

AGUA FRIA

WATERCOURSE MASTER PLAN

Evaluation of Public Safety Issues Final Report

Prepared for



A109.209

October 2001



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This watercourse master plan was prepared by a group of Maricopa County and Consulting professionals dedicated to improving the way we protect people and property from flood damages while meeting the multiple use needs of a growing population. The commitment to this ideal was demonstrated throughout this project by the Maricopa County Board of Supervisors and by leaders of the Flood Control District of Maricopa County. Finally, the plan for the West Valley Recreation Corridor captures the vision of John F. Long — a man who has spent his entire life trying to improve and promote quality of life for families in the West Valley.

Maricopa County Board of Supervisors

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Flood Control District of Maricopa County

Mike Ellegood
Doug Williams, Project Manager
Kris Baxter
Theresa Hoff
Dennis Holcomb
Joe Tram
Amir Motamedi
Dave Degerness

Consultant Team

Doug Plasencia, Project Manager, Kimley-Horn and Associates, Inc.
Alan Humphrey, Assistant Project Manager, Kimley-Horn and Associates, Inc.
Bob Eichinger, Sediment Transport, Kimley-Horn and Associates, Inc.
Lisa Burgess, Newsletter, Kimley-Horn and Associates, Inc.
Bruce Wilcox, Environmental Sciences, Kimley-Horn and Associates, Inc.
Jay Hicks, Landscape and Vegetation, EDAW, Inc.
Leslie Dornfeld, Recreation Master Planning, Cornoyer-Hedrick
Jon Fuller, Fluvial Geomorphology, JE Fuller Hydrology and Geomorphology, Inc.
Laurie Miller, Hydraulic Analysis, LTM Engineering, Inc.
Mike Lacey, Groundwater Recharge, Fluid Solutions
Michelle Olson, Public Involvement and Outreach, Lavidge & Baumayr
Nancy Dallett, Historian, Projects in the Public Interest
Barbara Macnider, Archaeology, Archaeological Consulting Services, Ltd.

Flood Control District of Maricopa County

Evaluation of Public Safety Issues
For the
Agua Fria Watercourse Master Plan

Final Report

Prepared for: Kimley Horn & Associates, Inc.

October 18, 2001



#310, 4727 E. Bell Road Suite 45
Phoenix, Arizona 85032

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1. INTRODUCTION

1.1 *Purpose*

The Agua Fria River Watercourse Master Plan (Watercourse Master Plan) is under development to establish a long-term flood control plan for the river. In addition to flood control, the Flood Control District of Maricopa County (District) is interested in allowing multiple uses of the corridor to enhance the river and maximize its value to the surrounding communities. Outdoor recreation very directly benefits the public and is being considered as a cohesive focal point for multiple uses of the river.

Floodplains are a valuable resource in creating multi-use opportunities and open space for communities. However, locating these opportunities in and around a major watercourse makes them vulnerable to periodic flooding and exposes users to weather-related hazards. The District wishes to minimize public safety concerns and is addressing them as part of the planning process.

Public safety issues related to the proposed multi-use plan for the Agua Fria River corridor were evaluated by LTM Engineering, Inc. Existing flood hazards were identified and current emergency management procedures along the river were investigated. Results of this evaluation and recommendations for minimizing safety hazards are presented in this report.

2. EXISTING PUBLIC SAFETY HAZARDS

2.1 Introduction

A number of city, county, state, and federal agencies were interviewed to identify existing flood hazards along the Agua Fria River. A summary of these interviews is presented below.

2.2 City of Peoria

At the north end of the study area, there are several public and recreational amenities that are affected by flooding of the Agua Fria River. There are houses along Hank Raymond Lake immediately downstream of the dam that would be in imminent danger in the event of a dam breach or failure.

On the west side of the river, the Morgan City Wash confluence crosses Bypass Road, which leads from SR 74 to the dam. The peak 100-year flow was estimated by the Corps to be 14,400 cfs. Probably as a result of seepage from New Waddell Dam, vegetation is abundant and this makes it an attractive hiking area. However, Morgan City Wash is incised and is subject to flash flooding. This could be a concern for hikers who are caught off guard during a flash flood. Finally, there is a 4-cell 10'x10' box culvert under Bypass Road. Bypass Road has sustained damage in the past from flooding.

Cow Town, a remote recreational area near the dam, could be hazardous because users could be trapped during active flooding of the Agua Fria River.

Although not currently constructed, the Universal Propulsion Co. is planning to move its industrial facility to the east side of the Agua Fria River south of SR 74 along the 99th Avenue alignment. Due to the nature of its operations and chemicals that will likely be stored onsite, the property would a potential safety hazard. The facility plans to prohibit public access onto its property.

There are several at-grade road crossings that flood during storms. Jomax Road is Peoria's northernmost unbridged crossing. Currently, the area is largely undeveloped. However, sand and gravel mining activity is increasing and residential developments are planned for the vicinity. Additionally, the archaeological site at Calderwood Butte is nearby. These activities are all affected by flooding and subsequent road closure of Jomax Road.

Hatfield Road is an at-grade crossing of the Agua Fria River. Development in the vicinity is currently sparse. An Arizona Public Service (APS) substation operates on the west side of the river and is occupied. Although it would be cut off from the east during active flooding, a road was recently constructed in the vicinity and now provides western access to and from the substation.

The southernmost at-grade crossing within the City of Peoria is Rose Garden Lane. A particular concern is an isolated residential development in the vicinity of Rose Garden Lane and 115th Avenue. Currently, Rose Garden Lane provides the only access and egress; therefore, the development is cut off during active flooding of the river.

