).

ADWR regulates the drilling, installation, and abandonment of groundwater wells. ADWR maintains a database containing annually updated well information. Active groundwater wells are located in the Study Area (Figure 4-36) (ADWR 2010).

The Roosevelt Irrigation District (RID) uses surface water and groundwater supplies and receives WWTP effluent from the City of Phoenix. Of the total amount of groundwater pumped by RID, approximately 85 percent is pumped from its well field in the southwestern portion of the SRP service area, just east of the Agua Fria River. RID annually purchases about 5,000 acre-feet of effluent from the City of Phoenix's 23rd Avenue WWTP. In addition, RID began annually taking 30,000 acre-feet of effluent from the City of Phoenix in 1995 through a water exchange agreement (City of Phoenix 2000).

SRP uses both surface water and groundwater pumped from its wells to meet its total delivery obligations.

The Buckeye Water Conservation and Drainage District (BWCDD) uses surface water and groundwater supplies, and receives WWTP effluent from the City of Phoenix. Groundwater makes up 12 to 18 percent of the total water supply for the BWCDD. In addition, up to approximately 40,000 acre-feet of effluent produced by the City of Phoenix's 91st Avenue WWTP is used by the BWCDD. The balance of water supply deliveries is from surface water diverted from the Gila River.

The irrigation districts in the Study Area (RID, SRP, and BWCDD) use groundwater wells and have both surface (canals) and subsurface (pipes) conveyance infrastructure associated with their operations. In addition, there are private, municipal, utility, and corporate-owned groundwater wells in the Study Area.

### Groundwater Quality

Use of groundwater is limited by both the total content and the type of salt and mineral solids dissolved in the water. Generally, in the greater Phoenix metropolitan area, water containing more than 1,000 milligrams per liter (mg/L) of total dissolved solids is generally not preferred for potable water supply without treatment; water containing as much as 3,000 mg/L is, however, used for irrigation. The EPA secondary maximum contaminant level (SMCL)[33] (nonenforceable) for total dissolved solids is 500 mg/L for potable water supplies.

Groundwater quality in the Study Area generally satisfies existing EPA standards for drinking water, although the maximum contaminant level for nitrate (10 mg/L) and the EPA nonenforceable SMCL for dissolved solids is exceeded (U.S. Geological Survey [USGS] 2009). The West Van Buren Water Quality Assurance Revolving Fund (WQARF) site extends east-to-west beneath the Study Area between Van Buren Street and Buckeye Road. The WQARF site is regulated by ADEQ, and water quality in several of the groundwater well locations exceeds standards for VOCs (ADEQ 2006).

The following describes groundwater levels and general groundwater quality in the Western and Eastern Sections.

#### *Western Section*

- **Groundwater levels** – In the western portion of the Western Section, the depth-to-groundwater level varies from approximately 65 to 134 feet below ground surface, as reported by USGS for five measured wells from 1991 to 1997. In the north-central portion of the Western Section, near the Salt River, the depth-to-groundwater level ranges from 35 to 50 feet below ground surface, according to data collected from five wells from 1982 to 1992. In the southern portion of the Western Section, near Laveen Village, USGS data collected from four wells from 1923 to 1992 indicate the depth-to-groundwater level ranges from 9 to 40 feet below ground surface.
- **Groundwater quality** – In the western portion of the Western Section, USGS sampling results from five wells from 1951 to 1997 indicated that all five wells exceeded the EPA SMCL for chloride, which is 250 mg/L. Two of the wells also exceeded the maximum contaminant level for nitrate. In the north-central portion of the Western Section, near the Salt River, data collected from four wells from 1933 to 1997 show that all four wells exceeded the EPA SMCL for chloride and sulfate. The SMCL for both constituents is 250 mg/L. Two of the wells also exceeded the maximum contaminant level for nitrate. In the southern portion of the Western Section, near Laveen Village, USGS data collected from four wells from 1923 to 1992 revealed the SMCL for chloride and sulfate was exceeded in each of the wells. The maximum contaminant level for nitrate was exceeded in two of the four wells.

