

Section 3.0 Affected Environment and Environmental Consequences

3.1 INTRODUCTION

This section describes the affected environment and analyzes the environmental consequences of the proposed action and the No-Action Alternative. The analysis addresses the following resource topics: water resources; vegetation, wildlife, and special status species; cultural resources and Indian trust assets; air quality; noise; traffic and circulation; and land use, visual resource, and environmental justice issues. The analysis focuses on the environmental consequences of the Ak-Chin Option and Lease Agreement and associated water delivery facilities and addresses environmental issues associated with the No-Action Alternative in a qualitative manner. The No-Action Alternative assumes that the proposed action would not take place and that The Villages would be supplied by an alternative water supply (see Section 2, "Proposed Action and Alternatives"). Water supply Option 1 (Appendix A) is presented for illustrative purposes, to identify the kinds of effects that may occur under any of the water supply options.

3.2 WATER RESOURCES

Affected Environment

Hydrology and Drainage

The pipeline corridor is situated in the northeastern part of the Sonoran desert along upper-elevation terraces of the Basin and Range physiographic province. The pipeline corridor experiences climatic conditions typical of the arid southwestern United States; these conditions are characterized by hot, dry summers and mild winters. The average maximum daily temperature is approximately 105°F in July and 65°F in December (U.S. Geological Survey 1989). Rainfall averages 9.5 inches annually near Lake Pleasant and can be substantially more in the surrounding mountains. Two distinct seasonal periods of precipitation occur in the region. During the winter, Pacific storms produce prolonged rainfall of moderate intensity. Approximately 50% of the annual rainfall is associated with winter seasonal storms from November to April. During the late summer, subtropical moisture moving northward from the Gulf of Mexico and the Pacific Ocean brings intense thundershower activity of short duration.

The proposed pipeline corridor is located in the Agua Fria River and the New River watersheds. The constructed turnout on Waddell Canal and a small portion of the pipeline corridor would be located in the Agua Fria watershed. Most of the 9-mile-long pipeline corridor is within the New River watershed. From the turnout on Waddell Canal, the pipeline corridor parallels the existing electrical transmission line along a broad crest that generally increases in elevation from south to north where it crosses the former Reclamation haul road. Except for the Reclamation borrow pit area, the haul road topography is generally level across a broad basin that is bisected by the New River channel. East of the New River, surface elevations increase gradually near I-17, and relief in the terrain is greater near the terminus of the proposed pipeline. The eastern end of the pipeline corridor drains to Deadman Wash, which intersects the New River several miles downstream.

The locations and directions of flow for predominant surface water drainage features within the pipeline corridor are shown in Figure 3-1 in the "Vegetation, Wildlife and Special-Status Species" discussion. New River, which would be the largest drainage feature intersecting the pipeline corridor, forms a small valley that crosses the pipeline corridor in a northeast to southwest direction. Numerous small surface drainage swales cross the electrical transmission line corridor, the former Reclamation haul road, and the portion of the pipeline corridor east of New River. All of the small swales within the pipeline corridor are typical of intermittent desert washes that generally have flow only after storms that produce intense or prolonged rainfall; several years may pass between substantial streamflows (U.S. Geological Survey 1994). Streamflow after storm activity is generally of short duration, with much of the water percolating into the sandy streambed substrate. Although New River is also an intermittent stream, its flow can be substantial because of the relatively large drainage area (approximately 83 square miles). The U.S. Geological Survey (USGS) operated a stream gauge on New River from 1961 to 1982. Data from this period indicate that estimated peak flows are approximately 33,400 cfs for a 100-year recurrence interval and 3,150 cfs for a 2-year recurrence interval (U.S. Geological Survey 1991). Within the period of record, the highest actual peak flow, 19,500 cfs, occurred in September 1970.

Federal Emergency Management Agency (FEMA) floodplain information indicates that 100-year flood flows for the New River are approximately 5 to 10 feet deep in the area of the pipeline corridor (Federal Emergency Management Agency 1996). The slope of the New River channel within the area is approximately 1.0% and the designated floodplain ranges from 1,500 to 2,000 feet wide.

Groundwater in the area is generally at depths greater than 200 feet below ground surface, and seasonal high water tables do not occur in the soils of the area (Soil Conservation Service 1977). Construction, operation, and maintenance of the pipeline and water treatment plant would not intercept or change the nature of groundwater resources within the pipeline corridor.

Water Quality and Soils

Surface water quality is primarily dependent upon the mineral composition of the soils and associated parent materials and sources of contaminants within a watershed as well as the watershed's hydrologic characteristics. Terrain in the area of the pipeline corridor is composed primarily of basin deposits of recent alluvium that originate from erosion of the surrounding granitic, metamorphic, and volcanic mountainous areas. The alluvium generally increases in thickness with increasing distance from the base of the mountains. The soils that have formed consist predominantly of fine-grained and coarser-grained sandy clays on basin terraces, with clayey sands and clayey gravels occupying drainage channels and surrounding channel banks (Bowden Design Group 1995). The soils show very weak profile development and are largely covered with gravel; their use is primarily limited to desert range land. The lack of well defined channels for the small drainage swales indicate that the soils are relatively resistant to erosion.

Based on the undeveloped status of the pipeline corridor area, the surface water quality of natural streamflows would be expected to be acceptable for beneficial uses, such as intermittent aquatic habitat, groundwater recharge, and water supply for wildlife. Streamflow from storms would be expected to carry elevated loads of suspended sediment when runoff begins, followed by a dramatic decrease in sediment concentrations when the rainfall dissipates and flows recede (U.S. Geological Survey 1994).

Environmental Consequences and Mitigation Measures

Proposed Action

Impact: Temporary Alteration of Drainage Patterns and Floodplain Characteristics. Grading and trenching activities associated with construction in the pipeline corridor would temporarily alter the land surface and disturb existing drainage patterns. The potential effects include minor changes to the shape of small swales in the area of the pipeline crossing that could result in increased erosion and changes in the direction of drainage. Minor increases in soil erosion in 17 small washes could ultimately result in increases in sedimentation effects in downstream channels and offsite properties. Construction-related disturbance of the New River channel at the pipeline crossing would cause minor effects similar to those for the smaller drainage features, but the construction site could be exposed to much larger streamflows as well as floods that have higher potential for channel erosion.

Flooding of a river, stream, or wash may cause erosion that can be relatively deep in the streambed. Often this erosion is filled back in by sediment deposited as the flood subsides, but a pipeline crossing the river must be protected against being exposed by the erosion. The technical term for this erosion is scour. A scour analysis was performed for the pipeline crossings of the New River, a tributary of Deadman Wash, and other washes. The analysis used soils information obtained from geotechnical borings of the river and wash beds. In addition, floodflow magnitudes and

frequencies were used to determine a depth of scour (or erosion). Because the New River flows intermittently in a broad floodplain, it can change locations within the floodplain each time it flows. The pipeline would be buried below the depth of scour for the entire floodplain width.

The potential impacts from the proposed action are considered minor because pipeline construction would be of short duration, ground disturbance is likely to occur in only a small area of each drainage feature, and the pipeline would be installed underground and would be inspected and monitored on a regular basis. Given the nature of the desert climate and infrequent streamflow activity, the potential for permanently altering the existing drainage patterns is very small. Construction is also not expected to change the overall ground surface grade, and backfill soil would be compacted to minimize erosion associated with the site. The Flood Control District of Maricopa County (FCDMC) reviews construction practices within designated floodplain areas of the county. The proposed pipeline may require a General License for construction within the FCDMC ROW to assure that drainage features would not be adversely affected (Stroup pers. comm.). Construction of the pipeline would also comply with regulations pursuant to Section 404 of the Clean Water Act under jurisdiction of the U.S. Army Corps of Engineers (Corps) for construction activities within jurisdictional waters of the United States. A Section 404 permit will be obtained by Del Webb, which would also require Section 401 Water Quality Certification from the Arizona Department of Environmental Quality.

Impact: Temporary Construction-Related Effects on Surface Water Quality. Construction activities in pipeline corridor drainages could result in temporary surface water quality effects if construction were to occur during periods of storm activity. Any water quality effects would primarily be associated with minor increases in soil erosion and associated sedimentation of downstream aquatic habitat or desert vegetation and the potential for inadvertent release of construction-related materials, such as fuels and oil-based materials. If contaminants were to enter ephemeral stream channels they could affect aquatic organisms and wildlife and have downstream impacts. The magnitude of the impacts is normally dependent on the hydrologic environment, type of construction practice and contaminants used, extent of disturbed area, timing of precipitation, and proximity to drainage channels.

The potential impacts on surface water quality associated with the pipeline corridor are considered minor because surface flows are infrequent, construction activities would require a relatively small amount of soil disturbance, the activities would be temporary, and the potential release of contaminants could be minimized by following normal construction practices. Construction staging areas used for onsite storage of construction materials would be located well away from drainage channels (Wagoner pers. comm.). If storms and, consequently, streamflow were to occur while construction activities are taking place, any piles of excess soils and any disturbed areas in stream channels would be stabilized to minimize erosion hazards. Del Webb will also comply with the National Pollutant Discharge Elimination System (NPDES) stormwater general permit and will implement a stormwater prevention plan. The planned construction practices and the timing of operations within jurisdictional areas would be reviewed by the Corps in association with the certification process under Section 401 of the Clean Water Act to assure that potential water quality concerns are addressed.

No-Action Alternative

Under the No-Action Alternative, water supply Option 1 and The Villages development could also result in water resources issues.

Topographic features along the water supply Option 1 pipeline alignment would be the same as those along the I-17 corridor. Most of the terrain is flat, open desert land interspersed with occasional areas of rock outcrops and desert washes. The alignment would cross Deadman Wash, Skunk Creek, and several other intermittent streams. Construction of this option would involve grading and trench activities that could temporarily alter drainage patterns and floodplain characteristics in several intermittent streams and washes in a similar manner as described for the proposed pipeline corridor. Construction activities in washes and intermittent streams could also result in temporary effects on surface water quality if construction were to occur during periods of rainfall.

Topographic features of The Villages development area vary to a much greater degree than the area of the proposed pipeline corridor. Elevation ranges from 1,760 feet to 2,430 feet with slopes averaging 6%. Slopes of the New River Mountains are located in the northeast portion of the development area, low hills occur adjacent to I-17, and generally level terrain occurs in the southern portions of the property. The total annual rainfall is greater at the upper elevations of the property than in the New River valley. Many small drainages are located on the property, and Deadman Wash drains a relatively large area of the central and southern portion. Skunk Creek, a major channel that flows from north to south through the southeast corner of the property, has a FEMA-designated 100-year floodplain. Deadman Wash is also subject to periodic flooding.

The soils east of I-17 consist primarily of well-drained, gravelly-clay loams with low permeability. Issues concerning surface water quality in The Villages area would generally be similar to those described for the proposed pipeline corridor; however, suspended sediment loads during runoff events would probably be greater due to the increased streamflow velocities associated with steeper slopes in the stream channels east of I-17.

Substantial groundwater depletion has occurred in the western Salt River Valley area, which encompasses the New River area. In some areas, the groundwater level has decreased by 150 to 250 feet from historic levels (U.S. Geological Survey 1989). As a result, groundwater withdrawals are regulated pursuant to a Groundwater Management Plan for the AMA by the ADWR (Arizona Department of Water Resources 1991, as amended). The overall goal of the groundwater management plan is to establish "safe yield use" (i.e., nondepleting use) of groundwater resources by the year 2025. To reduce groundwater depletion in the region, the groundwater management plan requires all new developments to have an assured 100-year water supply from sources other than groundwater. An assured water supply can be demonstrated in several ways, including, but not limited to, the use of existing municipal supplies or CAP water, natural surface water supplies, water transferred from specific extinguished water rights, reclaimed wastewater effluent, and membership in the Central Arizona Groundwater Recharge District (CAGR). The CAGR was established to

provide a mechanism by which water providers and developers can conveniently arrange to have groundwater they pump replenished with recharged surface water.

The Maricopa County Department of Planning and Infrastructure Development has required The Villages to provide a water supply in accordance with DMP Stipulation "r", which states:

The developer shall not use groundwater for golf course irrigation, residential, industrial, or commercial uses. The only time the developer may use groundwater is on an interim basis early in construction and on an interim basis for County and public uses (such as the fire station, Sheriff's substation and utility yard, trailheads and potential school sites), until the permanent water system is completed and hook-up is available to these facilities. Except for water needed for construction of the main water delivery pipeline and of the water and wastewater treatment facilities, the interim pumping of construction groundwater referenced above shall in all events not exceed a maximum construction period of 18 months nor a maximum amount of 150 acre-feet. All interim pumping of groundwater shall comply with ADWR's regulations providing for protection of existing groundwater users in the area. At a minimum this interim supply of groundwater shall be recharged into the aquifer as soon as the recharge facility described in the DMP has been fully permitted and constructed (Bowden Design Group 1995).

Stipulation "r" was required because of local concern about the possible effect of new wells for The Villages on existing wells in the development area, and, in particular, the possibility that new groundwater demands at The Villages could result in drying up existing wells. Consequently, Del Webb is being required to import a water supply to the site, thereby eliminating the need to use any groundwater from the development area to meet long-term community demands.

Under the No-Action Alternative, development of The Villages could ultimately result in a decline in use of groundwater in the development area. The potential for developing ground water recharge facilities is being investigated. Because groundwater in the development area would not be the source of water for The Villages' residents, development in this area would ensure that small parcel residential development with individual wells and septic systems would not occur in this area. Interim use of a small amount of groundwater during early construction and for County and public uses would be allowed until a permanent water supply system is completed and hookup is available. Interim use of groundwater for these purposes would not adversely affect groundwater resources because the amount of water pumped would not exceed 150 af and would occur for less than 18 months. Additional interim supplies, which may be pumped for construction of the pipeline, are currently estimated to be approximately 50 af, although this amount is not limited by Stipulation "r".

Effects on surrounding existing wells are unlikely. Two primary water-bearing units exist beneath The Villages site, an upper unit from 300 to 700 feet below land surface and a lower unit from 1,100 to 1,500 feet or more below land surface. Separating these two units are poorly permeable horizons of dolomite, clay, silt, and basalt flows. The surrounding residences pump water from wells typically 500 feet in depth from the upper unit. Del Webb would pump interim groundwater for pipeline construction from the lower unit. Because of the poor permeability of the horizons separating the upper and lower units, no adverse impacts are expected on surrounding wells

as a result of Del Webb pumping water for construction. Overall, elimination of the use of groundwater for residential use would have a beneficial effect on groundwater resources.