2.3 Sun City and Sun City West

Sun City and Sun City West are located in unincorporated Maricopa County. The only significant flood hazard identified was that of the McMicken Dam Outlet Channel north of Union Hills Drive. There is a potential for localized flooding as a result of a large discharge from McMicken Dam.

2.4 City of Surprise

Only a small portion of the City of Surprise is bisected by the Agua Fria River, from Bell Road one-half mile south to Paradise Lane. However, the Coyote Lakes development is near the river and runs parallel to it on the east side. No significant problems were identified within Surprise, although it was noted that the Bell Road bridge was washed out during severe flooding in the late 1970s.

2.5 City of El Mirage

The City of El Mirage straddles the west side of the Agua Fria River. Flood-related public safety concerns have focused on the El Mirage Landfill and the potential for it to be compromised by major flooding. Other potential concerns were noted regarding Sundial IV, a new subdivision being constructed on the west bank of the river south of Grand Avenue. The basis of concern was its proximity to the river.

2.6 Town of Youngtown

Youngtown borders the east side of the Agua Fria River from Grand to Olive Avenues. There have been flood safety issues within the channel itself in the past, including rescue of people from the river during major flooding in 1993. Additionally, the Town

is concerned with properties that have developed on the east side of the river directly across from the El Mirage Landfill.

2.7 City of Glendale

The City of Glendale has jurisdiction of Northern Avenue, which is an at-grade crossing. The area around Northern Avenue is largely industrial along the Agua Fria River. The southwestern corner of the City is located at the confluence of the Agua Fria and New Rivers. Industrial land use in this area includes a municipal airport, a wastewater treatment plant, and a recycling facility. These facilities are bordered by levees intended to contain the 100-year flood.

2.8 City of Phoenix

A small portion of the City of Phoenix lies in the vicinity of the Agua Fria River at the New River confluence. This portion of Phoenix has experienced recent development, namely Camelback Ranch. A levee was constructed to protect the development from the 100-year flood.

2.9 City of Avondale

The City of Avondale has several flood safety concerns along the Agua Fria River. First, Lower Buckeye Road is an at-grade crossing and poses a safety hazard during flooding. To mitigate the hazard, the Maricopa County Department of Transportation (MCDOT) constructed a low water crossing several years ago and installed a manual gate for closure during floods.

Another concern is at the Avondale Wastewater Treatment Plant on the east side of the river south of Broadway Road. The site itself was raised to mitigate flooding, but the surrounding roads were not. Therefore, access and egress during a flood is compromised.

Additionally, the City of Avondale is concerned with impending development in its southern portion. Of particular concern is the flood potential due to the influence of the Gila River on the Agua Fria River. The City is interested in using the Watercourse Master Plan as a guide for new development.

3. KNOWN CRITICAL FACILITIES

3.1 Introduction

The National Flood Insurance Program defines critical facilities as facilities in or near a special flood hazard zone that may have special needs or require special attention during a flood. It is important to coordinate flood response planning with these facilities so that their special needs can be met during an emergency. Critical facilities can include police and fire stations, hazardous materials storage, public and private utilities, hospitals, nursing homes, and schools. A number of facilities were identified and are summarized below.

3.2 Critical Facilities along the Agua Fria River

A comprehensive inventory of critical facilities was not included in the scope of work for this effort. However, a partial list of facilities was generated as summarized below:

- Lake Pleasant Visitor Center & Museum
- Canyon Raceway
- Cow Town
- Central Arizona Project Canal
- Future Universal Propulsion Co. facility
- APS substation
- Citizen's Utility Wastewater Treatment Plant
- Beardsley Wastewater Treatment Plant
- Santa Fe Railroad
- El Mirage Landfill
- Luke Air Force Base
- Glendale Municipal Recycling Facility
- Glendale Wastewater Treatment Plant
- Glendale Landfill
- Glendale Airport
- Avondale Wastewater Treatment Plant

Additionally, there are a number of sand and gravel operators that currently receive notification of impending flood threat.

It is important to identify critical facilities in order to provide time to secure operations and evacuate if necessary. It is also very important to develop and maintain an accurate list of individuals to contact in case of an emergency, including names and phone numbers of back-up personnel. As discussed in the next section, the Central Arizona Project (CAP) and Maricopa County Department of Emergency Management (MCDEM) maintain such lists. As the Agua Fria River corridor continues to develop and recreational elements are implemented, these lists should be reviewed and updated. Additionally, individual flood response plans should be developed or reviewed for all critical facilities.

4. CURRENT EMERGENCY RESPONSE PROCEDURES

4.1 *Central Arizona Project*

The CAP and the U.S. Bureau of Reclamation (USBR) have prepared an Emergency Action Plan (EAP) for New Waddell Dam. The CAP is responsible for maintaining the dam and implementing the EAP. The EAP includes four levels of response, from low-level internal response where no negative impacts are expected downstream to the highest level where dam failure is imminent. The CAP regularly participates in flood drills with MCDEM, downstream municipalities, USBR, Corps, Red Cross, and local fire departments.

The CAP also monitors its canal for flood and other public safety hazards. The canal is fenced and monitored via closed-circuit TV to prevent public access. Sirens are activated in the event of a security breach.

4.2 *Maricopa County*

4.2.1 Maricopa County Department of Emergency Management

MCDEM coordinates emergency management activities in unincorporated areas of the county and interfaces with local jurisdictions as well. If releases are made at New Waddell Dam, it is notified by the CAP. In turn, MCDEM notifies MCDOT, the Maricopa County Sheriff, and the District.