#### *Eastern Section*

- **Groundwater levels** – USGS groundwater level data (2009) in Ahwatukee Foothills Village were obtained for several wells from 1972 to 1992. Groundwater in this area is relatively deep, ranging from 97 to 117 feet below ground surface.
- **Groundwater quality** – Groundwater quality data from four wells from 1974 to 1983 indicated that the SMCL for chloride and sulfate was exceeded in each well (USGS 2009).

## ENVIRONMENTAL CONSEQUENCES

This section describes water resource-related impacts that could result from the proposed action, including increases in sediment loading into receiving watercourses, release of pollutants generated by traffic, and erosion of unprotected banks. Impacts on water resources from construction activities are also discussed in the section, *Temporary Construction Impacts*, beginning on page 4-161.

### Action Alternatives, Western and Eastern Sections

#### Surface Water

Regardless of the action alternative, pavement for the new road would increase the amount of impervious surface area, thereby increasing runoff quantities and peak flows during storms. Because the road surface would be impermeable, precipitation on the road would drain to catch basins and then to nearby natural channels. The increased runoff from the new impervious freeway surfaces would increase the transport of pollutants generated by vehicles using the freeway. This runoff would be transported from the road surface by the initial runoff generated during a storm. The most common impact would be the increase in pollutant loading into receiving waters. The action alternatives would concentrate vehicular traffic and the associated accumulation of pollutants throughout the road corridor. The total amount of road-related pollutants would be similar for each action alternative.

Mitigation, described in the section, *Mitigation*, on page 4-96, would reduce long-term impacts on water quality from operation of the road. In addition, the action alternatives would decrease regional and commuter traffic on the local road network. Runoff from the completed project would be directed to existing and new drainage facilities. Existing drainage facilities with inadequate capacity would be improved to handle increased runoff flows. New runoff detention facilities might be required in some locations to limit the maximum rate of runoff released to existing drainage facilities.

Several reaches of the Salt and Gila rivers are on the CWA Section 303(d) list, including that portion of the Salt River in the Study Area (ADEQ 2011). Increased pollutant loading from freeway operation might further impair listed reaches of the Salt River and might need measures in addition to existing permit controls to achieve or maintain water quality standards in accordance with CWA Section 303(d).

Construction activities such as clearing, grading, trenching, and excavating would disturb soils and sediment. If not managed properly, disturbed soils and

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### *Ephemeral washes*

An ephemeral wash has flowing water only during and for a short period following precipitation. Such washes are located in low areas and may or may not have well-defined channels. The washes are located above the water table year-round, so groundwater is not a source of water. Runoff from rainfall is the primary source of water for water flow.

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**Table 4-41** Potentially Affected Wells, Action Alternatives

| Alternative/Option | Number of Wells |
|---|---|
| **Western Section** | |
| W59 Alternative | 93 |
| W71 Alternative | 28 |
| W101 Alternative Western Option | 45 |
| W101 Alternative Central Option | 29 |
| W101 Alternative Eastern Option | 27 |
| **Eastern Section** | |
| E1 Alternative | 25 |

sediments can easily be washed into nearby water bodies during storms, where water quality is reduced.

### Groundwater

Operational impacts on existing wells may include restricted access to the well casing or head, restricted use of the well, and safety issues associated with access to or use of the well. If a well were adversely affected by freeway operation, well abandonment and compensation (e.g., drilling a new well) may be required. According to ADOT's Right-of-Way Group, if the well were acquired, the water would be replaced. This would be accomplished through well replacement (drilling a new well in compliance with the 2006 ADWR well spacing and well replacement rules), or by well abandonment and compensation (if requested by the owner). Canal, ditch, well, or pipeline replacements may be needed.

All action alternatives could affect existing wells located within the proposed R/W (ADWR 2010). A field verification of wells would be conducted prior to construction of any action alternative.

Table 4-41 shows the number of wells potentially affected by each action alternative. This table was developed using information obtained from the ADWR database, which identifies wells as monitoring, piezometer, production, geotechnical, observation, domestic, test, irrigation, and abandoned. Abandoned wells have been included in the totals provided in Table 4-41. If a well were adversely affected by roadway construction, well abandonment and compensation (e.g., drilling a new well) may be required (see box on page 4-100 for additional information).