The existing drainage configuration for The Villages property would be modified to accommodate development plans for the 5,661-acre residential development, including a traffic circulation system, golf courses, open space, and drainage channels. Construction of this residential area is not expected to substantially increase the volumes and peak rates of stormwater runoff to natural drainage channels because the requirements of the FCDMC have been incorporated into the Master Drainage Plan. These requirements limit peak runoff rates and require the use of retention/detention basins to provide for runoff control. In general, increased runoff rates can increase soil erosion and movement of debris in natural drainages if not checked by proper drainage channel design and construction, land grading practices, and soil stabilization measures. Increases in soil erosion can also lead to increases in associated sedimentation of downstream channels and offsite properties. If structures are constructed near the floodplains of major washes, flooding and possible structural damage could occur in these areas. The potential for drainage and flooding effects in The Villages development area would be reduced by implementing all phases of the project in accordance with the Master Drainage Plan (Bowden Design Group 1995). Golf courses planned for the community would be used to convey drainage.

Potential water quality issues under the No-Action Alternative associated with The Villages development include possible short-term effects from construction-related erosion and construction materials discharges and long-term urban runoff effects from residential areas and golf courses. Urban runoff typically carries increased loads of pollutants, such as heavy metals, petroleum products, and pesticides. Turfgrass management operations at golf courses have the potential to increase runoff and percolation of pesticides, fungicides, and fertilizers to shallow groundwater (Balogh and Walker 1992). Possible long-term water quality effects from implementing The Villages would need to be addressed during implementation of the Master Drainage Plan, erosion control, and turfgrass maintenance programs.

Potential construction-related soil erosion and contaminant discharges could be eliminated through strict compliance with standard construction practices. Construction staging areas used for onsite storage of construction materials, such as fuels, should be placed well away from drainage channels. If storms and resultant streamflow occur during construction, areas of excess and disturbed soil and disturbed stream channels should be stabilized to minimize erosion hazards. Long-term impacts from urban runoff and golf course maintenance activities could be minimized by proper maintenance of drainage facilities to allow settling and deposition of pollutants that could reach stream channels. In addition, the potential release of chemicals used to maintain turfgrass could be eliminated by implementing the Integrated Turfgrass Maintenance (ITF) program outlined in the Master Drainage Plan (Bowden Design Group 1995). The ITF should be implemented by providing thorough training for all parties responsible for maintenance activities, monitoring of turfgrass conditions to avoid overapplication of water and chemicals, and effective use of natural biological pest controls to minimize the use of chemicals.

3.3 VEGETATION, WILDLIFE AND SPECIAL-STATUS SPECIES

Affected Environment

This section provides information on vegetation and wildlife resources in the pipeline corridor. Common and scientific names of plants and wildlife and a description of drainage features in the pipeline corridor are provided in Appendix B. Data were obtained by reviewing published and unpublished reports, searching records of the Arizona Game and Fish Department's (AGFD's) Heritage Data Management System (1996), obtaining a sensitive species list from U.S. Fish and Wildlife Service (USFWS), contacting agency and local biologists (Spiller, Gatz, Olson, and Muhlbachler pers. comms.), and conducting field surveys.

A Jones & Stokes Associates botanist and wildlife biologist conducted a field survey on October 15 and 16, 1996. The survey consisted of walking an approximately 100-foot-wide corridor, covering the turnout and pumping plant site on Waddell Canal and the entire pipeline alignment (Figure 2-2). The biologists also surveyed a 44-acre site for the proposed water treatment plant east of I-17. The survey effort emphasized habitat assessments for *federally* protected and *state*-protected special-status animal and plant species. Additional survey work for a portion of the pipeline corridor was conducted by SWCA, Inc. (1996a). Plant identification was based on Arizona Flora (Kearney and Peebles 1960) and was confirmed using the Catalog of the Flora of Arizona (Lehr 1978) and the Field Guide to the Plants of Arizona (Epple 1995).

Special-status plant and animal species that are known or have the potential to occur in the pipeline corridor are presented in Table 3-1 and Appendices B and C. Special-status species are defined as:

- federally proposed or listed threatened or endangered species (16 USC 1532),
- wildlife of special concern in Arizona (WSCA) identified by the AGFD (Olson pers. comm.) (species included in WSCA are currently the same as those in Threatened Native Wildlife in Arizona)(Arizona Game and Fish Department 1988), and
- protected native plants as defined in the Arizona Native Plant Law (1993) (McGinnis pers. comm.).

Four habitat types are found in the pipeline corridor: Sonoran desertscrub, xeroriparian scrub, seasonal drainages, and disturbed areas (Figure 3-1). Plants and animals associated with these habitat types are described below. To calculate habitat acreages, the pipeline corridor and the proposed treatment plant site were plotted on USGS 7.5-minute topographic maps, assuming a 100-foot-wide, approximately 9-mile-long pipeline corridor (including a 200-foot-wide corridor for the New River crossing) and a 44-acre site for the proposed treatment plant. The analysis assumes that vegetation and wildlife in the entire pipeline corridor and at the treatment plant site would be disturbed, even though portions of these areas could be left undisturbed.

Figure 3-1
Habitat Types and Seasonal Drainages

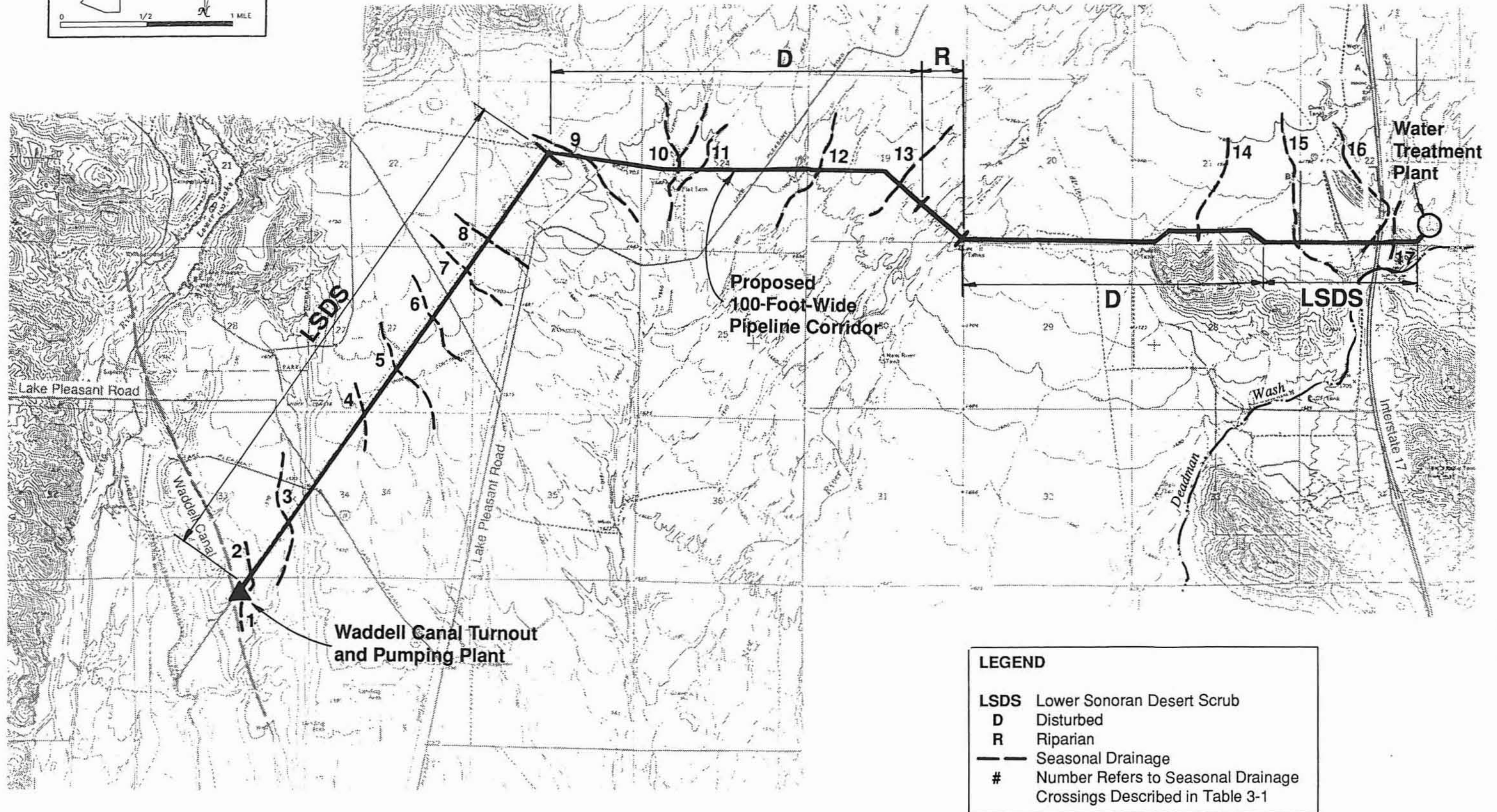
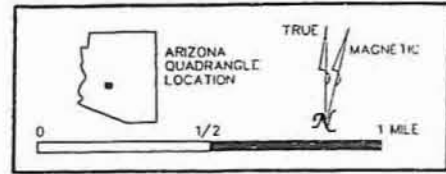


Table 3-1. Federally and State-Protected Special-Status Species That Could Occur in the Project Area (see also, Appendix C).

Scientific Name	Common Name	Status
Federally Protected		
Plants		
<i>Agave arizonica</i>	Arizona agave	E
<i>Purshia subintegra</i>	Arizona cliffrose	E
<i>Echinocereus triglochidiatus arizonicus</i>	Arizona hedgehog cactus	E
Mammals		
<i>Leptonycteris curasoae yerbabuenae</i>	Lesser long-nosed bat	E
<i>Antilocapra americana sonoriensis</i>	Sonoran pronghorn	E
Fish		
<i>Cyprinodon macularius</i>	Desert pupfish	E
<i>Poeciliopsis occidentalis occidentalis</i>	Gila topminnow	E
<i>Xyrauchen texanus</i>	Razorback sucker	E
Birds		
<i>Falco peregrinus anatum</i>	American peregrine falcon	E
<i>Haliaeetus leucocephalus</i>	Bald eagle	T
<i>Strix occidentalis lucida</i>	Mexican spotted owl	T
<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher	E
<i>Glaucidium brasilianum cactorum</i>	Cactus ferruginous pygmy-owl	E
<i>Rallus longirostris yumanensis</i>	Yuma clapper rail	E
State-Protected		
Plants		
<i>Agave murpheyi</i>	Hohokam agave	S, HS
<i>Colubrina californica</i>	California snakewood	S
Mammals		
<i>Macrotus californicus**</i>	California leaf-nosed bat	WC
Amphibians		
<i>Rana yavapaiensis</i>	Lowland leopard frog	S, WC
Reptiles		
<i>Gopherus agassizii</i>	Sonoran desert tortoise	S, WC
Birds		
<i>Haliaeetus leucocephalus</i>	Bald eagle	T, S, WC
<i>Buteo regalis**</i>	Ferruginous hawk	WC

T = Listed as threatened by the U.S. Fish and Wildlife Service (USFWS); protected by the federal Endangered Species Act.

E = Listed as endangered by USFWS; protected by the federal Endangered Species Act.

S = Sensitive species on U.S. Forest Service lands.

WC = Wildlife of special concern in Arizona.

HS = Highly safeguarded under Arizona Native Plant Law.

** = Identified by SWCA (1994a) as possibly occurring in the project area.

Sonoran Desertscrub Plant Community

The proposed pipeline corridor and treatment plant would encompass approximately 94.5 acres of Sonoran desertscrub habitat (Lower Colorado River Valley subdivision) (Figure 3-1), assuming a 100-foot-wide corridor. The desertscrub community occurs at the proposed pump station site on Waddell Canal and continues along the electric transmission line alignment to its intersection with the abandoned Reclamation haul road. This community also exists on both sides of the abandoned Reclamation haul road and is found east of New River in volcanic hills in the southern portion of Section 21. The proposed 44-acre water treatment plant site is also within this community.

Vegetation. Sonoran desertscrub is characterized by the presence of saguaro, creosote bush, mesquite, ironwood, saltbush, bursage, and cacti (Epple 1995) and is located in relatively undisturbed uplands within the pipeline corridor. Cacti are among the dominant shrubs; saguaro, teddy bear cholla, barrel cactus, beavertail, and strawberry hedgehog cacti were all observed. Cacti are interspersed with scattered foothill palo verde, creosote bush, triangle-leaf bursage, and velvet mesquite. The understory below the cacti and perennial shrubs was often grazed, with annual grasses remaining only in areas of cacti or other obstructions. Vegetation found east of New River includes species of cholla and prickly pear, brittle bush, creosote bush, triangle-leaf bursage, foothill palo verde, and tobosa grass (SWCA 1996a).

Wildlife. Indigenous mammals, birds, and reptiles (or signs of these wildlife, such as nests and tracks) observed during the field survey include kit fox (tracks), Harris' antelope ground squirrel, white-throated woodrat (stick nest), black-tailed hare, desert cottontail, Gambel's quail, Harris' hawk, loggerhead shrike, side-blotched lizard, and desert mule deer. The mixed cacti community provides habitat for a variety of common wildlife species, including woodpeckers, wood rats, owls, and lizards. Wildlife observed in the eastern portion of the pipeline corridor include desert cottontail, gila woodpecker, northern flicker, verdin, white-crowned sparrow, ruby-crowned kinglet, and black-throated sparrow. Signs of coyote, mule deer, and ringtail were also observed (SWCA 1996a). No major animal migration routes that could be affected by a buried pipeline, are known to occur in the area nor were any identified by AGFD or USFWS.

Disturbed Habitats

The proposed pipeline corridor would cross approximately 47.5 acres of disturbed habitat along the former haul road, at the Reclamation borrow site, and east of New River (Figure 3-1).

Vegetation. The area along the haul road is dominated by brittle bush, which was seeded for restoration purposes (Wonderley pers. comm.). Other plant species observed along the haul road portion of the pipeline alignment are four-wing saltbush, desert holly, Russian thistle, and triangle-leaf bursage. The former borrow site was also seeded by Reclamation following construction of New Waddell Dam, but contains less cover than other disturbed areas. Vegetation at the borrow

sites consists of Russian thistle, four-wing saltbush, triangle-leaf bursage, and brittle bush. Areas west of New River are heavily disturbed and generally devoid of vegetation.

Wildlife. The disturbed habitat lacks the diversity of plant species and amount of cover required by many wildlife species. The biologists observed black-tailed hares, mourning doves, black-throated sparrows, horned larks, and foraging red-tailed hawks along the haul road. The open areas along the haul road and at the borrow site provide foraging opportunities for raptors, such as the red-tailed hawk and American kestrel. Many of the same wildlife species that occur in desertscrub habitats would be expected to occur occasionally in the disturbed habitats because these areas are surrounded by desertscrub habitat.