In addition to internal notification of other county agencies, MCDEM contacts the following as the situation warrants:

- National Weather Service (NWS)
- Arizona Division of Emergency Management (ADEM)
- Arizona Department of Transportation (ADOT)
- City of Peoria Fire Department
- City of Phoenix Fire Department (Phoenix, in turn, notifies the City of Surprise and Sun City)
- Numerous sand and gravel operators
- Red Cross
- Other cities as appropriate

4.2.2 Flood Control District of Maricopa County

The District operates an automated network of precipitation, stage, and weather gages. The network uses Automated Local Evaluation in Real Time (ALERT) technology to monitor real-time information about rainfall, stormwater runoff, and weather conditions in Maricopa County.

The District also monitors meteorological conditions and provides forecast products for various meteorological forecast zones covering a large portion of the county, including the metropolitan Phoenix area. The Meteorological Services Program (MSP) provides weather information to participating agencies via fax or e-mail. The Agua Fria River corridor is located within the Northwest Valley and West Valley Forecast Zones.

The District monitors several precipitation and stage gages along the Agua Fria River including ones at New Waddell Dam, Grand Avenue and SR 85. New River is also gaged.

The District coordinates closely with other county and local agencies to keep them informed of developing severe weather and associated flooding. It disseminates three levels of alert status (ready-set-go) and a fourth all-clear level.

4.3 ***Municipalities***

Most of the municipalities rely on the CAP and MCDEM for information on developing flood conditions in the Agua Fria River. Direct monitoring of the river is not done routinely; rather, action is taken when notified of a problem or potential problem. For example, when significant flooding is expected, public works crews are deployed to monitor and/or barricade at-grade road crossings.

Currently, there is horseback and pedestrian traffic in the river, but ATVs or other motorized vehicles are prohibited. It is challenging for the municipalities to monitor activity along the middle and upper reaches of the river because the terrain prevents easy sighting of people. Also, there is little or no motorized access, so it is difficult to respond to an emergency in the channel or to warn people to leave the area.

Some of the municipalities expressed interest in posting warning lights on the river bank to signal threats to public safety. However, a common problem identified is the lack of funds needed to implement such a system.

5. PUBLIC SAFETY CONSIDERATIONS OF FUTURE RECREATIONAL FACILITIES

5.1 *Introduction*

A number of passive and active recreational opportunities were identified in the Watercourse Master Plan. Potential facilities identified in the Recommended Plan were evaluated with respect to public safety. A summary of the evaluation is provided herein. The Recreation Plan and location map was extracted from the Draft Alternatives Analysis Report, Agua Fria Watercourse Master Plan (KHA, 2001). It is reprinted as Appendix A in this report as a reference for more detailed information on locations and descriptions of proposed facilities.

5.2 *Parks and Interpretive Areas*

Several parks and interpretive areas are envisioned along the river corridor. Public safety may not be compromised if the parks are located outside the floodplain. However, if portions of the park allow access to or recreation in the river channel, special hazard conditions would need to be monitored and flood response plans specific to the individual park would need to be developed. Special concerns are noted below.

5.2.1 George's Pond Interpretive Area

A habitat/interpretive area is planned in the vicinity of George's Pond. The area is very near the downstream face of New Waddell Dam. Additionally, it is in the vicinity of the confluence of Morgan City Wash. Any facilities should be located above the regulatory flood elevation and would need to be monitored during a flood threat. Further, the facilities would need to be incorporated into the New Waddell Dam EAP.

5.2.2 McMicken Dam Park and Trail

A park is envisioned at the confluence of the McMicken Dam Outfall Channel with the Agua Fria River. A trail would extend along the McMicken Dam Outfall Channel to McMicken Dam. From a public safety standpoint, location of a park at the confluence of a major watercourse is problematic. Therefore, any park facilities should be located above the regulatory flood elevation.

McMicken Dam has sustained damage in the past and may not be operating effectively today. The functionality of the dam should be evaluated in order to quantify its effect on downstream recreational activities. In any event, an EAP should be prepared for the dam that includes monitoring of the park during storms and closure during flooding.

5.2.3 Avondale Mitigation Site Park

The Avondale Mitigation Site is proposed as a potential park site. It may be subject to flooding by both the Agua Fria and the Gila Rivers. Similar to the McMicken Dam park, a flood response plan should be developed that includes monitoring of the park during storms and closure during flooding.

5.3 Trails

The proposed trail system is largely envisioned to be outside or on the fringes of the floodplain and away from immediate contact with sand and gravel operations and haul routes. However, the trails may cross the river at several locations and in some cases would be located along the bottom of the Agua Fria River or its tributaries. Public safety concerns of specific in-channel trails are described below.

5.3.1 Morgan City Wash Trail

Morgan City Wash is an attractive location for a trail because of the lush vegetation and interesting terrain. In addition, the CAP has provided \$275,000 to the Arizona Department of Game & Fish for habitat protection and enhancement, conservation easements, land purchase, and fencing. However, there are public safety concerns with using the wash as a trail because the contributing watershed is large and it is currently unengaged. Any future trail along Morgan City Wash should be located above the regulatory flood elevation.

The District has considered installing gages for Morgan City Wash in the past. The initial conclusion at the time was that the terrain made the installation and data transmission of precipitation gages difficult. Also, since the area is remote and public use was low, further analysis was not justified. However, if a trail is developed along the wash, public presence will increase and the District may wish to install precipitation gages on the watershed and a stage gage at Bypass Road. The monitoring of gages could then be tied to a flood response plan for the wash. Installing gages on Morgan City Wash has additional advantages downstream at the

unbridged crossings of Jomax Road, Hatfield Road, and Rose Garden Lane.

5.3.2 Twin Buttes and Unnamed Washes Trails

Trails have been identified for Twin Buttes Wash on the west side and several large unnamed washes on the east side of the Agua Fria River. These trails would be similar to that planned for Morgan City Wash. Installation of stage gages to monitor runoff in these washes may not be feasible because of a lack of controlled cross sections (bridges). Another factor is that the contributing drainage areas are smaller than that for Morgan City Wash. If trails are developed in these washes, hydrologic analyses should be performed in order to quantify the threat to public safety. As with Morgan City Wash, any trails along these washes should be located above the regulatory flood elevation.