## Action Alternatives, Western Section

### Surface Water

In addition to the impacts identified as common to all action alternatives, the Western Section action alternatives would cross the Salt River and encroach into a federally mapped floodplain. If an action alternative were to become the Selected Alternative, runoff would be directed to drainage facilities that ultimately discharge to the Salt River. This runoff could temporarily increase contaminant concentrations in the river during periods of seasonal runoff. The impact of pollutant discharges to water quality would be directly proportional to traffic volumes on the proposed freeway.

Impacts on surface water (i.e., the Salt River) would depend on time of year and any associated flows. The Salt River bed is dry most of the year because of upstream flow diversions and SRP restrictions. If an action alternative were to become the Selected Alternative, however, a SWPPP would be prepared and would contain site-specific BMPs. In addition, the AZPDES permit would be consistent with discharge limitations and water quality standards established for the receiving water.

Several irrigation district conveyance canals, ditches, and pipelines would be crossed by the Western Section action alternatives (Figure 4-37). Impacts such as runoff discharge from the roadway to the irrigation district canals and conveyance ditches would be minimized by roadway design and the use of BMPs.

### Groundwater

Affected wells that would need to be fully replaced (by drilling a new well) would be required to comply with the 2006 ADWR well spacing and well replacement rules pursuant to A.R.S. § 45-454(c). The rules, collectively called "well spacing rules," establish criteria for well spacing for certain new wells and well uses and define what constitutes a replacement well in approximately the same location.

## Action Alternative, Eastern Section

### Surface Water

In addition to the impacts identified as common to all action alternatives, the E1 (Preferred) Alternative could affect receiving water quality in the Gila River. Discharges of pollutants to ephemeral washes and, ultimately, to the Gila River would occur as a result of storms. The drainage design features of the E1 Alternative would be such that drainage patterns from the South Mountains toward the Gila River would not be altered. Currently, drainage flows generally from the north to the south, passing under Pecos Road through a series of culverts following natural drainages/washes. The E1 Alternative would include small drainage basins and channels on the northern side of the freeway to treat the water quality and meter and direct drainage flows under the freeway and onto Community land in the same manner as they are currently.

### Groundwater

Affected wells that would need to be fully replaced (by drilling a new well) would be required to comply with the 2006 ADWR well spacing and well replacement rules pursuant to A.R.S. § 45-454(c). The rules, collectively called "well spacing rules," establish criteria for well spacing for certain new wells and well uses and define what constitutes a replacement well in approximately the same location.

## No-Action Alternative

Project-related water quality impacts would not occur as a result of the No-Action Alternative. There would be no construction that could create project-related erosion or sediment deposits in existing watercourses or that could alter the existing groundwater. Because no new freeway facility would exist in the Study Area, pollutants associated with increased road runoff would not occur. As urban growth continues, traffic volumes would, however, likely increase on surface streets. As a result, pollutants would continue to be generated by the increased traffic on the surrounding road system and be dispersed over a larger area. Storms may cause erosion of exposed soil surfaces and subsequent runoff of sediment-laden water.