Seasonal Drainages

The proposed pipeline alignment crosses 17 seasonal drainages (2 of the crossings are at different locations in the same drainage [16 and 17]); the area of the crossings totals approximately 0.27 acre. Appendix B provides a description of the location, the dominant vegetation either in or surrounding the drainage, and the approximate width of each drainage. Figure 3-1 shows the location of these drainage features.

Vegetation. Common trees, shrubs, and plants observed in the seasonal drainages include catclaw acacia, foothill palo verde, velvet mesquite, creosote bush, and triangle-leaf bursage. Drainages ranged from 1 to 15 feet wide; most were 10 feet wide or less. None of the drainages contained standing water during the field survey. The five drainages crossing the former haul road and borrow area had been substantially altered by the construction activities associated with the New Waddell Dam. Downstream of the haul road, drainages were narrower, more eroded, and less defined than upstream of the haul road, where the drainages are significantly larger, with well-defined bed and banks.

Wildlife. Seasonal drainages provide a temporary water source for wildlife species but probably do not provide standing water long enough to support amphibian breeding. Seasonal drainages provide more cover than the surrounding desertscrub or disturbed habitats and serve as movement corridors for wildlife species, such as the kit fox and numerous birds.

Xeroriparian Scrub Habitat

The proposed pipeline corridor crosses approximately 5.75 acres of xeroriparian scrub habitat in the New River channel (Figure 3-1).

Vegetation. The New River channel is the largest drainage that the pipeline would cross. A patchwork of sandy areas and areas with medium- to large-sized cobbles and small boulders is present in the channel. Vegetation in the channel is sparse and is subject to periodic scouring flows. Common plants include burro brush, canyon ragweed, sweetbush, and desert broom. Vegetation on small islands in the channel and on the western bank of the New River is more dense and diverse.

Species occurring in these areas include catclaw acacia, brittle brush, creosote bush, triangle-leaf bursage, canyon ragweed, desert broom, and foothill palo verde. Saguaro occur in low numbers between the abandoned Reclamation haul road and the west bank of the New River. Many plants present between the abandoned Reclamation haul road and the west bank of the New River also occur in Sonoran desertscrub. The east bank of the New River is heavily disturbed within the pipeline corridor. Vegetation between the east bank and the southeastern corner of Section 19 (where the pipeline corridor turns to the east) is sparse and consists predominantly of weedy annual species.

Wildlife. Wash habitats such as the New River are important to wildlife because they add diversity to the landscape. Riparian and wash areas provide water, thermal and hiding cover, movement corridors, and diverse nesting and feeding habitats for wildlife species. Common species that occur in washes include phainopepla, warblers, mourning doves, Gila woodpeckers, bats, and desert cottontails. Wildlife observed east of New River includes black-tailed jackrabbit and northern flicker (SWCA 1996a).

The proposed pipeline corridor is located south of an area previously proposed as critical habitat for the cactus ferruginous pygmy-owl, as described in the December 12, 1994, *Federal Register* (59 FR 63975-63986). In the final rule on cactus ferruginous pygmy-owl, published in the March 10, 1997, *Federal Register* (62 FR 10730-10746), USFWS determined that designation of critical habitat in Arizona was not prudent. Please refer to the "Special-Status Wildlife" discussion below for survey results related to the cactus ferruginous pygmy-owl.

Special-Status Species

Table 3-1 and Appendices B and C provide lists of special-status plant and animal species that may potentially occur in the pipeline corridor. The USFWS (Spiller pers. comm.) identified 14 *federally* protected species that may potentially occur in suitable habitat in Maricopa County, including three endangered plants, eight endangered fish and wildlife species, two threatened wildlife species, and one wildlife species (cactus ferruginous pygmy-owl) that is proposed for listing as endangered. (The cactus ferruginous pygmy-owl has since been listed by USFWS as endangered [62 FR 10730-10746].) The Heritage Data Management System used by AGFD (Olson pers. comm.) identified four additional special-status species that could occur in the pipeline corridor: one U.S. Forest Service sensitive plant, one U.S. Forest Service sensitive and "highly safeguarded" plant, and two *state* wildlife species of special concern (Appendix C).

A biological assessment (BA) was prepared, which concluded there would be "no effect" to federally listed threatened or endangered species from direct or indirect impacts of the pipeline or cumulative impacts associated with The Villages (Appendix D). Of the 14 species listed by USFWS as threatened or endangered in Maricopa County, only four species that could potentially occur in the project area, based upon their known geographic range and habitat requirements, were assessed in the BA. These included the bald eagle, American peregrine falcon, southwestern willow flycatcher, and cactus ferruginous pygmy-owl. Because the BA concluded there would be "no effect" to listed species, formal consultation with USFWS is not required and Reclamation has satisfied the Endangered Species Act, Section 7, requirements.

Special-Status Plants. Except for plants protected by the Arizona Native Plant Law, no special-status plants were observed during the field survey of the pipeline corridor and water treatment plant site. There is a potential for one “highly safeguarded” plant, Hohokam agave, to occur in the pipeline corridor; the Hohokam agave has been previously observed in the region (SWCA 1994a). The four remaining special-status plants that could occur in Maricopa County—California snakedwood, Arizona agave, Arizona hedgehog cactus, and Arizona cliffrose—are found at higher elevations than the proposed pipeline corridor and are not expected to occur in this area.

Several native plants protected by the Arizona Native Plant Law were observed during the field survey that are in one of three *state* protected categories: salvage restricted, salvage assessed, and harvest restricted. These plants are listed in Appendix B and include eight salvage-restricted species (saguaro, strawberry hedgehog, ocotillo, barrel cactus, teddy bear and chain fruit cholla, desert Christmas cactus, and Englemann’s prickly pear); three salvage-assessed species (blue and foothill palo verde and desert willow); and two harvest-restricted species (western honey and velvet mesquite). The Arizona Native Plant Law requires that a salvage permit and tags be obtained before any of these native plants are removed from the site.

Special-Status Wildlife. No *state* or *federally* listed wildlife species were observed during the field surveys of the pipeline corridor and WTP site (Jones & Stokes Associates 1996 and SWCA 1996a, 1996b, and 1997). Surveys were conducted for all the species identified in Appendix C with special emphasis on the American peregrine falcon, bald eagle, southwestern willow flycatcher, cactus ferruginous pygmy owl, and Sonoran desert tortoise. Based on this information, a BA was prepared, which concluded there would be “no effect” on *federally* listed species from activities in the pipeline corridor (Appendix D). The project site supports potential habitat for only one *state* special-status wildlife species, the Sonoran desert tortoise. Other *state*-protected species that are either known or expected to occur in the area include the California leaf-nosed bat and ferruginous hawk (SWCA 1994). *Federally* protected bald eagles and peregrine falcons could be transitory and may occasionally forage in the area but would not be adversely affected by the proposed pipeline construction and operation.

Desert tortoises have the potential to occur along the proposed pipeline corridor and at the treatment plant site but were not observed during the field survey. The Sonoran population of desert tortoises prefer rocky, boulder-strewn hillsides, but could also occur in the desertscrub and disturbed habitats throughout the pipeline corridor and in drainages and washes in the pipeline corridor. Investigation of the volcanic hills in the southern portion of Section 21 found no evidence of desert tortoise. Known forage plants for this species do occur on the hills, but suitable tortoise shelter sites are rare.

Although the proposed pipeline corridor at the New River crossing is near an area previously designated as proposed critical habitat for the cactus ferruginous pygmy-owl, no owls are expected to occur near the pipeline corridor because suitable nest sites are limited and riparian habitat along

the New River is confined to a narrow and disjunct area. Habitat types in the pipeline corridor differ significantly from those where cactus ferruginous pygmy-owl are known. No tape-playback survey was completed along the corridor, but in two surveys for the species on The Villages property (along the New River approximately 2.25 miles northeast of the proposed corridor and along several washes east of I-17; SWCA 1994a, 1996b) and north of the proposed alignment approximately 0.5 mile upstream, no cactus ferruginous pygmy-owls were observed. In addition, no cactus ferruginous pygmy-owls have been observed in the New River Valley since 1892, and the nearest known recent observations are from more than 100 miles away (SWCA 1996b).

Environmental Consequences and Mitigation Measures

Proposed Action

Impact: Potential Loss of Protected Native Plants. A number of *state* protected native plants that could be affected by construction and maintenance operations, including saguaro, blue and foothill palo verde, and velvet mesquite, were observed along the proposed pipeline corridor and at the water treatment plant site. Del Webb will conduct preconstruction surveys to determine whether the construction activities would result in the loss of native plants listed in the Arizona Native Plant Law (1993). If Del Webb cannot avoid native species and proposes to remove native plants over an area exceeding 0.25 acre, Del Webb will submit, in writing, a notice of intent to the Arizona Department of Agriculture (ADA) at least 60 days before the plants are scheduled to be removed. Del Webb will not begin removing native plants until it has received written confirmation from the ADA and will comply with applicable *state* law concerning salvage and relocation of native plants. In addition, Del Webb will coordinate with AGFD before reseeding disturbed upland areas with a native seed mix appropriate for desertscrub habitat. Seasonal drainages and riparian areas will also be reseeded with an appropriate seed mix to achieve an acceptable level of revegetation success.

Although Hohokam agave (*Agave murpheyi*) was not found in the pipeline corridor or treatment plant site during field surveys, field surveys conducted east of the pipeline corridor indicate that Hohokam agave does occur in the region. Its presence in the region indicates that it has the potential to occur in the pipeline corridor. Hohokam agave is listed as "highly safeguarded" under the 1993 Arizona Native Plant Law. The highly safeguarded designation is applied to plants "whose prospects for survival are in jeopardy or which are in danger of extinction throughout all or a significant portion of their ranges". If encountered along the pipeline corridor, Del Webb will comply with Arizona Native Plant Law regarding Hohokam agave as outlined above.

Impact: Effects on Waters of the United States and Xeroriparian Scrub. Constructing the pipeline would result in temporary disturbance of drainage features that are considered jurisdictional waters of the United States as defined by the Corps, including up to 7.7 acres within jurisdictional waters as determined by the Corps in 17 seasonal drainages and New River. Pipeline construction would likely disturb up to a 100-foot-wide area at each minor drainage crossing and a 200-foot-wide area at the New River crossing. Approximately 5.75 acres of xeroriparian scrub habitat in the New River channel would be affected. Habitat loss would be temporary and would

effect a marginal number of velvet mesquite, catclaw, and foothill palo verde plant species and associated wildlife species.

As part of the proposed action, Del Webb will re-establish preconstruction conditions within the corridor to allow natural colonization of plant species in this area. This includes re-establishing natural landscape contours and reseeding with an appropriate native seed mix. Del Webb has applied for an individual Section 404 permit from the Corps and will comply with all special conditions set forth therein.

Impact: Loss of Sonoran Desertscrub. Construction of the pipeline would result in the temporary loss of nearly 51 acres of Sonoran desertscrub habitat; construction of the water treatment plant could result in the permanent loss of approximately 44 acres of this habitat. Del Webb will also reestablish preconstruction conditions within the pipeline corridor to allow natural colonization of native plant species and will reseed disturbed upland areas, as necessary, with an appropriate native seed mix. Therefore, the temporary and permanent loss of desertscrub habitat is considered a minor effect that is not anticipated to substantially affect plant and animal resources.

Impact: No Loss of *Federal* Special-Status Species. Construction in the pipeline corridor would not adversely affect any *federally* listed special-status species because none are known to occur in this area. A BA was prepared, which concluded there would be "no effect" to *federally* listed threatened or endangered species from direct or indirect impacts of the pipeline or cumulative impacts associated with The Villages (Appendix D).

Impact: Possible Effects on Desert Tortoise. Although not observed during the field survey, the desert tortoise could occur in the pipeline corridor and particularly near the volcanic hills east of New River and the treatment plant site. Del Webb will conduct preconstruction surveys for desert tortoise burrows. If tortoises are found on the site, Del Webb will contact the AGFD for recommendations and the appropriate permits to move the tortoise before construction begins. Construction of temporary shelters or burrows also could be required, depending on the number of burrows located in the area. Implementing the proposed action is expected to have little or no effect on desert tortoise mortality or long-term viability.

No-Action Alternative

Under the No-Action Alternative, water supply Option 1 and The Villages development could result in biological resources impacts.

Water Supply Option 1. During a preliminary survey conducted by SWCA on April 23, 1997, three plant communities were identified along the Option 1 pipeline alignment: disturbed habitat, Sonoran desertscrub, and xeroriparian habitat (SWCA 1997). Disturbed areas, such as those occurring between the Deer Valley and Pinnacle Peak interchanges, are either devoid of vegetation or are only sparsely vegetated with non-native species, such as Russian thistle and red brome, and provide minimal habitat for wildlife. Sonoran desertscrub habitat mainly occurs north of the Pinnacle Peak interchange and is dominated by creosotebush, triangle-leaf bursage, velvet mesquite, and

buckhorn cholla. Because of the proximity of desertscrub habitat to the I-17 corridor and evidence of disturbance, wildlife habitat value in this habitat type is generally considered low. Xeroriparian habitat is extremely limited and mainly occurs at Deadman Wash and a few other minor washes north of Carefree Highway. Common plant species observed in xeroriparian habitat include velvet mesquite, creosotebush, desert ironwood, and blue palo verde. The water supply Option 1 alignment crossing at Skunk Creek has been previously disturbed and no xeroriparian vegetation occurs at this location.

No *federally* listed threatened, endangered, or previously designated candidate species were observed along the alternative alignment. Habitat along the alternative alignment does not resemble breeding habitat that is currently known to be used by the southwestern willow flycatcher, bald eagle, or peregrine falcon. Because bald eagles and peregrine falcons are extremely mobile species, they may occasionally fly over and even forage within the area (especially in winter), but neither species is likely to regularly occur along the alignment. No cactus ferruginous pygmy-owl were detected at the Deadman Wash crossing or any other pipeline corridor areas during the current or previous surveys and the owl is considered unlikely to occur along this pipeline route. The *state*-protected California leaf-nosed bat and ferruginous hawk may occur along the alignment, but none were observed (SWCA 1994a). Numerous native plants, protected by the Arizona Native Plant Law occur within the Option 1 alignment.

The Villages at Desert Hills. The Villages development area covers approximately 5,661 acres of undeveloped land. Vegetation on the site is typical of the Arizona Upland and Lower Colorado River Valley subdivisions of the Sonoran desertscrub community. Upland habitat occurs on approximately 5,094 acres, and riparian habitat (ephemeral washes) covers approximately 567 acres. About 938 acres of the project site was burned during a 1993 wildfire.