5.3.3 Riparian Habitat Trail

A trail is included in the Recreation Plan to connect Coldwater Park at Buckeye Road with a riparian project underway at the I-10 outfall channel. The riparian trail alignment would likely extend down to the channel bottom.

In general, where a trail crosses the river or is located within it, special safety issues must be considered. Minimal safety precautions would include proper signage identifying the flood hazard. Signs should be installed at all access points and periodically along the trail itself. If the signs also incorporate flashing lights to signal imminent flooding, they should be installed at a height that reduces the chances of startling horses when activated.

5.4 **Recharge Operations**

Several recharge plans are under development along the Agua Fria River. Operational and public safety concerns for these facilities include water quality, water safety, and security issues. It is likely that the recharge facilities would prevent direct public access to their intake works and recharge basins.

6. PUBLIC SAFETY CONSIDERATIONS OF FUTURE FLOOD CONTROL FACILITIES

6.1 Introduction

Several types of structural flood control facilities were analyzed in considering potential future changes to the river and in developing alternatives for the Watercourse Master Plan. These facilities include grade control structures, river channelization, and bank protection. Of these, grade control structures and river channelization can directly affect public safety and are discussed below.

6.2 Future Grade Control Structures

Grade control structures may be constructed at various locations within the river to mitigate channel bed erosion. However, events that occurred in the past decade have affected how grade control structures are implemented.

During a major flood in 1993, two people illegally entered the river in a kayak. During the trip, they were pulled underwater at a grade control structure and died. It was believed that the cause of the accident was that the stilling basin on the grade control structure overflowed. A submerged hydraulic jump subsequently occurred. In a submerged hydraulic jump, the water appears stable on the surface. However, under the surface considerable turbulence occurs and the current is dangerous to unsuspecting boaters.

As a result of the 1993 accident, the design of grade control structures in the Salt River was modified to eliminate hydraulic jumps altogether. The modified design recommendation was a stepped or cascade structure where the step is wide enough to avoid overshoot of the step during shallow flow, and shallow enough to avoid a hydraulic jump. This type of design is not as effective in dissipating energy, but is more likely to avoid submerged hydraulic jumps.

Even though boating is not allowed in the Agua Fria River and would not likely be allowed in the future, the potential exists for people to enter the river illegally during a flood. Therefore, it is important to monitor the river during floods and avoid submerged hydraulic jumps at any future grade control structures.

6.3 *Future River Channelization*

One element of the structural alternative analyzed for the Watercourse Master Plan is the channelization of the river from Grand Avenue to Beardsley Road. The channel would be designed to contain the 100-year flow with one foot of freeboard and would incorporate a landscaped trail for recreational use.

The recreational potential for such a channel and trail configuration makes it a very attractive element. However, compromised public safety of lands adjacent to the channel would be a serious concern. The floodplain in some areas is broad and the historic channel embankment is steep and high. If the 100-year flow is contained in a channel, the adjacent area would no longer be within the floodplain or floodway under existing regulations. Therefore, it is conceivable that the surrounding area could subsequently be developed. This area may not be subject to flooding from the regulatory flow; however, it would still be at risk to flooding in the event of a dambreak or overtopping of New Waddell Dam. If this occurs, the ensuing property damage and loss of life would be catastrophic. This special hazard condition should be recognized and addressed prior to allowing any development on the historic floodplain.

7. PUBLIC SAFETY RECOMMENDATIONS

Public safety issues must be considered at all stages of river restoration and management, from planning through implementation. It is important to avoid locating recreational facilities at points of concentrated flow, coordinate emergency management and response activities, and address specific hazards on individual projects. Recommendations for incorporating public safety elements into future facilities are summarized below.

7.1 Public Recreational Facilities Design

Recommendations for guiding the design of public recreational facilities include:

- Modify the floodplain use permit application process to include a formal review of public safety. Permit application requirements could include an evaluation of flood safety concerns and the requirement of a mitigation plan as warranted.
- Require signage of flood hazards wherever public amenities are constructed within the corridor and at all access points to the river.
- Encourage benched or tiered recreational areas; passive recreation on lower tiers, active on higher tiers.
- Locate structures and parking lots above the regulatory flood elevation.
- If structural recreational facilities are allowed within the regulatory floodplain, require that they be secured.
- Disallow amenities within any designated low-flow drainageways.
- Coordinate with appropriate agencies to develop wetlands or habitat zones that allow for periodic maintenance of the drainage facilities.
- Incorporate access points for emergency response into the design of recreational facilities. Access points (e.g., trailheads, staging areas) must be large enough for emergency vehicles and related equipment to enter and exit the area.
- Incorporate park rangers into emergency management and response activities where parks are constructed in or adjacent to the river.

- Install a light system such as blue-light stations that would be visible at night from the river and where users could safely get out of the river or to a telephone.

7.2 Flood Control Facilities Design

Recommendations for designing grade control structures include:

- Require stepped or cascade designs that prevent the formation of a hydraulic jump, particularly a submerged hydraulic jump.
- Where channelization occurs in a broad, flat floodplain, restrict adjacent development to areas above the historic river banks in order to avoid catastrophic damage in the event of a dam failure.

7.3 Flood Threat Recognition

As recreational amenities are constructed and public use increases, the District's ALERT system should be expanded accordingly. Suggested enhancements could ultimately include:

- Install precipitation gages in the Morgan City Wash watershed and a stage gage at Bypass Road.
- Evaluate the need for installing additional monitoring equipment in the Twin Buttes and three unnamed washes downstream of New Waddell Dam.
- Expand the MSP to include all interested communities along the Agua Fria River in the dissemination of flood threat information.