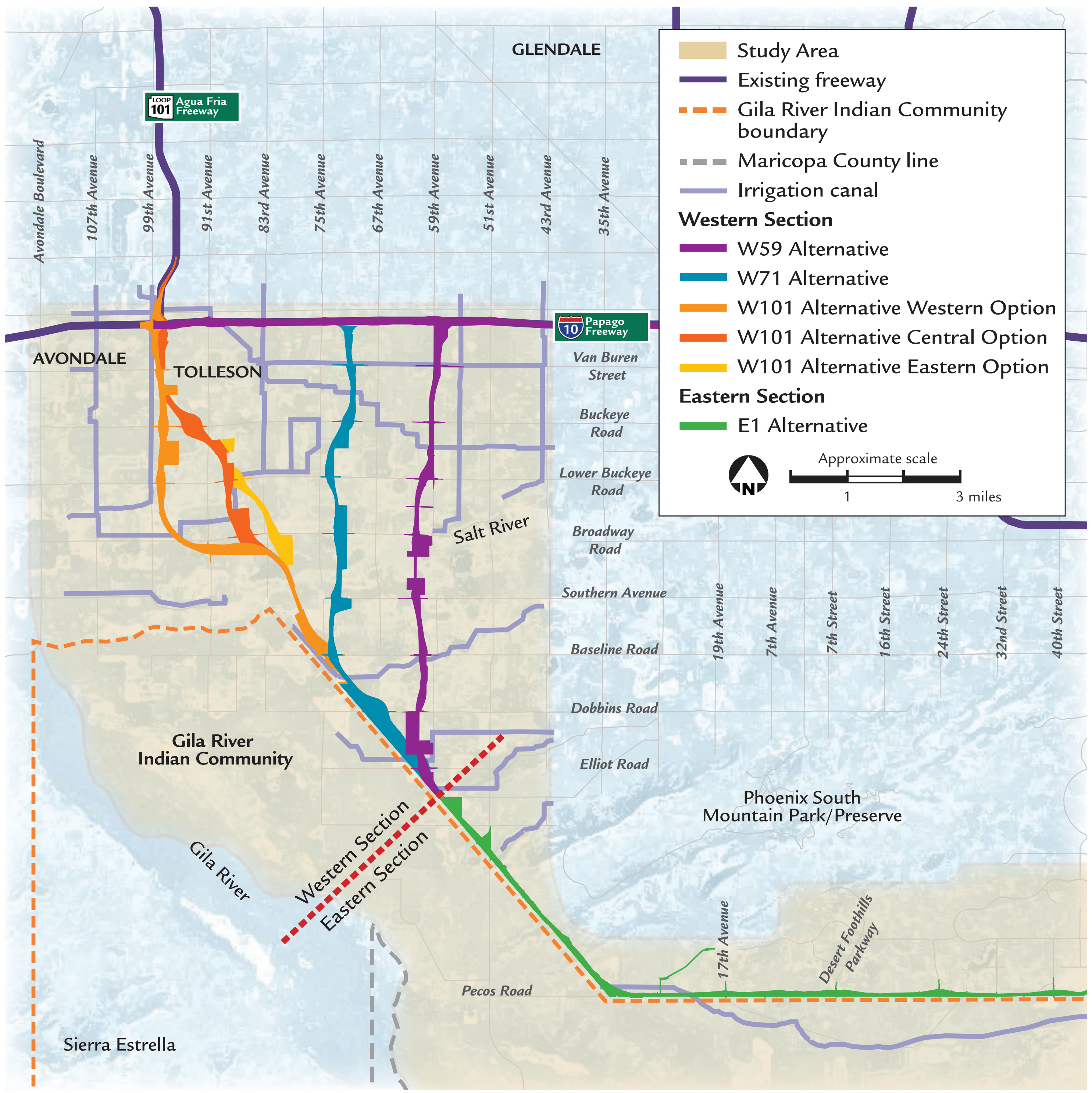
## MITIGATION

None of the action alternatives would completely avoid causing impacts on water resources because any freeway in the southwestern Phoenix metropolitan area connecting to I-10 (Maricopa and Papago freeways) would cross the Salt River and ephemeral washes.

## ADOT Design Responsibilities

Mitigation to reduce the quantity of pollutants reaching the Gila and Salt rivers is inherent in the design of the proposed freeway. All action alternatives would have

**Figure 4-37** Irrigation Canals




*An extensive network of irrigation canals is indicative of the region's long agricultural history.*

properly designed roadway channels to resist erosion, energy-dissipating structures at all culverts where discharge velocity may cause downstream erosion, and sediment-trapping basins strategically located to maximize sediment removal and to function as chemical-spill containment structures.

Vegetative or mechanical means would be used to minimize erosion from cut and fill slopes. Vegetation would slow surface runoff, help bind soils, reduce raindrop impact, and break up flow patterns. Mechanical means include retaining walls, rock slope protection, and geotextiles such as matting. Where appropriate, retaining walls would decrease cut and fill slopes, which, in turn, would reduce runoff velocities and erosion potential. Rock slope protection, where placed, would armor the slope, thereby preventing soil movement. Geotextiles would prevent extensive contact between surface runoff and soil, keeping the soil intact.