The same *state* and *federally* protected special-status species surveyed for on the proposed pipeline corridor also potentially occur in The Villages development area. The BA prepared for the proposed action, consistent with the requirements of the *federal* Endangered Species Act, evaluated the cumulative impacts associated with The Villages, concluding there would be "no effect" to *federally*-listed species from The Villages (SWCA 1994a, 1996b, and Appendix D). Bald eagles and peregrine falcons could fly over or occasionally forage on the site because they are known to occur in the region, but none were observed during the surveys. Evidence of two *state* species of special concern was observed on or adjacent to the property: Hohokam agave (highly safeguarded plant) and desert tortoise (SWCA 1994a). The California leaf-nosed bat and ferruginous hawk are also expected to occur in the area (SWCA 1994a). Development of The Villages property may have an adverse effect on individuals of these *state* special-status species.

Under the No-Action Alternative, construction activities in The Villages development area would affect a variety of native plant communities and plant species. Impacts in xeroriparian areas will be minimized because development will generally be avoided in drainages. Effects on plant communities will also be reduced by implementing strategies in the Ecological Resources Management Plan that calls for a number of habitat protection measures, including preservation of hillsides over 15% slope and land use controls in sensitive or high-density plant communities. The Villages and water supply Option 1 pipeline will be subject to The Arizona Native Plant Law, which

will reduce impacts on plants protected under the *state's* salvage restricted, salvage assessed, and harvest restricted categories.

Construction activities in The Villages development area could temporarily affect habitat in drainages, but are expected to largely avoid these areas. The development area contains xeroriparian vegetation, including Palo Verde mixed-scrub, mesquite/Palo Verde mixed-scrub, and desert broom mixed-scrub (SWCA 1994a). Palo Verde mixed-scrub occurs along Skunk Creek and Deadman Wash, mesquite/Palo Verde mixed-scrub occurs along a majority of the smaller washes and arroyos, and desert broom mixed-scrub occurs along the banks and within the braided channel of New River.

The washes and arroyos that support the xeroriparian vegetation are considered potential jurisdictional waters of the United States. Del Webb has applied for a Section 404 individual permit from the Corps for activities within jurisdictional waters of the United States.

3.4 CULTURAL RESOURCES

For the purposes of NEPA compliance, and consistent with the organization of the rest of this EA, information on cultural resource impacts from the pipeline and water treatment plant are described in the Affected Environment and Proposed Action portions of this section. The effects of The Villages development are discussed under the No-Action Alternative. However, for purposes of fulfilling the requirements of Section 106 of the National Historic Preservation Act (NHPA), the "area of potential effect" (APE) includes the proposed pipeline corridor, water treatment plant, and the 5,661 acres of The Villages development. Section 5.1 of this EA provides more information on Reclamation's compliance with Section 106 of the NHPA.

Affected Environment

Information provided on existing cultural resources in the pipeline corridor and treatment plant site is summarized from SWCA 1994b, 1996c, and 1996d.

Site Conditions

The pipeline corridor ranges in elevation from 1,460 to 1,860 feet above msl between the Agua Fria River to the west and the 44-acre water treatment plant site east of I-17. Most of the area consists primarily of desert scrub habitat dominated by creosote bush, bursage, and grasses. The geology is primarily gravel and cobble terraces covered by fine alluvium or areas with highly patinated desert pavement. Three basaltic rock outcrops are located near the pipeline corridor east of the New River crossing. The pipeline corridor runs along the eastern edge of the Navajo/West Wing electrical

transmission line corridor for approximately 3.3 miles and then extends along the abandoned Reclamation haul road for approximately 2 miles of the 9-mile long pipeline alignment. East of New River, the pipeline corridor crosses terrain that was disturbed during excavation of earthen rock material used to construct New Waddell Dam.

Prehistorical and Historical Setting

The potential for prehistoric archaeological sites in the pipeline corridor and treatment plant site is quite variable, ranging from sites that were used only for resource exploitation to intensively used agricultural and habitation areas on river terraces. Few indications of historic activities have been identified, other than ranching activities, isolated travel, or occasional recent or modern-age trash dumping episodes (SWCA 1996c, 1996d).

In prehistoric times, the Archaic people inhabited the region from 8000 B.C. to 300 A.D. Much of the land was used for seasonal hunting and gathering. Lithic tools used for gathering and building included various functional forms, such as scrapers, bifacial knives, unifacially altered flakes (various styles), drills, perforators, planes, bifacial and flake cores, and projectile points (Slaughter et al. 1992). Archaic populations followed a mobile lifestyle, with movements being constricted to specific geographic regions. As the Archaic Period continued, mobility decreased, reflecting a tendency toward sedentism (Slaughter et al. 1992).

Following the Archaic Period, the area was occupied by a sedentary group of people called the Hohokam. The Hohokam were desert farmers best known for engineering an extensive system of irrigation canals in central and southern Arizona (Haury 1976). As their population increased, they began to venture out and expand into other drainages. From A.D. 700 until A.D. 1450, the Hohokam established villages in the New River and Agua Fria river valleys (Green 1989). This area, known as the northern periphery, consists of sites suggesting an adaptation by small groups of Hohokam settlers who mixed agriculture, including irrigation, with hunting and gathering technologies.

The Hohokam occupation of the area appears to have been concentrated along the New River and Agua Fria drainages. Farming methods included reliance on direct precipitation and runoff that was diverted to fields (SWCA 1996c and d).

Previous Studies

Various segments of the pipeline corridor and areas near the corridor have been previously surveyed. In 1972, the Museum of Northern Arizona conducted a survey of the Arizona Public Service Navajo Project 500 kV transmission line. Four cultural properties were identified along this corridor. Results of the interim and final reports indicate that none of the sites occur within or adjacent to the proposed pipeline corridor.

Various surveys were conducted between the Agua Fria drainage and I-17 as part of activities associated with construction of New Waddell Dam. Related archaeological surveys include those

for the East Terrace Borrow Area (Green 1985), the New River Borrow Area (Fedick 1986), the Eastern Addition of the New River Borrow Area (Green and Rankin 1988), the New Waddell Haul Road (Hackbarth and Green 1986), and the Agua Fria Borrow Area (Green and Effland 1985). Each of these surveys included a portion of the proposed pipeline corridor, and none identified any cultural resource properties in or near the pipeline corridor.

SWCA completed a cultural resources investigation of the 5,661-acre Villages development area in 1994 (SWCA 1994b). The investigation identified 13 sites and 205 isolated occurrences. None of the sites and only one of the isolated occurrences occur in the vicinity of the proposed water treatment plant.

Survey Methods

The archaeological surveys for the proposed pipeline corridor and associated facilities were completed by walking parallel transects along the linear corridor (two transects within the 100-foot wide corridor) and transects spaced at 20-meter intervals in the survey block of Section 22 (T6N, R2E). Segments of the pipeline corridor were marked with flagging to ensure that the surveys were conducted in the correct locations. All cultural materials identified during the survey were plotted on USGS maps, and descriptions of all artifacts were recorded for later reference. Much of the realigned portion of the pipeline corridor was surveyed previously as part of borrow activities for New Waddell Dam. An additional survey of a portion of the proposed corridor was conducted on December 12, 1996, east of New River in the eastern half of Section 21. The survey was conducted in a 200-foot-wide corridor for an approximately 0.5-mile section of the pipeline corridor east of New River that had not been surveyed previously (SWCA 1996d).

Survey Results

One previously recorded site and 44 isolated occurrences were identified during the initial pipeline corridor survey (Alternatives A-1, B-1, and C-1). Site AZ T:4:171 (ASM) was originally recorded in December 1964 as Site AZ T:4:13(ASU). It was recorded as a lithic and sherd area containing plainware pottery, mano fragments, a chert knife, cores, hammer stones, and chipped stone. The site was relocated by SWCA in 1996 and presumably had been disturbed by borrow activities conducted during construction of the New Waddell Dam. Much of the site is intact, although no ceramics were found on any portion of the undisturbed site area. Flaked stone on the site consisted of three chert flakes, one quartz flake, 77 basalt/rhyolite flakes, one basalt core tool, and 10 basalt/rhyolite cores (SWCA 1996c). Site AZ T:4:171(ASM) is probably a surface site, with a maximum depth of 10 centimeters. The undisturbed surface is desert pavement, and many artifacts are difficult to recognize. The proposed pipeline corridor is located approximately 0.5 mile south of the site.

No National Register eligible archaeological or historic sites, or substantial lithic scatters were located within the proposed pipeline corridor. One site, AZ T:4:53(ASM), a surface artifact scatter, is located immediately southwest of the survey area. The site was originally recorded by Don

Simonis of the Bureau of Land Management (Green and Rankin 1988). At that time, it contained limited lithic and ceramic artifacts. The site was reinvestigated as part of the New Waddell Dam New River Borrow Area expansion. Green and Rankin (1988) documented the site as containing only lithic artifacts. Both previous investigations recommended that AZ T:4:53 (ASM) was not eligible for listing on the National Register of Historic Places (NRHP). During the current work, the site was revisited and evaluated. It still contains no evidence to suggest that it should be considered eligible for the NRHP. The proposed pipeline corridor would be adjacent to the extreme northern portion of the site where only a few lithic artifacts are present (SWCA 1996d). No artifacts are located within the proposed pipeline corridor.

No archaeological or historic sites were identified in the 44-acre water treatment plant site east of I-17 (SWCA 1994b).

Isolated Occurrences. Of the 44 isolated occurrences identified during the initial survey, 39 are prehistoric and 5 are historic. Many of the prehistoric isolates are made from the black porphyritic basalt that is common in the region. This material is commonly fine-grained with crystalline inclusions, which vary in frequency and size and often appear blue in color. Many of the cores and flakes may have been the result of cobble testing or expedient production of flakes. One of the isolates is a corner notched projectile point made of quartzite. The projectile point is somewhat crude and resembles an Archaic period form. Six Hohokam Red-on-buff sherds that appeared to be smaller pieces of a larger sherd, a Gila Plain, and Salt Variety pot break were also discovered. These were the only ceramic artifacts observed during the survey. The historic isolates, including a trash scatter, were all cans and tins (SWCA 1996c, 1996d).

Traditional Cultural Properties. Traditional Cultural Properties (TCPs) are properties that are eligible for listing on the NRHP because of their association with cultural practices or beliefs of a living community that (a) are rooted in that community's history and (b) are important in maintaining the continuing cultural identity of the community. Cultural resource surveys for the proposed water delivery pipeline and water treatment facility did not identify TCPs in the area. Reclamation has consulted with Indian tribes who have a recorded presence or who have claimed ancestry to the area. The tribes are: Ak-Chin Indian Community, Ft. McDowell Mojave-Apache Indian Community, Gila River Indian Community, Hopi Tribe, Salt River Pima-Maricopa Indian Community, Tohono O'odham Nation, Yavapai-Prescott Indian Tribe, and Zuni Pueblo.

Environmental Consequences and Mitigation Measures

Proposed Action

Impact: No Effect on Known Cultural Sites. Construction in the proposed corridor would have no effect on historic properties, as defined by federal regulations. Site AZ T:4:53 (ASM), located adjacent to the proposed corridor, would not be adversely affected because it is not considered significant.

Impact: No Effect on Isolated Occurrences. Construction in the pipeline corridor and at the treatment plant site would not result in adverse impacts on prehistoric isolated occurrences because they have been recorded and the data potential has been exhausted.

Impact: Potential Disturbance of Unknown Cultural Resources. Constructing the pipeline and treatment plant could result in disturbance or alteration of unknown cultural sites that have not yet been uncovered or discovered. Ground-disturbing activities, such as grading and trenching, could uncover previously undiscovered resources. Access roads for pipeline maintenance and operation would also provide access to normally untraveled areas, including potentially sensitive archaeological or historic sites. If significant cultural materials are encountered during construction or other activities, work would be stopped until a qualified archaeologist can evaluate the finds. Reclamation, in consultation with the Arizona State Preservation Officer (SHPO), would require implementation of the following measures if significant cultural materials are present:

- complying with the NHPA, Arizona State Historic Preservation Act of 1982, the Arizona Burial Protection Law of 1990, and the Native American Grave Protection and Repatriation Act;
- securing an Archaeological Resources Protection Act (ARPA) permit from a federal land management agency (Reclamation or U.S. Bureau of Land Management);
- securing a State of Arizona Antiquities Permit from the Arizona State Museum; and
- preparing a mitigation plan, as appropriate, in consultation with the SHPO and the ACHP, other participating parties, and the interested public.

Impact: No Adverse Effect on Indian Trust Assets. Indian trust assets (ITAs) are legal interests in property and assets held in trust by the United States for federally recognized Indian tribes or individual Indians. Such trust status is derived from rights reserved by or granted to Indian tribes or individuals by treaties, statutes, and executive orders. ITAs may include land, minerals, water rights, and hunting and fishing rights. Reclamation has reviewed the proposed action for possible effects on ITAs. ITAs have not been identified within the pipeline corridor and would not be adversely affected by construction in the pipeline corridor. The following Indian tribes were provided an opportunity to comment on the draft EA: Gila River Indian Community, Salt River Pima-Maricopa Indian Community, Ak-Chin Indian Community, Tohono O'odham Nation, Hopi Tribe, Pueblo of Zuni, and Fort McDowell Mojave-Apache Indian Community.

Impact: No Effect on Traditional Cultural Properties. Eight Indian tribes that have a recorded presence, or who have claimed ancestry to the area, were consulted to ensure that TCPs have been identified, recorded, and that impacts on them have been considered. No TCPs were identified; therefore, construction of the proposed water delivery pipeline and the water treatment facility will have no effect on known TCPs.

No-Action Alternative

Under the No-Action Alternative, water supply Option 1 could have similar effects as those described for facilities under the proposed action. The water supply Option 1 pipeline alignment could encounter known and unknown cultural resources sites located along the I-17 ROW during the site selection and construction processes. Prehistoric sites encountered could include sites associated with habitation of the area during the Archaic period and, later, the Hohokam period. Historic period artifacts would be associated with agricultural use of the Black Canyon corridor. Should historic properties or prehistoric artifacts be encountered, implementation of this option would require compliance with applicable state law and coordination with the SHPO to ensure that sites are either avoided or protected.

Based on site surveys conducted by SWCA from August 3 to August 18, 1994, for The Villages development, 13 archaeological sites and 205 isolated occurrences (including prehistoric lithics and ceramics and historic cans, glass and miscellaneous metal artifacts) were found on the 5,661-acre property (SWCA 1994b). Sites include one large agricultural complex, three field houses, three prehistoric artifact scatters, four historic trash dumps, one rock ring, and a road alignment that is possibly related to old Black Canyon highway. Isolated occurrences are scattered throughout the property, with concentrations apparent in the north and southeastern portions of the property and northwestern portions of the property.