7.4 Emergency Management & Response

Emergency management and response activities should be designed to be site-specific to maximize their effectiveness:

- Develop EAPs or Flood Response Plans as appropriate for individual facilities.
- Keep the CAP informed of recreational development as it occurs so that the New Waddell Dam EAP can be updated.
- Develop and maintain a complete inventory of critical facilities along the Agua Fria River.
- Encourage/require critical facilities to prepare an EAP.
- Routinely (at least annually) exercise the EAPs.

Appendix A
Recreation Plan Excerpt from the
Draft Alternative Analysis Report
Agua Fria Watercourse Master Plan

3.5 Recreation

Existing and planned recreation features shown in Table 3.5-1 were inventoried to identify opportunities where they could be preserved, enhanced, or improved, and to serve as a basis for establishing a linked system of recreational opportunities throughout the project area. The recreation resources included in this inventory include open spaces, natural areas, interpretive opportunities, active play areas, sports fields, trails, and passive sites. Table 3.5-1 lists the existing and planned recreational features located within the one-mile buffer along the Agua Fria from the New Waddell Dam in north Peoria to the Confluence with Gila River in Avondale. The information is subdivided by jurisdiction.

3.5.1 Parks, Trails and Open Space Inventory and Recreation Needs Analysis

A parks and open space inventory and a recreation needs analysis were conducted to ascertain the extent to which demand for recreation facilities is being met as well as to identify the existing facilities that could be woven into an interconnected recreation system along the river. The inventory and analysis includes all recreation facilities within one mile of the floodplain. This distance is coincident with the service area radius of a community park.

Parks

There are many improved neighborhood, community, and regional parks within each of the municipalities located within one mile of the Agua Fria River. These parks serve the community and regional needs of populations along the river.

Parks under development include Avondale's Regional Park II north at McDowell Road on the east bank of the river and the City of Phoenix Camelback Ranch Park. Regional Park II will include sports fields, a soccer facility, picnic areas, gardens, restrooms, and ramadas. The City of Phoenix Camelback Ranch Park is a community park and will include an equestrian trail and trailhead, sports fields, restrooms, picnic areas, and a ramada. A planned community park will be located at Deer Valley Road on the east side of the river.

Developed parks include Coldwater community park on the west bank of the river on the north side of Buckeye Road in Avondale, the Maricopa Lake community park on the east bank of the Agua Fria River in Youngtown, and the Rancho Santa Fe private community park on the west bank just north of McDowell Road.

Several existing and planned parks located outside the study area serve residents of the Agua Fria corridor. These include the City of Surprise funded Cactus League facility and regional park in conjunction with its new town core, the Sunshine Mountain community park south of Jomax Road, and the Las Legas community Park in Avondale, and several unnamed community parks identified in the City of Peoria General Plan.

Table 3.5-1 – Existing Recreational Features

Agua Fria River Watercourse Master Plan

City/Recreation Feature	Amenities	Status	Location	River Reach
<i>Avondale</i>				
Coldwater Park	Baseball Fields, Ramadas, Picnic Facilities, Parking.	Developed	West of Agua Fria & Buckeye Road	Lower Reach
Regional Park II	Japanese Garden, sports fields, soccer facilities, restrooms, picnic areas, armadas.	Under construction	East of Agua Fria & McDowell Road	Lower Reach
City of Avondale Trails	Shared use trail	Partially completed		Lower Reach
Estrella Mountain Park	Rodeo and equestrian facilities, parking, picnic areas, hiking trails, restrooms	Master plan to be updated in 2001-2002.	South of Gila River Confluence area	Lower Reach
Agua Fria Union High School	Sports fields	Complete	West of Agua Fria at Dysart & Riley Drive	Lower Reach
Rancho Santa Fe Park	Tot lot, open grass play area, barbecue area, on street parking	Complete	North of McDowell Road	Lower Reach
<i>El Mirage</i>				
Existing Bike lanes	Street bicycle lane	Complete; additional lanes planned	El Mirage Road between Thunderbird Road and Canal	Middle Reach
Pueblo El Mirage Country Club	Golf course, club house, private residential lots.	Golf course complete, residential lots available	West of Agua Fria River between Peoria & Cactus Roads.	Middle Reach
Dysart High School	Sports Fields	Complete	Dysart Road	Middle Reach

Table 3.5-1 – Existing Recreational Features

Agua Fria River Watercourse Master Plan

City/Recreation Feature	Amenities	Status	Location	River Reach
<i>Glendale</i>				
Luke AFB Horse Stables	Stables	Complete	West side of Agua Fria River, north of Glendale Road	Middle Reach
<i>Phoenix</i>				
Camelback Ranch Park and Equestrian Access	Sports fields, grass areas, ramadas, restrooms, parking, equestrian facilities.	Under design	East side of Agua Fria River just north of Camelback Road	Middle Reach
Garden Lake Parks (2)	Tot lots, picnic areas	Complete	East side of Agua Fria at Thomas & 115 th Avenue	Middle Reach
<i>Sun City East</i>				
Sun City Golf Course	Golf Course and Clubhouse	Complete	East of Agua Fria/ South of Peoria Avenue	Middle Reach
South Golf Course	Golf Course and Clubhouse	Complete	East of Agua Fria / North of Peoria Avenue	Middle Reach
North Golf Course	Golf Course and Clubhouse	Complete	East of Agua Fria/ South of SR 60	Middle Reach
Lakes West Golf Course	Golf Course and Clubhouse	Complete	East of Agua Fria / North of SR 60	Middle Reach
Willow Creek Golf Course	Golf Course and Clubhouse	Complete	East of Agua Fria/ North of Bell Road	Upper Reach
<i>Sun City West</i>				
Briarwood Golf Course	Golf Course and Clubhouse	Complete	East of Agua Fria & north of SR 60	Upper Reach
Star Dust Golf Course	Golf Course and Clubhouse	Complete	East of Agua Fria & north of SR 60	Upper Reach