Slopes along roadside channels and at discharge points from culverts may be steep, promoting erosion. Therefore, conveyance features may need protection in the form of channel lining, reduced slopes, or energy-dissipating structures. Impacts such as runoff discharge from the road to the irrigation district canals (east of 51st Avenue in the Eastern Section) and conveyance ditches would be minimized by roadway design and the use of BMPs.

To reduce the potential impact of contaminants such as oil, grease, soil, and trash, settling basins would be used to collect water and allow materials to settle. The basins could also serve to contain chemical spills resulting from vehicle accidents. Each basin would be designed to contain a certain rainfall runoff volume before allowing discharge. If an accident were to occur, and the basins were dry at the time of the accident, the spill volume, in most cases, could be accommodated. These settling basins would require periodic cleaning.

If an action alternative were to become the Selected Alternative, a construction AZPDES permit, for ground-disturbing activities exceeding 1 acre, would be obtained from ADEQ in accordance with the provisions set forth in Section 402 of the CWA (ADEQ 2008). The

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## Process to Find Replacement Water

In the area north of Pecos Road and west of 24th Street, the Foothills Community Association (FCA) owns a well that is used to provide irrigation water stored in five lakes distributed throughout the area. The proposed freeway alignment would likely necessitate acquisition of this well for the roadway R/W.

Members of the public expressed concerns about the loss of this well to the area. According to comments received, several wells have been drilled in the area and have either produced small amounts of water or no water. Because the FCA well is the highest-capacity well owned by the association and is associated with grandfathered water rights, its replacement would be considered vital to the FCA; therefore, clarification was requested regarding ADOT's process for assessing the value of the existing well and the procedures for well replacement.

The FCA's well (ADWR Identification No. 55-630347) is a part of the lake system that provides physical and aesthetic amenities to Foothills-area residents and to the golf course. According to the *Foothills Lake System Study* (FCA 1996), the well has a high capacity, capable of producing 730,000 gallons of water per day (gpd). The well is an integral part of the five-lake system, which 1) provides and stores irrigation water, 2) serves as an aesthetic feature, and 3) provides stormwater detention for area drainage. The lakes are interconnected by pressure and gravity piping, which allows water to be pumped to the lakes for storage and provides circulation as well as operational flexibility.

The *Foothills Lake System Study* states that the lakes are supplied by three water sources: reclaimed wastewater, groundwater from wells, and potable water supplied by the City of Phoenix. Irrigation of the golf course needs approximately 300,000 gpd in the winter and between 1.2 and 1.4 million gpd in the summer months. The lakes were designed with excess capacity that allows runoff to be stored. After a storm, water can be released at overflow points or be used to irrigate the golf course by being drawn down gradually.

The priority of water consumption for irrigation and maintenance of lakes is to first use reclaimed wastewater, then to use all well water available, and then, if necessary, to use City of Phoenix potable water as a last resort. Reclaimed wastewater generated from the treatment plant at 17002 South 7th Avenue is used for irrigation during the summer months. During the winter months, excess effluent is pumped to the lakes and, if not needed for irrigation, is discharged in accordance with the AZPDES permit. The wastewater is obtained from the Foothills Wastewater Reclamation Facility under a 60-year contract initiated with the City of Phoenix in 1988. This water source is more expensive than pumping from FCA's wells, but less expensive than obtaining potable water from the City of Phoenix.

Wastewater is more expensive than groundwater produced from a well and is of insufficient quantity to satisfy all irrigation needs, especially during the summer months. To meet the 1.2- to 1.4-million-gpd demand in the summer months, the wells are used to supplement the wastewater. The agreement with the City of Phoenix requires FCA to use its well water to the fullest extent before using City of Phoenix potable water.

The high-capacity well that may be acquired by the project and a second well (No. 55-630348, which has a capacity of 76,000 gpd and is not in jeopardy of acquisition) have Type 2 nonirrigation grandfathered water rights that allow a total of 45 acre-feet of groundwater to be withdrawn per year (40,176 gpd). According to the Arizona Groundwater Code, Type 2 rights can be used only for a nonirrigation purpose. The right is based on historical pumping of groundwater for a nonirrigation use and equals the maximum amount pumped in any one year between 1975 and 1980. Examples of nonirrigation uses include industry, livestock watering, and golf courses. Type 2 rights are the more flexible type of water rights because they may be sold separately from the land or well. In addition, the owner of Type 2 rights may, with ADWR approval, withdraw groundwater from a new location in the same AMA. It is possible to lease a portion of Type 2 rights, but if the rights are sold, they may not be divided; instead, the entire rights must be sold.