Of the 13 sites identified, six are recommended for inclusion in the NRHP under Criterion (d) because of their potential to provide important information to Hohokam and possibly Archaic Period research in the northern periphery. These sites include: Site AZ T:4:119(ASM), a temporary habitation (field house); Site AZ T:4:121(ASM), a temporary habitation with agricultural features (field house); Site AZ T:4:122(ASM), an artifact scatter; Site AZ T:4:124(ASM), a large agricultural complex; Site AZ T:4:125(ASM), an artifact scatter with field house; and Site AZ T:4:128(ASM), an artifact scatter. These sites are important resources in that they are indicative of the broad subsistence farming pattern and natural resource exploitation strategies that were implemented by Hohokam groups in the northern periphery of the Hohokam region.

A TCP was identified at one archaeological site by tribal representatives during a visit to the project area. The TCP will be avoided during construction and protected from future development.

The remaining seven sites and all of the 205 isolated occurrences were determined by a professional archaeologist to not meet the criteria for listing in the NRHP because their data potential was exhausted during the recording process (SWCA 1994b). Reclamation and SHPO concur with this recommendation.

3.5 AIR QUALITY

This section describes the existing air quality conditions and regulatory requirements for the region. The air pollutants of greatest concern in the pipeline corridor are ozone, inhalable particulate

matter less than 10 microns in diameter (PM10), and carbon monoxide (CO). These pollutants are considered to be of concern because of the potential health risks they pose. These health risks are described below under "Federal Ambient Air Quality Standards".

Affected Environment

Federal Ambient Air Quality Standards

Ozone is a respiratory irritant that increases susceptibility to respiratory infections. Ozone causes substantial damage to leaf tissues of crops and natural vegetation and damages many materials by acting as a chemical oxidizing agent. Ozone is of concern primarily during summer because it is created by the interaction among high temperatures, the presence of sunlight, and atmospheric inversion layers, inducing photochemical reactions among nitrogen oxides (NO_x) and volatile organic compounds (VOC) and/or reactive organic gases (ROG). For this reason, significance thresholds are set for these ozone precursors rather than for ozone itself. The federal standards for ozone have been set for a 1-hour averaging time. The federal 1-hour ozone standard is 0.12 part per million (ppm), not to be exceeded more than three times in any 3-year period.

Federal PM10 standards have been set at 150 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) for a 24-hour average and at 50 $\mu\text{g}/\text{m}^3$ for an annual average. Federal 24-hour PM10 standards may not be exceeded more than 1 day per year, and annual standards may not be exceeded at all. Few particles larger than 10 microns in diameter reach the lungs, so PM10 is the focus of the federal standards. Health concerns associated with suspended particles focus on those particles small enough to reach the lungs when inhaled because they can lodge in the lungs and contribute to respiratory problems, including permanent lung damage. Fine particles interfere with the body's mechanism for clearing the respiratory tract or by acting as a carrier of an absorbed toxic substance.

CO is a mildly toxic pollutant that bonds to hemoglobin in the bloodstream when inhaled and interferes with oxygen transport to body tissues. The federal 8-hour average standard for CO is set at 9 ppm and may not be exceeded more than 1 day per year.

Existing Air Quality Conditions

In 1995, federal standards for ozone, PM10, and CO were violated in Maricopa County. The two active monitoring sites closest to the pipeline corridor have recorded exceedances of CO, ozone, or PM10 in 1996 (Brown pers. comm.). The nearest operating monitors are located in North Phoenix and Glendale, Arizona. The proposed pipeline corridor and treatment plant sites are located within the pollutant nonattainment area for CO, ozone, and PM10.

Emission Sources

Ozone precursor pollutants (VOC and NO_x) and CO emissions stem primarily from vehicle traffic associated with urban development. A variety of emission sources contribute to current particulate matter problems in the area. Major contributors to particulate matter problems include agricultural activities, dust resuspended by vehicle traffic on unpaved roads, construction and demolition, and aerosols formed by photochemical smog reactions.

Attainment Status and Air Quality Planning

Air quality management in Arizona is governed by the federal Clean Air Act (CAA), which is implemented by the U.S. Environmental Protection Agency (EPA). The Arizona Department of Environmental Quality (ADEQ) and the Maricopa County Environmental Services, Department of Air Pollution Control (APC), oversee air quality planning and control throughout Maricopa County. ADEQ is responsible for portable and refinery sources control, whereas APC is responsible for stationary and indirect source control, air monitoring, and preparation of air quality attainment plans. The federal Clean Air Act mandated the establishment of ambient air quality standards and requires areas that violate these standards to prepare and implement plans to achieve the standards. These plans are called state implementation plans (SIPs). A separate SIP must be prepared for each nonattainment pollutant. The SIPs for ozone, PM10, and CO are currently being revised because Maricopa County has not attained the federal standards for these pollutants as scheduled, and the EPA reclassified all three from "moderate" to "serious". As part of revising the SIPs, the County is in the process of preparing Serious Area Plans, which are scheduled to be complete in December 1997 for PM10, February 1998 for CO, and December 1998 for ozone. (Crumbaker pers. comm.)

Conformity Screening

The CAA conformity regulation states that for any new project using federal funds or requiring federal approval, the federal agency must show that the project does not cause or contribute to a worsening of air quality in areas that violate the federal ambient air quality standards. The federal agency must perform a formal conformity determination if the emissions from the federal action will exceed certain threshold levels. These pollutant threshold levels, called *de minimis* emission levels, vary from pollutant to pollutant and depend on the nonattainment status of individual air basins.

In the case of the Ak-Chin Option and Lease Agreement, the federal action is Reclamation's provision of leased settlement water under the Option and Lease Agreement. The leased settlement water would be carried through a nonfederal pipeline constructed by Del Webb. Reclamation has no financial or other involvement in, or control over, the construction or operation of the water delivery facilities, or the ultimate construction of The Villages. Nevertheless, because the pipeline and water treatment plant associated with the leased water would likely not be constructed without Reclamation's approval, Reclamation considered emissions associated with construction and operation of Del Webb's proposed water delivery and treatment facilities in determining whether a conformity determination is required.

The nonattainment status of the area is classified as "serious" for CO, PM10, and ozone (Crumbaker pers. comm.). The applicable *de minimis* levels are 100 tons per year (tpy) for VOC and NO_x, 100 tpy for CO, and 70 tpy for PM10. Construction and operation emissions would be well below the minimum threshold emissions level that would trigger the formal conformity requirement (see emissions estimates presented in Table 3-2). Thus, no conformity determination is required for this project.

Environmental Consequences and Mitigation Measures

Proposed Action

Impact: Short-Term Increase in VOC and NO_x (Ozone Precursors) and CO Emissions during Project Construction. Construction of the pipeline and water treatment plant could result in a minor short-term increase in the generation of CO, VOC, and NO_x emissions from the operation of construction equipment. Measures are available to minimize VOC and NO_x emissions during construction. Construction-related emissions would be short-term and would not exceed *de minimis* levels because a relatively small number of construction vehicles would be needed to construct the pipeline and treatment plant. Worst case total emissions were estimated to be 1.40 tpy for CO, 0.33 tpy for VOC, and 2.37 tpy for NO_x, which are well below all applicable *de minimis* levels (Table 3-2). Total emissions includes combustion emissions from construction vehicles and equipment, as well as use of employee vehicles by construction crews associated with construction of both the pipeline and water treatment plant. (Sierra Research 1997.)

Impact: Short-Term Increase in PM10 Emissions during Project Construction. Construction of the pipeline and treatment plant would result in a short-term increase in generation of PM10 emissions attributable primarily to earth-moving activities occurring over several months. Worst case total emissions were estimated to be 45.52 tpy for PM10, which is well below the *de minimis* levels (Table 3-2). Total emissions includes fugitive dust emissions from soil disturbance associated with construction of both the pipeline and water treatment plant. (Sierra Research 1997.) As a condition of the construction contract, Del Webb would be required to submit an earth-moving permit application to the APC and implement a dust control plan to reduce PM10 fugitive dust emissions in accordance with Maricopa County Rule 310 for Fugitive Dust (Anthony pers. comm.). These PM10-reducing measures are included as part of the proposed pipeline and treatment plant construction requirements.

Impact: Potential Long-Term Increase in ROG and NO_x (Ozone Precursors) and CO Emissions during Project Operation. Operation of the water treatment plant could result in emissions to the air of ozone precursors and CO only if operation of the water treatment plant involves the use of internal combustion engines (thereby requiring the use of petroleum fuels). In such a case, Maricopa County may require that Del Webb obtain an Air Quality Permit, depending on the type of engines and the hours operated per year. The APC may also require that additional engineering modifications be made to water treatment equipment to reduce emission levels prior to granting an Air Quality Permit (Anthony and Chiu pers. comms.). Before receiving an Air Quality

Table 3-2. Comparison of Pipeline and Water Campus Emissions (tons per year) to Applicable General Conformity De Minimus Levels Specified in 40 CFR 51.853(b)

Category	PM10	VOC	NO _x	CO
Emissions:				
Pipeline	12.20	0.24	1.72	1.07
Water Campus	33.32	0.09	0.65	0.33
Total	45.52	0.33	2.37	1.40
Applicable De Minimus Threshold Levels	70 ¹	100 ^{1,2}	100 ^{1,2}	100 ¹

PM10 = particulate matter smaller than or equal to 10 microns in diameter

VOC = volatile organic compounds

NO_x = nitrogen oxides

CO = carbon monoxide

¹ Maricopa County is a serious nonattainment area for PM10 and CO.

² EPA recently issued a proposed rule for reclassification of the Maricopa County ozone nonattainment area from moderate to serious (Federal Register, Vol. 62, No. 169; [September 2, 1997]). If finalized as proposed, the applicable de minimus levels for ozone precursors in an area designated as "serious" become 50 tons per year for VOC and NO_x as stated under 40 CFR 51.853(b)(1).

Source: Sierra Research 1997.

Permit from Maricopa County, Del Webb must demonstrate that air emissions would not exceed threshold levels. Operation of the pipeline is not anticipated to generate emissions of ozone precursors and CO. Because ROG-, NO_x-, and CO-reducing measures would be necessary prior to construction, this would be considered a minor adverse effect on air quality. No operating emission sources were identified (Sierra Research 1997).

Impact: Potential Long-Term Increase of PM10 Emissions during Project Operation. Operation of the pipeline and treatment plant is not expected to result in earth-moving activities that would generate substantial PM10. No operating emission sources were identified (Sierra Research 1997).

No-Action Alternative

Development of water supply Option 1 and The Villages would occur under this alternative. Existing air quality conditions are the same as identified in the "Affected Environment" section. The Villages and the water supply Option 1 pipeline alignment would not be subject to EPA's general air quality conformity regulation because these projects do not involve federal funding or Reclamation approval.

Air quality issues related to the water supply Option 1 pipeline would be similar to those described for the proposed pipeline corridor. Short-term, construction-related ROG, NO_x, and PM10 emissions would result from trenching and pipeline placing activities involving heavy equipment. Construction emissions under this option would likely be slightly greater than under the proposed pipeline because the Option 1 pipeline corridor would be approximately 3 miles longer than the proposed pipeline. No long-term pollutant emissions would result from this option because water would be treated at the existing City of Phoenix water treatment plant.

Air quality emissions generated from The Villages development would be consistent with air emission levels of other urban or suburban developed areas. Potential emission sources resulting from The Villages development include temporary construction-related sources and vehicular and truck traffic from the more than 16,500 projected residential units, associated commercial development, and proposed wastewater treatment plant facilities. As a result of the traffic expected to be generated at buildout in 20 years from The Villages development, the No-Action Alternative could be expected to generate long-term ROG, NO_x, CO, and PM10 emissions in a region currently identified as a nonattainment area for federal standards.

3.6 NOISE

Affected Environment

Relevant Guidelines and Regulations

Maricopa County has not established noise compatibility criteria for the pipeline corridor (James pers. comm.). The EPA, however, has established sound level guidelines for various types of uses (U.S. Environmental Protection Agency 1971). A sound level of 55 decibels (dB) day-night average sound level (L_{dn}) was established as the outdoor level in residential areas that protects the public health and welfare with an adequate margin of safety. The L_{dn} descriptor is a 24-hour average weighted to penalize noise that occurs during nighttime hours (10 p.m.- 7 a.m.) when people are likely to be most sensitive to noise levels.

Existing Noise Conditions

No noise-monitoring data are available for the pipeline corridor. Existing noise conditions in the areas of the proposed turnout structure, storage reservoirs, water treatment plant, and pipeline corridor are typical of noise conditions in desert open space areas (relatively quiet). The area around the pipeline, however, is generally uninhabited. Existing noise sources consist primarily of traffic from local roadways and I-17 as well as Waddell Canal, which is a minor noise source.

Environmental Consequences and Mitigation Measures

Proposed Action

Impact: Temporary Construction-Related Noise. Construction of the proposed water delivery facilities would result in a temporary increase in noise levels at the turnout structure, pumping plant, pipeline, storage reservoirs, and water treatment plant construction sites. Figure 3-2 illustrates noise levels produced by various types of construction equipment. Properly maintained equipment would produce noise levels near the middle of the indicated ranges. The types of construction equipment that would likely be used for the pipeline construction would typically generate noise levels of 80-90 A-weighted decibels (dBA) at a distance of 50 feet while the equipment is operating (U.S. Environmental Protection Agency 1971, Toth 1979, Gharabegian et al. 1985). The operations of construction equipment can vary from intermittent to fairly continuous, and many pieces of equipment can operate at the same time. Assuming that a bulldozer (87 dBA), backhoe (90 dBA), and front-end loader (82 dBA) are operating simultaneously in the same area, peak construction-period noise could be approximately 94 dBA at 50 feet from the construction sites.

CONSTRUCTION EQUIPMENT	Noise Level (dBA) at 50 feet					
	60	70	80	90	100	110
Equipment Powered by Internal Combustion Engines						
Earthmoving						
Compactors (rollers)		70-75				
Front loaders		70-85				
Backhoes		70-90				
Tractors		75-95				
Scrapers, graders		80-95				
Pavers			85-90			
Trucks			80-95			
Materials Handling						
Concrete mixers		75-90				
Concrete pumps			80-85			
Cranes (movable)		75-85				
Cranes (derrick)			85-90			
Stationary						
Pumps		65-70				
Generators		70-85				
Compressors		75-90				
Impact Equipment						
Pneumatic wrenches			80-85			
Jackhammers and rock drills			80-95			
Pile drivers (peaks)				95-105		
Other						
Vibrators		70-85				
Saws		75-85				

Source: U.S. Environmental Protection Agency 1971.



Jones & Stokes Associates, Inc.

Figure 3-2
Construction Equipment Noise Ranges

Although construction-related noise levels could be substantial at the proposed construction site, they would be temporary and no construction would occur at night. In addition, there are no sensitive noise receptors in the pipeline corridor. One homesite is located approximately 0.5 mile north of the pipeline corridor; it would not be affected by construction-related noise.