Table 3.5-1 – Existing Recreational Features

Agua Fria River Watercourse Master Plan

City/Recreation Feature	Amenities	Status	Location	River Reach
Pebblebrook Golf Course	Golf Course and Clubhouse	Complete	East of Agua Fria & north of SR 60	Upper Reach
Gaines Park	Ramadas, picnic areas	Complete	East of Agua Fria & north of SR 60	Upper Reach
Bicentennial Park	Ramadas, picnic areas	Complete	East of Agua Fria & north of SR 60	Upper Reach
<i>Youngtown</i>				
Maricopa Lake Park	Lake, picnic areas	Complete	East side of Agua Fria River at Lakeshore Drive.	Middle Reach
<i>Surprise</i>				
Coyote Lakes Golf Course	Golf Course	Complete	East of Agua Fria & north of Bell Road	Upper Reach
<i>Peoria</i>				
Country Meadow Golf Course	Private golf course, clubhouse	Complete	East of Agua Fria/ North of Northern Avenue	Middle Reach
Conceptual Neighborhood Park		Identified in City of Peoria General Plan	Union Hills Road and Agua Fria River	Upper Reach
Conceptual Community Park		Identified in City of Peoria General Plan	Beardsley Road and Agua Fria River	Upper Reach
Conceptual Neighborhood Park		Identified in City of Peoria General Plan	Deer Valley Road & Agua Fria River	Upper Reach
Conceptual Neighborhood Park		Identified in City of Peoria General Plan	Cloud Road and Agua Fria River	Upper Reach
Conceptual Neighborhood Park		Identified in City of Peoria General Plan	Joy Ranch Road and Agua Fria River	Upper Reach

To determine the extent to which existing and planned facilities meet current and future need, an analysis of existing and planned park facilities based on population and service area was conducted. The analysis shows that the existing populations along the river are generally well served by either community or neighborhood parks, and that park development has generally followed residential development. Some gaps in service exist on the east side of the river between Olive Avenue and Thunderbird Road as well as north of Bell Road on the east side of the River. However these areas are either not generally residential in character (as with the Olive to Thunderbird Areas) or are served by open space and golf courses (as with the Sun City West Area north of Bell Road) appropriate to surrounding demographic patterns. Finally, the analysis demonstrates no recreation facilities are currently provided for the largely undeveloped area in Peoria north of Pinnacle Peak Road. However, planned facilities for this area are included in the City of Peoria General Plan. In addition, the City of Peoria has identified the area on both sides of the river as open space (discussed below) and generally requires developed parks as part of private development. Consequently, as this area develops, its' recreation service needs will most likely be met.

Trails

Several existing and planned trails intersect with or terminate at the river. These trails include bicycle lanes and routes and shared use paths.

Although the City of Avondale has no adopted trails plan, several trails constructed through private developments cross or are adjacent to the river. The City of Phoenix designates all arterial streets for bicycle lanes, including Camelback and Indian School Roads. Glendale similarly designates arterial streets for bicycle lanes. The New River is also a planned shared use corridor. Maricopa County is currently working to designate a countywide, shared use trail that would include the Agua Fria River corridor. While east/west routes provide a variety of connections from the river to other destinations, the Sun Circle Trail is the only designated north/south connection identified along the river.

Open Space

Substantial designated open space exists along the Agua Fria Corridor. In the southern areas of the River, the City of Avondale has designated the confluence with the Gila River as an opportunity to promote eco-tourism. While the City is currently revising its general plan, it is likely that the commitment to conserving this area will remain. In the northern areas of the river, the City of Peoria has identified both sides of the Agua Fria River as an open space buffer. In addition, slopes over 14% and most major washes in Peoria have been designated open space.

In the more urbanized areas (between I-10 and Bell Road), several golf courses provide private open spaces. These include the Coyote Lakes golf course in the Town of Surprise and the Pueblo El Mirage Country Club in El Mirage. Both Sun City and Sun City West provide golf courses for their residents. The Coldwater Springs golf course is located within Avondale.

In summary, a variety of public and private open space resources are located near or adjacent to the Agua Fria River. These open spaces are dispersed along the corridor and are not connected by any direct street routes.

As discussed previously in this section of the report, planned recharge along the river could return it to a more vegetated state and may support the development of new of riparian and wildlife habitats. Although current mining activities limit recreational opportunities in certain areas of the river, there may be the potential to reclaim these pits as a recreation amenity once their resources are spent. Finally, the rich culture and history of the West Valley, including the Agua Fria River, also influence the future use of the river through development of interpretative areas in significant historical and pre-historical areas.

3.5.2 Recreation Opportunities and Planning Issues

As shown in Figure 3.5-1, there are many opportunities for open spaces, interpretive areas, shared use facilities, and recreation facilities along the Agua Fria River. These opportunities are summarized below by type of facility.

1.5.2.1 Parks

Parks could be developed to serve residential areas between Union Hills and Joy Ranch roads. These include parks at the El Mirage Treatment Plant and at the McMicken Dam Outfall. Additionally, interpretive sites could reinforce the history of the river as a resource for mining, agriculture, and water. Interpretive sites could also be integrated with recharge facilities. Finally, several archaeological areas from the Hohokam period could be developed as interpretive parks including Calderwood Butte, Casa de las Piedras (north of Calderwood Butte), and pit houses throughout the northern reach.