If the well were to be acquired, the water would be replaced, which could occur in a number of ways. Some of the methods of water replacement are summarized below.

ADOT's first choice would be replacement of the acquired well. ADOT prefers to pay well owners to replace the acquired well. This would involve negotiations with the well owner and a payment to the owner for associated replacement well costs. These costs could include, but not necessarily be limited to:

- costs of any hydrologic studies that may be required
  - according to ADWR regulations, if the replacement well is relocated within 660 feet of the existing well, no hydrologic study would be required; it is unknown at this time whether a new well could be located to meet this criterion; however, hydrologic studies may be required to determine the best location for a new well
- costs of exploratory drilling and final well development
- costs of reconnecting the new well to the lake system

ADOT's next choice would be to hire a contractor to perform the necessary studies on well placement and to drill a new well (not considered a replacement well by ADWR and assumed to be farther than 660 feet from the original well location). The well would then be provided to the owner of the acquired well. The preference would be to locate the new well on the former well owner's property; if additional R/W would be needed for the new well location, however, these costs would be included in negotiations. It is assumed that a new well location could be found that would produce water comparable in quality and quantity to the acquired well and that no change in the existing groundwater right would result.

It is understood that finding a suitable location for a new well in this area may be difficult. In the event that well replacement were not possible, ADOT would still replace the water that would be lost through the acquisition. As noted earlier, other sources of water are now used (wastewater and potable water) by the FCA. If well replacement were to be impossible, alternative sources of water may be provided. These replacement water sources would probably prove more costly than the pumping of wells; therefore, the difference between the costs of pumping the well and the new water source would be included in ADOT's negotiations with the well owner. In addition, the existing Type 2 water rights held by the FCA have value, and these rights could conceivably be lost if the well were not replaced. ADOT and the FCA would have to assign a value on the loss of the water rights, and this value would be included in the negotiations.

AZPDES permit must be consistent with discharge limitations and water quality standards established for the receiving water. Construction-related activities regulated under the permit are required to have a SWPPP, which would be prepared by the contractor.

To control construction-related pollution discharged to waters of the United States as defined in the CWA, ADOT would prepare erosion and sediment control plans, details, and specifications (see the section, *Waters of the United States*, beginning on page 4-106) set forth in the ADOT *Erosion and Pollution Control Manual for Highway Design and Construction* (ADOT 2005c). The contractor would use ADOT's project erosion and sediment control plans, details, and specifications to guide development of a SWPPP. BMPs set forth in the project erosion and sediment control plans, details, and specifications would be included in the contractor's SWPPP.

BMPs may include:

- Silt barriers (silt fences, compost-filled socks, or straw barriers) would be constructed to restrict and filter sediment flowing to off-site channels.
- Trapped silt and debris would be removed to an off-site location before removing barriers.
- Contamination from leaking equipment would be reduced or prevented through frequent construction equipment inspections. Faulty equipment would be repaired when discovered.
- Construction equipment would be cleaned on a regular basis to minimize potential runoff contamination from petroleum products.
- Sediment basins would be constructed to treat sediment-rich runoff before discharge to off-site drainage channels.
- Equipment would be fueled and serviced at designated locations to minimize work site contamination. These fueling locations would be located away from nearby channels, swales, or other features that would quickly facilitate movement in the event of a spill.
- Upon construction completion, all contaminated material (e.g., concrete wash water) would be

removed and disposed of in accordance with local, regional, and federal regulations.

Implementation of BMPs associated with any of the action alternatives would reduce water quality impacts on the receiving waters of the Salt and Gila rivers. Both construction and operational impacts may be mitigated through the use of BMPs.

ADOT would coordinate with appropriate governmental bodies such as flood control districts and the Community when designing drainage features for the proposed action (see section, *Drainage*, on page 3-58).