Impact: Operational Noise. Operation of the proposed turnout structure, pumping plant, and water treatment plant would create noise. In addition, operation of the water delivery system will require occasional maintenance, which also would generate noise; however, noise from maintenance activities would be temporary and would most likely be within the range of levels previously mentioned. No sensitive noise receptors exist in the pipeline corridor vicinity.

No-Action Alternative

Under the No-Action Alternative, similar noise effects, as described for the proposed pipeline, could result from alternative water supply facilities. Construction of the water supply Option 1 pipeline and booster pump plants would involve a temporary increase in noise levels in the 80-90 dBA range adjacent to I-17 between Deer Valley Road and The Villages site. Construction noise associated with the pipeline at this location would probably not be noticeable because of the proximity of the I-17 background traffic noise source. Booster pumping plant operation would likely create a minor increase in noise levels at Happy Valley Road and north of the Carefree Highway; however, no inhabited structures are present in these areas.

Noise levels generated from The Villages development would be typical of those in other suburban areas around Phoenix. Noise levels would be greatest near roadways and in areas identified for public use. Background noise levels on I-17 could also increase by the time the development is completed, which is estimated to be approximately 20 years.

3.7 TRAFFIC AND CIRCULATION

Affected Environment

The proposed pipeline alignment would cross seven roadways: SR 74, New River Road, 87th Avenue, three unnamed gravel/dirt roads, and I-17. Most areas of the alignment would cross undeveloped rural land.

Highways and Roads

The primary roadway in the pipeline corridor is I-17, which connects Phoenix and Flagstaff, Arizona. In the project vicinity, I-17 is a four-lane facility. Average daily traffic (ADT) on I-17 in the vicinity of the pipeline corridor is 22,910 vehicles (Maricopa County Department of Transportation 1996).

Lake Pleasant Road (SR74) is a two-lane road extending north/northwest from Carefree Highway and crossing the Agua Fria River south of New Waddell Dam. The ADT on SR 74 in the vicinity of the proposed action is 678 vehicles (Hamlin pers. comm.). New River Road begins at an intersection with SR 74 approximately 0.5 mile north of Carefree Highway and extends northeast to I-17. New River Road is a two-lane road that is paved for a portion of its length north of the pipeline crossing; in the vicinity of the pipeline corridor as well as to the south, New River Road is improved gravel and dirt. The ADT on New River Road in the vicinity of the pipeline corridor is approximately 2,500 vehicles (Hamlin pers. comm.).

The Arizona Department of Transportation (ADOT) has jurisdiction over I-17 and SR 74, and the Maricopa County Department of Transportation (MCDOT) has jurisdiction over New River Road.

Environmental Consequences and Mitigation Measures

Proposed Action

Impact: Potential Alteration of Present Patterns of Vehicular Circulation and Increase in Traffic Hazards during Construction Activities. The proposed pipeline corridor would cross I-17, SR 74, New River Road, 87th Avenue, and a number of other unpaved roads. The crossing of I-17 and SR 74 would be accomplished by using conventional underground boring methods. These methods would not disrupt traffic patterns on I-17. Where it would cross New River Road and 87th Avenue, the proposed pipeline would be installed using trench-and-bury construction methods. Construction of the pipeline could result in lane or road closures, detours, open trenches, and the addition of construction trucks and equipment on the surrounding roadway system. This potential effect is considered minor because Del Webb has incorporated a traffic control plan for all road crossings into the project design. The traffic control plan will be coordinated with the MCDOT and ADOT, and construction will follow the standards of the local jurisdiction. Elements of the traffic control plan could include:

- coordinating with state and local jurisdictions regarding hours of construction and lane closures that would minimize construction impacts on the roadways;
- obtaining easements or encroachment permits from local agencies and ADOT, as necessary;
- providing for detours or ensuring that at least one traffic lane remains open along affected roadways and minimizing lane closures during the peak a.m. and p.m. commuting hours;
- specifying types and locations of warning signs, lights, and other traffic control devices;
- providing access for driveways and private roads; and

- notifying and consulting with emergency service providers to ensure that adequate emergency access is maintained.

Impact: Increased Vehicular and Truck Traffic on the Existing Roadway Facilities during Construction. Activities associated with construction of the intake structure, pipeline, storage reservoirs, and water treatment plant are expected to result in additional traffic on the pipeline corridor roadways. Because construction traffic would be temporary and truck volumes would be low, this impact would have a minimal effect on daily traffic levels.

Impact: Temporary Effect on Roadway Conditions. Pipeline installation and heavy equipment traffic could result in effects on roadway surface conditions at crossings. As part of the project, Del Webb will be required to follow normal construction practices, including restoring all road surfaces to original conditions and coordinating with local jurisdictions to ensure that appropriate truck routes are used.

Impact: Minimal Increase in Employee Traffic Volumes and Traffic Delays from Operation and Maintenance. Operating the water treatment plant would require additional employees that would generate additional new trips during both morning and evening peak hours. The possible generation of new trips during the peak hours would not result in a substantial increase in traffic. Operation and maintenance of the Waddell Canal turnout structure, pipeline, and storage reservoirs would require minimal traffic from maintenance vehicles and may occasionally require lane closures for maintenance activities. The maintenance activities would be relatively infrequent and would involve only temporary effects on traffic circulation.

No-Action Alternative

Under water supply Option 1, construction activities associated with the pipeline alignment would result in temporary increases in vehicular and truck traffic on the local roadway network and could result in temporary effects on road conditions (e.g., asphalt damage, detours, or delays) related to construction equipment traffic. Operation and maintenance of the pipeline corridor would result in minor operational traffic effects, and no additional employee traffic related to water treatment plant operation would occur because the water supply would be treated by the City of Phoenix.

Traffic and circulation effects that could result from implementation of The Villages development were evaluated during the Maricopa County plan of development approval process in 1995. MCDOT later developed the Northeast Valley Area Transportation Study (NVATS) (1996), which addresses growth in this area of the state over the next several years. The study area encompasses the New River and Desert Hills communities, including The Villages development (Figure 3-3). ADOT is currently conducting the Phoenix-Flagstaff-Page Multimodal Corridor Profile, an independent study also addressing growth in this area over the next several years (Tognacci pers. comm.). Following is additional information on these studies and recommended traffic improvements.

Northeast Valley Area Transportation Study. The NVATS is a technical plan and contains traffic projections for the study area for the planning horizon year 2015. To develop a long-range plan, future conditions for the study area were projected using a regional transportation modeling program, which accounts for socioeconomic data and roadway network data. Traffic estimates for the base year 1995 were made using existing Maricopa Association of Governments (MAG) socioeconomic data, and the model was calibrated against 1995 traffic counts. For the horizon year 2015, population and employment projections were estimated by the County (based on MAG data that were updated by MCDOT) to represent the highest level of development that could reasonably be expected in the study area by 2015 (Miller pers. comm.). This included 80% buildout of The Villages and development of lands not identified as sensitive by Maricopa County in an area south of the Honda Bow alignment. Figure 3-3 shows the current average weekday traffic and the existing roadway network, and Figure 3-4 shows projected ADT volumes based on 2015 growth projections. The NVATS also evaluated a No-Build option, which assumes 2015 growth and no long-range traffic improvements.

Generally, the NVATS traffic modeling shows that ADT volumes on I-17 would increase from approximately 23,000 (in 1995) to 70,000-98,000 (in 2015) in the vicinity of The Villages development area, with the greatest volumes south of Carefree Highway. In 2015, traffic volumes on I-17 are projected to be 129,000 ADT between the proposed interchange near Deadman Wash and Carefree Highway and 142,000 ADT south of Carefree Highway (Figure 3-4).

Improvements on I-17 to interchanges and interchange approaches are recommended by the County to accommodate the projected increase in traffic volume (Figure 3-4). At the maximum zoning densities, the existing Desert Hills and Pioneer Road interchanges would require improvements. The NVATS also recommends a new interchange be located near Deadman Wash, 2 miles south of the Desert Hills interchange. Connections to the new interchange would be provided by six-lane major arterials that would parallel Deadman Wash and run northeast from the interchange.

The County also proposes improvements to arterial roadways within County jurisdiction to facilitate the projected traffic increase. The arterial roadways would receive traffic from 15 proposed major collector streets, two for the property west of I-17 and 13 for the property east of I-17. The major collector roadway proposed for the property on the west side of I-17 would be a north-south roadway that would eventually connect to the Desert Hills interchange. The major collector roadways proposed for the property east of I-17 would be a combination of east-west and north-south roadways that would connect to the arterial system. The major collector roadways would penetrate the individual subdivisions, collecting local traffic and distributing it to the arterial street system. They would also provide traffic circulation between neighborhoods and recreational facilities. All of the major collector roads are proposed to be three lanes, including a two-way left-turn channelization that will be widened to provide the appropriate intersection geometry required at arterial streets. The existing Desert Hills Drive is proposed to be a four-lane minor arterial street extending west and south along I-17 to connect with the existing Pioneer Road interchange. Six-lane major arterial connectors running east and west to the existing Desert Hills interchange are also recommended.

Implementation of Traffic Improvements. Traffic improvements in the NVATS are recommended by the County, for both arterial roads in MCDOT jurisdiction and for I-17 in ADOT jurisdiction, to accommodate growth and traffic volume increases in the study area. Although ADOT participated in the NVATS by serving on the Technical Advisory Committee and providing comments, ADOT does not currently have plans to widen I-17 (Tognocci pers. comm.). Funding has not been secured for most of the improvements discussed and ADOT believes determining specific improvements is premature.

Improvements to I-17 (i.e., interchanges and additional lanes) recommended in the NVATS study are recommendations by the County, but would have to ultimately be implemented by ADOT. Additional traffic lanes and interchange improvements are often funded by ADOT (or ADOT secures the funding through federal, state, local, and private sources), but ADOT does not fund projects until they are placed on the ADOT Five-Year Highway Construction Program, which is updated annually. The only improvement from the NVATS that has been placed on the Five-Year Highway Construction Program thus far is the Desert Hills traffic interchange, which would be primarily funded by Del Webb. Del Webb would also participate in the funding of an additional interchange, but the specific interchange has not yet been identified.

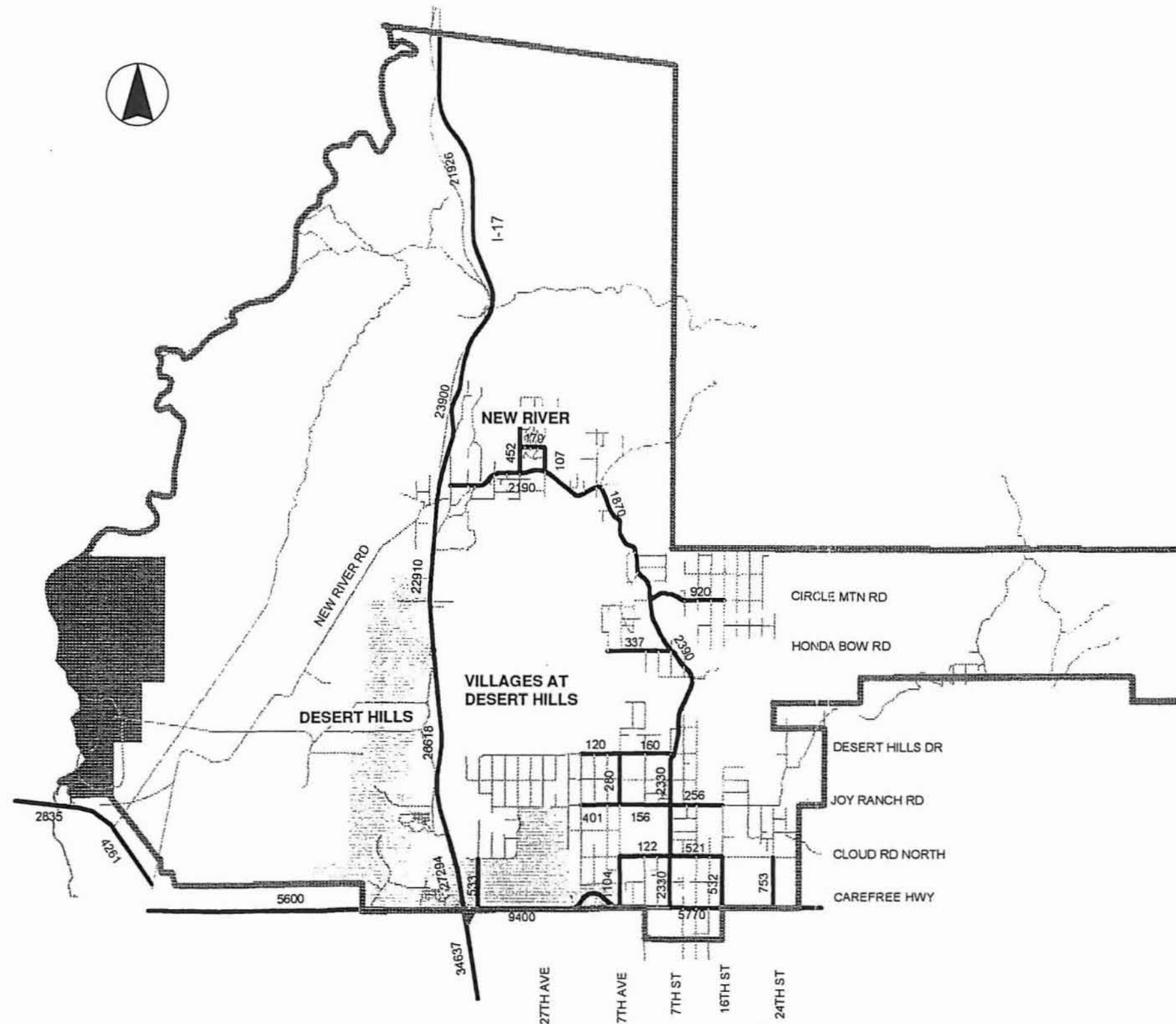
Improvements to arterial roadways are proposals that would be implemented by MCDOT if within County jurisdiction at the time of development. Specific roadway improvements have been identified in the NVATS study with a proposed phasing schedule. However, funding of these improvements has not been committed. As development occurs, it would be the responsibility of the appropriate agency, developer, or jurisdiction to begin programming and funding the project. The NVATS will be updated periodically to reflect changing conditions. (Miller pers. comm.)

I-17 Corridor Profile. ADOT is currently conducting the Phoenix-Flagstaff-Page Multimodal Corridor Profile, an independent study to assess traffic conditions for horizon year 2020. The I-17 Corridor Profile, which represents the southern part of the Phoenix-Flagstaff-Page Multimodal Corridor Profile, is one of a series of long-range studies being conducted to implement the 1994 State Transportation Plan, a policy document developed in response to the federal Intermodal Surface Transportation Efficiency Act (ISTEA). The Phoenix-Flagstaff-Page Multimodal Corridor Profile is anticipated to be complete in mid-1998 and will be used to help identify highway improvements for ADOT's Five-Year Highway Construction Program (Tognocci pers. comm.).