1.5.2.2 Maintenance Road

An access road would be needed to monitor and maintain the river for flooding and erosion activities. At the same time, it is desirable to link recreational resources. Therefore, it is proposed that an access and maintenance road be constructed that would also allow non-motorized recreational use. A continuous stabilized surface trail could be constructed along the river from Southern Avenue (extended) to Camelback Road. North of Camelback Road to approximately Bell Road, mining makes passage within the river difficult. Consequently, the trail could continue along the New River to Olive Avenue or agreements with mining operators could provide access through their operations. North of Olive Avenue, the in-river trail could be continued to SR 74, where on-street access would be necessary to enter Lake Pleasant Park.

Figure 3.5-1 – Planning Influences

NOTE: *This figure was not referenced in the Evaluation of Public Safety Issues and is not reprinted here.*

1.5.2.3 *Levee Trails*

Along the levee reach of the river, a shared use trail along both sides of the river could be constructed. This trail would be directly accessible to residents along the river and could offer amenities such as lighting, benches, and rest areas outside the floodplain.

1.5.2.4 *Trailheads*

Several trailheads are proposed to connect to existing trails that intersect the river and to provide access to the river. Two general types of trailheads are proposed. The major trailhead would include horse trailer parking and other equestrian facilities, restrooms, shade areas, and water. These facilities would be co-located with parks whenever possible. The minor trailhead is intended as a parking area and access point, and would offer directional signing and limited amenities.

1.5.2.5 *Natural Areas and Passive Open Spaces*

Open space, interpretive, and passive recreation facilities could be preserved or developed at the northern and southern ends of the river. At the I-10 crossing, a proposed mitigation site could be developed into an open space interpretive area with in-channel trails. Other natural open spaces are proposed at Rose Garden Lane and between Patton Road and Dixileta Drive.

1.5.2.6 *Recreation Planning Constraints*

In conjunction with recreational potential along the river, there are many issues that may affect their inclusion in the recommended plan. These issues include regulations that may restrict the uses of some areas, the need to preserve the river as a stormwater conveyance, access, environmental hazards, existing development patterns, current land use, and cost of implementation and maintenance.

Recreation

- The Industrial feel of the Middle Reach and current mining activities limit access and continuous recreation use.
- Existing and planned parks along the corridor that are developed privately reduce the incentive for public agencies to provide potentially redundant facilities along the river.
- Access to the river is difficult in many places due to the design of existing developments, flood control improvements, mining, or natural topography.
- Flooding events could potentially result in the damage or loss of recreation improvements placed within the river.
- Because of access constraints, policing is more difficult, and safety may be an issue. The braided character of the main channel limits the opportunity to

create developed recreation connections between the east and west side of the river.

- Regulatory agencies should continue to work with new development along the river to ensure opportunities for access, conservation of recreation, open space, environmental, habitat and cultural resources and maintained.

Recharge

- Recreation activities adjacent to recharge channels and basins may affect the class of water and the amount of water being recharged. Some recharge (i.e., effluent) may have undesirable characteristics that could impact recreation use.
- The type of conveyance (constructed or in channel natural flows).
- Some recharge facilities are underway, requiring retrofit if these facilities are to be designed in a manner that promotes multiple or interpretive uses.

Archaeological

- Additional research is needed to fully document these sites
- Most of the northern sites are underground.
- Most sites do not lend themselves to public interpretation.
- One rock art site may have religious association.
- While some sites contain valuable information, the resources are not readily visible.
- Many sites are on private land.
- Sites could be open to the public only when adequate protection is in place.

Cultural

- Most of the cultural/interpretive sites are not focused on the River itself, but on getting people across the river.
- The story of the river is one of how it was exploited whichever group was using it at the time.
- Many of the resources and sites are not adjacent to or within the project boundaries.

Environmental

- With the exception of the northern end and the restoration of the southern end of the corridor, the Agua Fria River has marginal environmental value.
- Water quality issues may impact the potential for mitigation banking within the river.

3.5.3 Proposed Recreation Plan

The vision of the recreation plan is to complement the flood control functions of the Agua Fria River by creating a dynamic open space and recreation corridor that remembers landscapes of the river and the people who lived along it. In order to achieve this vision, the following goals are identified:

- Create activity within the Agua Fria River while minimizing the impact of recreation on the landscape.
- Use the River as a bridge to connect to the cultural history of the West Valley.
- Connect the open space recreation resources along the river to each other, adjacent neighborhoods, and other recreation and open space resources in the West Valley, the region and the state.
- Provide access to the river.
- Educate the public about the history of the people who lived along the river and role of the river in the development of the West Valley and the region.
- Integrate ecological values with recreation concepts.
- Integrate recreation functions with flood control facilities.

To implement this vision of enhancing the character of the river, three broad management areas were identified. The purpose of these areas is to guide the types of activities that could occur along the river to realize this vision. Table 3.5-2 describes the types of activities appropriate to the management areas.