### ADOT Right-of-Way Group Responsibilities

Existing groundwater wells within the proposed R/W may be abandoned or replaced, as necessary. New wells would be installed outside the proposed R/W in accordance with ADWR regulations. Groundwater wells can be replaced within 660 feet of the original location without a hydrogeologic analysis (ADWR 2006). If a well were affected by roadway construction, the well owner would maintain rights for the water (see box on this page). According to ADOT's Right-of-Way Group, if the well were acquired, the water would be replaced. This would be done through full well replacement (drilling a new well, in compliance with the 2006 ADWR well spacing and well replacement rules) or well abandonment and compensation (if requested by the owner).

Affected existing irrigation district canals may be relocated to allow for conveyance of irrigation water (through installation of pipe, conduit, or extension) from one side of the freeway to the other.

### ADOT District and Contractor Responsibilities

To control construction-related pollution discharges to waters of the United States as defined in the CWA, ADOT will prepare erosion and sediment control plans, details, and specifications using BMPs from the ADOT *Erosion and Pollution Control Manual for Highway Design and Construction* (ADOT 2005c) and the ADOT *Post-Construction Best Management Practices Manual for Highway Design and Construction* (ADOT 2009b).

The contractor would use ADOT's project erosion and sediment control plans, details, and specifications as a guide in developing a SWPPP. BMPs set forth in the project erosion and sediment control plans, details, and specifications would be included in the contractor's SWPPP. The contractor would file a Notice of Intent and a Notice of Termination with ADEQ and MS4s (ADOT, Glendale, Phoenix, Chandler, Goodyear, Tolleson, and Avondale) in accordance with Section 402 of the CWA and provide copies to ADOT. ADOT would also comply with the State of Arizona Surface Water Quality Standard Rules (18 A.A.C. § 11).

The project would be located within designated MS4s. Therefore, the contractor, in association with the District, would send a copy of the certificate authorizing permit coverage and a copy of the Notice of Termination acknowledgement letter to the ADOT Office of Environmental Services Water Quality Group, Glendale, Phoenix, Chandler, Goodyear, Tolleson, and Avondale as appropriate based on the location of project activities.

Other measures that ADOT would undertake include:

- improving surface water quality when the freeway would be open to operation by proper maintenance of the retention, detention, and stormwater runoff facilities
- mitigating, as previously outlined, for wells that may be adversely affected during construction
- conveying affected irrigation ditches through pipe under the roadway
- securing CWA Section 401 certification by ADEQ
- relocating existing irrigation district canals that may be affected by the proposed action to allow for conveyance of irrigation water (through installation of pipe, conduit, or extension)

## CONCLUSIONS

With implementation of any of the action alternatives, runoff from the action alternatives themselves would temporarily increase pollutant loading in surface water drainage during periods of seasonal runoff. Pollutant loading would be greatest with implementation of the W101 Alternative/E1 Alternative, primarily because the combined Western Section/Eastern Section action alternative would introduce the greatest amount of impervious surface into the Study Area. The differences in pollutant loading among action alternatives would be minor and the impacts from pollutant loading would be typical of such impacts experienced throughout the region's freeway system. Impacts would be effectively mitigated through the AZPDES and SWPPP permitting processes.

In the Eastern Section, runoff from the South Mountains passes under Pecos Road through a series of culverts following natural drainages/washes. The design of the E1 Alternative would alter the drainage pattern by use of a series of drainage detention basins to direct runoff to specific locations to discharge under the proposed freeway and onto Community land (see the section, *Drainage*, on page 3-58). Under the No-Action Alternative, increased traffic volumes on surface streets would contribute to increased pollutant loading dispersed over a larger area.

Additionally, implementation of any of the action alternatives would alter water well access or may require well abandonment. The W101 Alternative Eastern Option/E1 Alternative (when combining the Western and Eastern Sections) would affect 52 wells, the least of any action alternative; the W59 Alternative/E1 Alternative (the Preferred Alternative) would affect 118 wells, the most of any action alternative. The number of wells potentially affected would be consistent with that of a project the magnitude of the proposed action, and the well replacement program as outlined by State law has been regularly implemented by ADOT to effectively mitigate well impacts associated with its projects throughout the region.