The Villages at Desert Hills Development. The Villages development plan includes several arterial streets within The Villages to be developed by Del Webb. Additionally, intersections of arterial streets and major collector roads may require traffic signals. These traffic improvements would be funded by Del Webb. Existing access to residential areas south of Desert Hills Drive would not be affected by The Villages' circulation improvements.

Figure 3-3

Current Average Weekday Traffic



LEGEND

-  Annexed Phoenix Area
-  Annexed Peoria Area



SOURCES:

MCDOT Street Network
 MCDOT Traffic Counts Program, ADT
 November, 1996

Maricopa County Department of Transportation

Northeast Valley Area
 Transportation Study



LOGAN SIMPSON & DYE

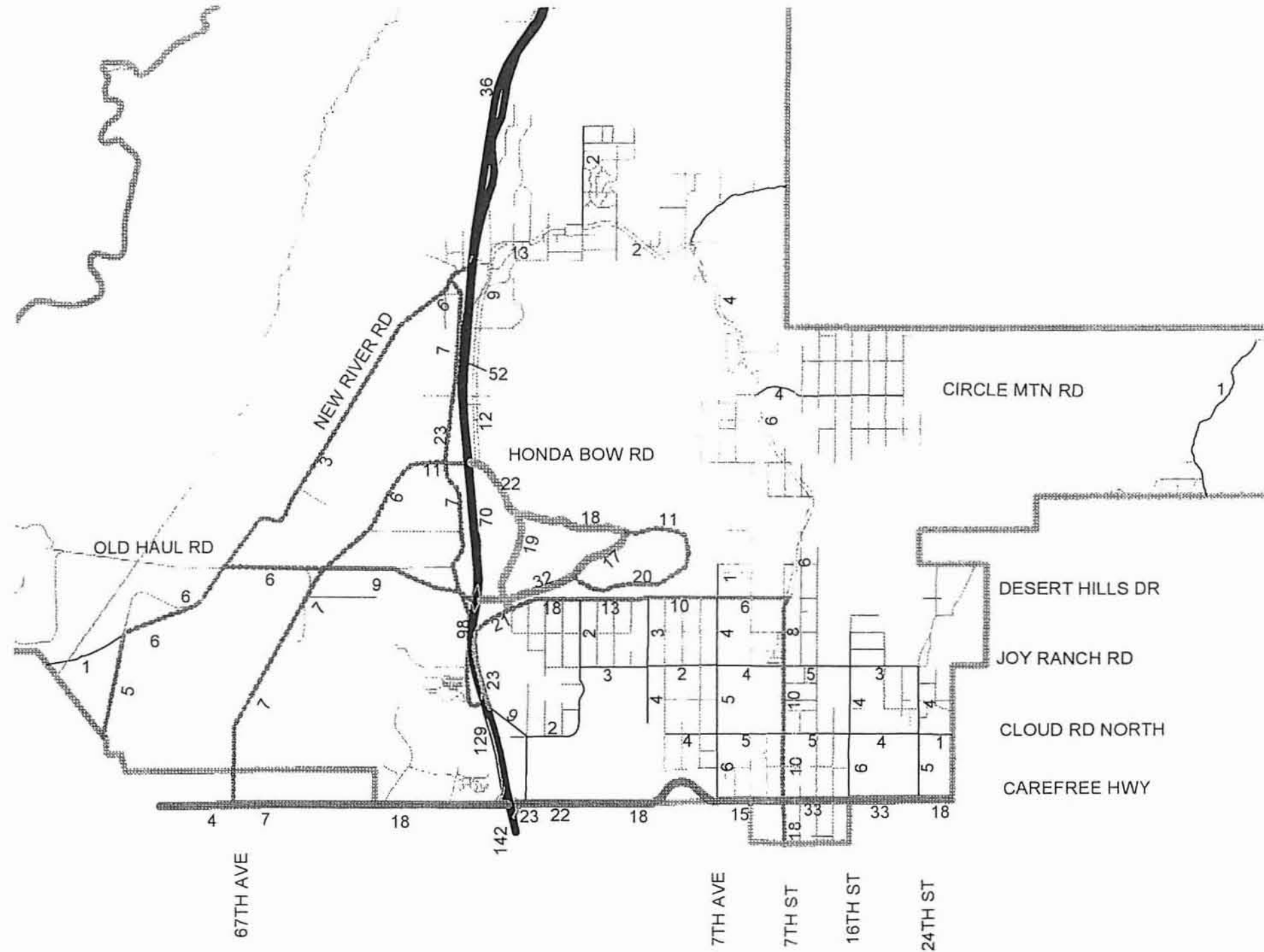


Figure 3-4

Recommended 2015 Roadway Network, Future Average Weekday Traffic

LEGEND

- Interstate
- Principal Arterial
- Minor Arterial
- Major Collector
- Minor Collector

Average Weekday Traffic in Thousands



SOURCES:

Lee Engineering
Logan Simpson Dye

November, 1996



LOGAN SIMPSON & DYE

Maricopa County Department of Transportation

Northeast Valley Area Transportation Study

3.8 LAND USE AND VISUAL RESOURCES

Affected Environment

Existing Land Use Conditions

The proposed pipeline would be located adjacent to Waddell Canal, an existing electrical transmission line corridor, and Reclamation's abandoned haul road for over half of its 9-mile length. The pipeline corridor consists primarily of desert open space, with few improved land-use features in the vicinity. The corridor would cross 17 minor drainages, the New River channel, the El Paso Natural Gas pipeline corridor, six roads, and I-17.

The construction of the pipeline would require both temporary construction and permanent ROW easements because it would cross land owned by several different state and federal agencies. ROW access would be required from the U.S. Bureau of Land Management (BLM), State Land Department of Arizona (SLD), ADOT, and MCDOT. State and BLM land is primarily used for grazing and other open space uses. During pipeline construction, an approximately 100-foot-wide temporary construction easement would be required for all but the New River crossing where the construction site would be larger. Following construction, a 30-foot-wide, 50-year access easement would be required for the pipeline alignment.

The proposed project is located within the 216-square-mile New River Land Use Planning Area in Maricopa County. The land that the proposed pipeline corridor crosses is currently zoned R-43 (Rural Residential, 1 unit/acre). The New River Land Use Plan also provides for the development of higher densities associated with a development master plan.

East of I-17 several areas of scattered residential development exist on lots of 1 or more acres. The Arizona Factory Outlet Shops are located on the west side of I-17 at the Honda Bow Road (Desert Hills) interchange. The area between I-17 and Lake Pleasant Regional Park is mostly vacant and consists of undeveloped Sonoran desertscrub. In addition, one home site is located approximately 0.5 mile north of the pipeline corridor. No minority or low-income communities are located near the pipeline corridor. The Ben Avery Shooting Range, the Arizona Pioneer Museum, and an RV Park are located approximately 2 miles south of the pipeline corridor, a federal correctional center is located approximately 1 mile south of the pipeline corridor, and the New River Landfill, a residential waste site, is located over 1 mile to the north.

Visual Resources

Visual resources near the pipeline corridor consist generally of typical Sonoran Desert landscape features with scattered rural development. Background views in the area are typical of the landscape setting in much of central Arizona, consisting of distant views of foothills and mountainous terrain, which are generally considered to have high scenic value. Middleground views in the area are of flat desertscrub habitat in the lowland areas and of higher elevation hills, bluffs, and mountains.

Prominent features in the area that add visual variety to the otherwise flat desert habitat are Daisy Mountain east of I-17 (a relatively low volcanic outcrop 1 mile west of I-17 and south of the pipeline corridor), the New River channel, and the Agua Fria River. The surface of Lake Pleasant cannot be seen from the pipeline corridor.

Prominent views in the area are generally only from I-17, SR 74, and New River Road. Viewing opportunities in the area are also possible from a number of lightly traveled unimproved roads.

Environmental Consequences and Mitigation Measures

Proposed Action

Impact: Consistency with Land Use Goals and Planning Objectives of Maricopa County. Construction of the proposed water pipeline is consistent with the goals and planning objectives of Maricopa County. Maricopa County has identified the New River Planning Area as an area of desired future urban growth. However, uncertainty concerning water availability in the New River Planning Area is a severe constraint on future growth; 100% of the current water supply comes from groundwater sources that yield low volumes of water. Because the surface water supply under the proposed action would provide a reliable alternative to groundwater, it is considered consistent with applicable plans and policies.

Impact: Consistency with Adopted Land Use Designations and Zoning. The majority of the area that the proposed pipeline corridor would cross is vacant land. The property is currently zoned R-43 (one residential unit per acre). Because this zoning allows for provision of utility corridors and easements, the water delivery facilities are considered consistent with the intended land use for this area. The New River Land Use Plan makes development provisions for higher-density provided they are part of a Maricopa County Development Master Plan.

Impact: No Conflict with Adjacent Land Uses. Implementing the proposed action would not result in substantial conflicts with surrounding land uses because the pipeline corridor is vacant. The land immediately surrounding the proposed pipeline alignment is undeveloped, with the exception of Waddell Canal, roadway crossings, the El Paso Natural Gas pipeline, and the existing electrical transmission corridor (see the discussion of rights-of-way below). The land uses in the area identified above are not in the immediate vicinity of the proposed pipeline corridor and would not be affected because construction activities for the water delivery facilities would be temporary and the pipeline would be underground. No land use conflicts would occur with the one homesite located approximately 0.5 mile north of the proposed pipeline corridor.

Impact: Possible Conflicts with Existing Local, State, and Federal Agency Rights-of-Way. Construction and operation of the proposed pipeline and treatment facilities would generally create minimal effects on existing local, state, and federal property and ROWs because construction

of water delivery facilities is consistent with the general land use in the area and would not substantially affect use of property or ROWs.

Arizona State Lands Department. Most of the lands that the proposed pipeline corridor would cross are Arizona State Trust Lands. The state's primary goal for these lands is to maximize revenues from use of the lands for state schools. The proposed pipeline corridor has been reviewed by SLD staff, which determined that the pipeline would have only minor effects on State Trust Lands. Construction-related activities would create temporary physical effects on State Trust Lands; these effects would be minimized by measures incorporated into the pipeline design to restore the corridor. (See Section 4, "Environmental Commitments", for additional information on measures to restore the construction corridor.) Additional revenue would be generated related to use of state land for a pipeline easement. Therefore, the ROW conflicts associated with Arizona State Trust Lands are not considered adverse, and the pipeline construction would have a beneficial economic effect on Arizona State Trust Lands.

Bureau of Land Management. BLM is in the process of acquiring acreage on the east side of Lake Pleasant for a dedicated conservation area, which may include portions of the pipeline corridor. The pipeline corridor also includes crossing a narrow BLM ROW east of New River that is known as the Black Canyon Corridor. Del Webb would be required to obtain a ROW easement from BLM to cross the corridor. BLM is working toward establishing a designated trail in the corridor to provide a public amenity for equestrian and pedestrian users. Constructing an underground pipeline across the BLM ROW would result in only minor effects on BLM's plans to develop a trail in their designated corridor (Ragsdale pers. comm.).

Arizona Department of Transportation. The pipeline construction would involve crossing I-17 and SR 74. The ADOT has a policy of not allowing utilities in their ROW, with the exception of perpendicular crossings. The ROW along I-17 is 300 feet. A tunnel would be bored under the I-17 and SR 74 ROW to accommodate the proposed pipeline. Once completed, the pipeline would not affect the ROW. However, construction activities associated with the pipeline could create short-term impacts. Barricades and other traffic control measures would be required to reduce potential safety impacts.

Maricopa County Department of Transportation. MCDOT allows recognized public utilities to be placed in the ROW along county roads, but requires a permit. The proposed pipeline would cross New River Road and several other small roads within the County. Necessary permits have been obtained, and no impacts to the ROWs will occur. However, there will be short-term, construction-related impacts on roadways. Following construction, Del Webb would be required to restore the roadways.

Arizona Public Service Electric Utility Corridor. The proposed pipeline would be sited adjacent to the electric transmission line corridor for approximately 3.3 miles from just after the pumping station at Waddell Canal to the former Reclamation haul road. No adverse land use impacts on the existing transmission corridor are anticipated because the transmission line towers would not be affected by an underground pipeline. Because of the potential for the transmission line to induce current in the pipe during construction, an induction survey would be conducted to determine what

grounding measures need to be implemented during construction of the pipeline. Additionally, locating the proposed facilities adjacent to an existing utility corridor would minimize any potential long-term land use conflicts because the facilities would be sited near an already disturbed corridor. APS has been contacted and pipeline placement will be coordinated with staff to ensure no conflicts with the existing ROW would occur. Approximately 35 feet of APS's existing right-of-way would be used as part of the 100-foot-wide construction easement, further reducing effects in the area.

El Paso Natural Gas Pipeline Corridor. The proposed pipeline would cross the alignment of the El Paso Natural Gas pipeline corridor. The proposed pipeline would not interfere with operation of the gas pipeline because the pipeline would be placed beneath the gas pipeline. Precautions will be taken during construction of the proposed pipeline to eliminate hazards associated with the gas pipeline. El Paso Natural Gas has been contacted to ensure no conflicts arise associated with the water pipeline.

Impact: No Effect on Prime Agricultural Lands. Implementation of the proposed pipeline and treatment plant would not require the conversion of prime agricultural land to nonagricultural uses because no prime agricultural land exists in the pipeline corridor. The proposed pipeline would cross existing grazing land. Provisions will be made to prevent livestock from falling into the trenches during construction.

Impact: Effect on Visual Resources. The proposed pipeline would not be visible during the operational phase and would, therefore, not create any long-term impacts on visual resources. Short-term effects on visual resources during construction are expected to be minor because construction would be temporary, the affected area is relatively small, and no sensitive visual resource receptors would be adversely affected. Minor changes to views of the desert visual resources would be most apparent to motorists during construction at the SR 74 crossing and near I-17. Visual resource changes at the Waddell Canal turnout structure would be consistent with visual resources at the canal.

Impact: No Environmental Justice Effects. The proposed pipeline corridor construction site would not affect any minority or low-income communities because none exist in the corridor area. Environmental commitments identified for the proposed pipeline would also not directly or indirectly affect such communities.

No-Action Alternative

Under the No-Action Alternative, alternative water supply options would be used to serve The Villages development area. Water supply Option 1 would be consistent with the land uses goals, objectives, and designations of Maricopa County and would likely not result in substantial land use conflicts because the pipeline corridor would be sited adjacent to the I-17 corridor, and the pipeline would be buried. ADOT's policy of generally not allowing utilities in its 300-foot-wide ROW would require the pipeline to be sited over 150 feet east of I-17. The pipeline alignment would not affect any prime agricultural land, and no long-term visual resources impacts would result because the

pipeline would be buried, the corridor would be revegetated, and the alignment would be sited adjacent to an existing transportation corridor.

The Villages development is within the 216-square-mile New River Planning Area. The Villages would be developed under a DMP that encompasses 5,661 acres of vacant desert scrub in the southern portion of the New River Planning Area. The site is currently vacant and is zoned to accommodate the proposed development. The DMP, NUPD, and planned development overlay are reflected in the New River Land Use Plan (NRLP) text and map, as amended.

Land uses surrounding the development area consist of I-17 to the west, vacant hills and the community of New River to the north, and scattered rural residences to the east and south. The rural residential area south of Desert Hills Drive is the most concentrated residential area in the development site vicinity.

The Villages development would convert 5,661 acres of vacant Sonoran Desert habitat to a master planned community environment. The development would include a mix of residential units, commercial, employment, recreation, and open space uses. There could be a maximum of 16,526 residential units, as indicated in the adopted master plan, although recent announcements by Del Webb suggest there may be 2,000 fewer units. The average residential density for the entire project is 2.9 dwelling units per acre. Approximately 38% of the development plan is devoted to open space and recreation areas, including undisturbed natural areas, hillsides with slopes over 15%, major drainage ways, golf courses, and 300 acres of neighborhood and community parks. No prime agricultural land would be converted in the development area.

The Villages development is consistent with the goals and objectives of Maricopa County and the NRLP. Additionally, numerous stipulations have been presented by the county with which The Villages development must comply. These stipulations are observed in the NUPD and have been incorporated into the plan of development or will be completed before construction.

The NRLP promotes using DMPs on large tracts in the area, provided that the project is responsive to the physical and natural constraints of the property. The reduction of rural residential sprawl and preservation of natural environmental features are goals of the NRLP that are taken into consideration in the proposed Villages development. The development will be integrated into the natural environment, allowing for the preservation of sensitive open space areas that contain visual resources and natural environmental features such as riparian washes, scenic areas, open desert, and steeply sloping desert hillsides.

A goal of the NRLP is to provide a land use environment which generates a diversified economic base that fosters varied employment opportunities, and encourages business formation and expansion. The Villages DMP meets this goal by providing commercial and job employment centers within the proposed Villages plan of development.

It is also anticipated that The Villages would be consistent with the socioeconomic and land use goals of the County and the NRLP, which encourage higher density urban residential developments that provide a mixture of housing types. Development of a treated surface water

source and wastewater treatment plant for The Villages would eliminate the need for a groundwater source and would ensure that groundwater quality problems associated with individual septic systems do not occur in the development area.

Under the No-Action Alternative, The Villages development would not be expected to create substantial land use conflicts with adjacent rural residences. Rural residences to the north, east, and south of the property would be buffered from new development by the incorporation of low-density residential buffer areas into development plans. Daisy Mountain and the New River Range would eliminate views from and buffer land use conflicts with the existing New River community. Skunk Creek and over 300 acres of low-density residential buffer area would substantially reduce land use conflicts that could arise on the southern and eastern property boundaries. Based on the approved DMP, buffer areas along Desert Hills Drive would retain an R1-43 zoning density.

The northwest portion of the site west of I-17 near the Desert Hill interchange would include commercial and mixed land uses. This portion of the site is compatible with surrounding uses because it is adjacent to the existing Outlet Mall.

Under the No-Action Alternative, conversion of open desert habitat in The Villages development area to a master planned community environment setting would substantially change the current views of the site from I-17 and surrounding rural roads. Del Webb plans to preserve many of the natural drainage and hillside features and will provide 38% of the site for open space and recreation/park features, which will help reduce visual resource impacts. The development area will be landscaped and developed as a high-quality, master planned community. Background views of the mountains would not be affected.

Under the No-Action Alternative, public services and utilities for The Villages development area will be provided according to the DMP. Before adoption of the master plan, Maricopa County identified the lack of infrastructure in the New River Planning Area as a constraint to future development. The provision of public services by a developer is encouraged and many times required as a stipulation of development. All of the public services required in the area will be provided, as described below.

The Villages is in the Deer Valley School District. The Desert Mountain Middle School is approximately 2 miles to the south, and the Deer Valley Junior High and Barry Goldwater Senior High Schools are 10.5 miles south at Rose Garden Lane and 27th Avenue. The New River Elementary School is approximately 3 miles to the north on the east side of Black Canyon Highway. Land will be made available for elementary, junior, and senior high school facilities within The Villages development area. To the extent possible, schools will be located adjacent to parks to maximize shared use of recreational facilities. An agreement with the Deer Valley School District for specific types of facilities has been executed pursuant to a DMP Stipulation "u" to dedicate a 50-acre high school site and construct a \$7 million elementary school. Pursuant to DMP Stipulation "mm", The Villages has committed to reserve two additional school sites for a period of 10 years to serve future populations if necessary. Pursuant to DMP Stipulation "ee", the first Information Center will be converted to a library no later than 10 years from the opening of the first model home complex.

The Maricopa County Sheriff's Department currently provides police protection and security to the general area from a substation 18 miles from The Villages development. Police services in the development area will also be provided by the Maricopa County Sheriff's Department. Pursuant to DMP Stipulation "qq", Del Webb has dedicated a 12-acre site on the west side of I-17 adjacent to the Factory Outlet Mall for use by the Sheriff's Department, which may be operated in conjunction with a maintenance facility for the MCDOT.

The Daisy Mountain Fire District currently provides fire service in the area, with stations located at 7th Avenue and Desert Hills Drive and at 27th Avenue and New River Road. Pursuant to Stipulation "rr" of the DMP, a 2.5-acre site was donated in the development area to the Daisy Mountain Fire District for fire station facilities.

No sanitation district currently exists in the area. The Villages development will provide a sewer system and a wastewater treatment facility for both potable water and reclamation of non-potable wastewater. The 44-acre site for the water treatment plant identified under the proposed action would also serve as a site for a tertiary wastewater treatment plant that will accommodate the entire development. Treated effluent is planned as a future source of water for golf course and landscape irrigation. The golf course lakes will serve as storage basins for the irrigation systems. The wastewater treatment facility is anticipated to serve only The Villages development.

The Villages site is currently not served by solid waste disposal services. Trash collection and disposal services in the development area will be provided by a private collection company and will be disposed of at either the Skunk Creek landfill or the Maricopa County Northwest Regional Landfill. Both have sufficient capacity to serve The Villages and would not need to be expanded.

The Villages site is not within an established water district. The Desert Hills Water Company service area abuts the southeast corner of the property and the boundary of the Sabrosa Water Company service area is approximately 1 mile to the northeast. Under the No-Action Alternative, The Villages development will secure one of the alternative water supply options. Groundwater will not be extracted from local wells to serve the community. (Groundwater can only be used on an interim basis early in construction until a permanent water system is completed). No effects on existing water companies in the area are expected because no established water district exists in the development.

A number of developed and undeveloped recreational resources currently exist in the pipeline corridor near the I-17 corridor. Lake Pleasant Regional Park, which is managed by the Maricopa County Parks Department, is located approximately 10 miles to the west of The Villages development area. The 141,400-acre park includes an extensive system of recreational facilities. The Cave Creek Recreational Area to the east of The Villages development area includes 2,752 acres of trails for hiking and equestrian uses.

The Ben Avery Shooting Range and Recreation Area encompasses 1,443 acres and has facilities that include public shooting ranges and a 100-space campground. An excellent archery range with 5 miles of trails and a practice area is also present, and a trap and skeet range is lighted for night use.

Under the No-Action Alternative, The Villages development would ultimately increase the local population and demand for existing recreational resources in the area. The Villages, however, will provide substantial new recreational amenities, such as 300 acres of public and private parks and open space areas with walking, biking, and equestrian trails. The community will also include a number of private 18-hole golf courses and will feature public access to multi-use/equestrian trails and pathways that will traverse the community and provide access to offsite destinations. Del Webb is also required under its DMP to initiate discussions with the Arizona State Land Department to help secure an interconnecting trail system across state and federal land to Lake Pleasant.

3.9 CUMULATIVE IMPACTS

Cumulative impacts result from the incremental impact of the proposed actions when they are added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7).

The water delivery pipeline development that would result from implementing the proposed action would have only minor environmental impacts on seasonal drainages, state special-status plant and wildlife species, cultural resources, air quality, noise, land use, and traffic conditions as described above for the proposed action topical analyses. Construction impacts of the water delivery system would be temporary, operational impacts would be minimal, and facility construction and operation would be subject to the environmental commitments identified in the document including those enumerated in Section 4. The proposed pipeline corridor also has been selected because much of the alignment has been previously disturbed (along the APS electric transmission line corridor and abandoned Reclamation haul road), and biological and cultural resource conditions are generally considered moderate to low quality in the area.

Other past, present, or reasonably foreseeable actions proposed in the area that would contribute to cumulative background conditions (conditions that would occur with or without the proposed action) include preliminary proposals for other water supply infrastructure projects and scattered commercial, recreational, and residential development. The City of Phoenix has indicated that it intends to construct a future water treatment plant and distribution facilities in the vicinity of Lake Pleasant to serve future development in northern Phoenix. It is possible that pipeline facilities described under the proposed action could be considered for use or could be expanded in the future for City of Phoenix municipal and industrial (M&I) use. No detailed plans for City of Phoenix water treatment or delivery facilities are available.

The most notable development in the recent past that is located near the pipeline corridor is the Factory Outlet shopping mall located to the north. Maricopa County has approved plans for The Villages master planned community located east of the pipeline corridor and I-17. The Villages consists of 5,661 acres and was approved for 16,526 residential units as described in Section 2 under the No-Action Alternative. Other planned projects include the BLM Black Canyon trail corridor, City of Peoria annexation and development plans near Lake Pleasant, and MWD's development at Lake Pleasant. In addition, an estimated 1,150-acre parcel located northeast of the I-17 and Carefree Highway intersection is being planned for residential and mixed use development. The developer

is currently in the zoning and annexation process and is negotiating for water service from the City of Phoenix.

Maricopa County's New River Land Use Plan, which covers the area that includes the pipeline corridor, indicates that most of the property in the vicinity of the pipeline corridor is currently designated as rural residential (1 unit per acre). Higher densities can occur under this plan if it is part of a development master plan. Much of the area surrounding the pipeline corridor is state trust land, which can be sold or leased for residential and commercial development. The State Land Department typically creates master plans for large expanses of land prior to sale or lease.

The existing or planned developments that contribute to cumulative background environmental conditions are those that have had or could have similar effects as described for the proposed pipeline corridor. Such developments include all of the projects that could result in direct physical effects from construction in the desert environment or that could contribute to indirect growth-related effects. Cumulative hydrologic and water quality impacts in desert washes are expected to be relatively minor because streamflows in the area are infrequent and because the Corps of Engineers regulates effects on jurisdictional waters of the United States, FCDMC regulates the rates of runoff that are allowed from new developments, and construction in or near drainages would generally be temporary or minimized. Inadvertent release of construction materials, such as fuels or oil-based products, could be minimized using standard construction practices and measures required by FCDMC. Groundwater withdrawals would not increase in the area because water supplies from either the City of Phoenix or surface water from the Colorado River, rather than groundwater, would be used for domestic consumption.

Effects from other reasonably foreseeable actions would result in conversion of Sonoran desertscrub habitat, including over 5,000 acres in The Villages development area, and reduction in its value as habitat for common and state special-status wildlife species. Portions of desert washes and xeroriparian vegetation could be temporarily affected in areas where cumulative development would involve crossing the washes. Numerous minor washes and Deadman Wash and Skunk Creek could be temporarily affected. The potential exists for federally listed threatened or endangered plant or wildlife species to be affected by the cumulative background development that could occur in the New River Planning Area, but no federally listed species were identified as occurring in The Villages development area. The BA indicated that no cumulative effect on federally listed species would occur in The Villages area. Other special-status species that are either known to occur or have the potential to occur in the area could be affected by cumulative background development.

The potential for cultural resource effects on identified or unknown sites exists in the area, particularly near drainages, washes, and New River because of the prehistoric and historic Hohokam occupation. The Villages development area, for example, contains six cultural resource sites that were determined by Reclamation to meet the criteria for listing in the NRHP. Construction effects on these resources would be avoided or minimized based upon recommendations of the SHPO or as required by applicable state law.

Cumulative air quality impacts would involve minor, short-term, construction-related NO_x and PM10 emissions from construction equipment and earthmoving activities, long-term pollutant

emissions related to increased population growth, and automobile emissions associated with urban development. Cumulative noise effects would also involve short-term, construction-related impacts in the range of 80-90 dBA at a range of 50 feet and longer term noise impacts primarily near major transportation corridors, such as I-17, that are typical of suburban or urban environments.

Please refer to the discussion of the No-Action Alternative under the "Traffic and Circulation" section for a complete description of projected future average daily traffic volumes and transportation improvements that could be required by 2015. Future development in the Northeast Valley Area Transportation planning area is projected to result in traffic volume increases on I-17 from approximately 23,000 in 1995 to 70,000-98,000 ADT by 2015.

The proposed action is not expected to result in substantial incremental increases in cumulative impacts beyond those resulting from other past, present, or reasonably foreseeable actions in the New River Planning Area. Impacts from constructing and operating the proposed water delivery system would affect a relatively small corridor of the Sonoran Desert. Most of the effects would occur only during project construction, and Del Webb will incorporate environmental commitments into the pipeline design to minimize environmental effects (see Section 4.0).

CAP water is a major renewable water source available to provide municipal and industrial supplies to accommodate future urban growth in the Phoenix metropolitan area. The cumulative growth impacts that were anticipated to result from use of CAP water were considered and disclosed in Reclamation's final EIS entitled "Water Allocations and Water Service Contracting - Central Arizona Project", which addressed CAP municipal and industrial, agricultural water, and Indian Community allocations (Bureau of Reclamation 1982). That EIS identified similar types of regional/cumulative land use changes, growth, and biological resource effects, which may be associated with use of water delivered through the CAP system and may be relevant to the types of effects that may be associated with delivery of the Leased Settlement Water through the CAP.

3.10 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Construction of the pipeline would result in the temporary loss of nearly 51 acres of Sonoran desertscrub habitat; construction of the water treatment plant would result in the permanent loss of a maximum of 44 acres of this habitat. Del Webb will re-establish preconstruction conditions within the pipeline corridor to allow natural colonization of native plant species and will reseed disturbed upland areas, as necessary, with an appropriate native seed mix (see Section 4.0). Therefore, the temporary and permanent loss of desertscrub habitat is considered a minor effect that is not anticipated to substantially affect plant and animal resources.