Table 3.5-2 – West Valley Recreation Corridor Planning Matrix
West Valley Multi-Modal Transportation Corridor Plan

DEVELOPMENT ACTIVITIES	Management Goals & Intensity		
	RURAL (HABITAT/ WILDLIFE CONSERVATION)	SUBURBAN (PASSIVE)	URBAN (ACTIVE)
Transportation	Access restricted to protect sensitive desert areas; trails will skirt such areas	Link with community open space systems and residential areas	Links between residential, commercial, recreational, etc., areas; bypass routes to separate more intensive users from pedestrians
Flood Control	Natural, generally non-structural low flow channels integrated into environment	Non-structural with structural elements to protect road crossings and existing development or to preserve natural features.	Structural to stabilize banks; protect planned and existing development and desired natural features
Recreation	Fitness, observation, restricted hiking/packing, equestrian routed around fragile areas. Stabilized surfaces	All activities in Conservation Wildlife Management Goal and picnicking, camping, restricted bicycling, restricted blading, restricted horseback, concessions, fitness, hiking/packing, touring, climbing, non-motorized boating, services	All activities in Conservation Wildlife and Passive Management Goals and motorized activities, shooting, bicycling, blading, field oriented sports, rodeo, large group (>10 people) activities, fitness, festivals, concessions, services
Interpretation/Education	Controlled access; viewing platforms and elevated pathways for observation of protected habitat, especially in areas near New River Dam	Numerous opportunities on proposed trails with informational signs on bridges, and structures; linkages also serve as educational opportunities, identification of historic sites	Numerous opportunities on proposed trails with informational signs; links also serve as educational opportunities
Extraction/Mining	None	None	Revegetation and restoration plans required, time limits placed on activities, buffering during activities required
Economic	No development or alteration of floodplain; buffer floodplain from	Incorporate floodplain into development without altering shape	Incorporate trails or river amenities into land uses adjacent to the

Table 3.5-2 – West Valley Recreation Corridor Planning Matrix
West Valley Multi-Modal Transportation Corridor Plan

DEVELOPMENT ACTIVITIES	Management Goals & Intensity		
	RURAL (HABITAT/ WILDLIFE CONSERVATION)	SUBURBAN (PASSIVE)	URBAN (ACTIVE)
	adjacent uses	or characteristics, restore floodplain and floodway to enhance land uses	floodplain; some alteration of the floodplain to encourage desired uses
Trailhead	Outside the floodplain	Limited facility trailheads inside the floodplain. Compacted parking areas, restrooms, small picnic areas	Full facility trailheads. Paved parking areas, restrooms, picnic areas, play fields (if appropriate).
Land Use	Residential (buffered from the floodplain). Open Space, Resort	Residential outside the floodplain, neighborhood commercial, community (i.e., library, park, low intensity administrative or doctors office)	All in Passive Management Goal Category and mixed use, high intensity areas, including mixed use Cores and/or nodes, industrial
Recharge	Natural (wetlands) only	Revegetated areas, soft surface basins and/or channels integrated into surrounding environment	All in Passive Management Goal Category and landscaped hard surface basins, pipes, hard surface, and landscaped channels.
Others/Special Areas			

3.5.4 Recreation Plan Summary by Recreation Component

This section of the report summarizes the planned recreation elements for the Agua Fria Watercourse Master Plan. The development of the Agua Fria Watercourse Master Plan culminates the planning process, which involved collaborative planning and design with multi-jurisdictions. Figure 3.5-2 shows how the proposed recreation plan components connect to existing and planned recreation facilities along the River.

1.5.4.1 Parks

Two developed parks associated with the El Mirage Wastewater Treatment Plant and the McMicken Dam outfall are proposed.

1.5.4.2 Trails and Trailheads

Two trails are proposed to travel the extent of the river. The primary trail is planned as a shared use recreation trail intended to serve pedestrians and bicyclists. This facility is planned for use by bicycles, walkers, joggers, and skaters, and is generally located outside the floodway or adjacent to the levees between Buckeye and Camelback Roads. An in channel secondary trail is planned as a stabilized surface facility that would include equestrian use. The secondary trail would merge with the primary trail from time to time. When the trails are merged, they are planned as either paved or unpaved, depending on their location (in channel or on street). When the merged or secondary trail is in channel, it is planned to be incorporated into a vegetated area proposed as part of the Landscape Character Plan element of the Watercourse Master Plan. Trailheads are proposed at several locations in conjunction with trail crossings, arterial streets, and parks.

1.5.4.3 Equestrian Facilities

Two existing horse stables include the private Lower Buckeye horse corrals on the east side of the River below Lower Buckeye Road and the Luke Air Force Base horse corrals north of Glendale Avenue. A planned equestrian access is located at Camelback Ranch Park. Equestrian facilities are recommended at lower Buckeye Road.

1.5.4.4 Environmental/Habitat/Open Space Areas

Riparian interpretive areas and trails adjacent to recharge basins and channels are recommended to be associated with recharge facilities underway or planned by the Central Arizona Project and the Southwest Regional Operating Group. In addition, a mitigation site is proposed for the I-10, and open spaces are identified throughout the corridor.

Figure 3.5-2 – Proposed Recreational Corridor Plan

NOTE: *This figure was not referenced in the Evaluation of Public Safety Issues and is not reprinted here.*

1.5.4.5 *Interpretive Historic and Cultural Resources*

The rich history of the Agua Fria River has been incorporated as part of the Agua Fria Master Plan. The historic Akimel Au Authm inhabited and farmed the area at the confluence of the Gila River and the Salt River, and the Yavapai's traditional homeland was along the middle and upper reaches of the Agua Fria River (ACS report). These historic sites are preserved as part of the Agua Fria Master Plan by creating interpretive areas at the Casa de Piedras prehistoric ruins and Calderwood Butte. The Master Plan also includes conceptual interpretative areas at the Beardsley and Central Arizona Project Canals, Calderwood Stage Site, at master planned developments, and other important sites and crossings.

3.5.5 Recreation Components in the Lower Reach (Gila River Confluence to New River Confluence)

The southern reach of the river consists of two types of planning management areas. The lower portion is rural in character and transitions to suburban between approximately Lower Buckeye Road and the New River Confluence at Camelback Road. Plan elements are identified below by subreach. Figure 3.5-3 is an illustrative showing various recreational components of the master plan. The numbers in parenthesis refer to the locations shown in the illustrative.

1.5.5.1 *Confluence of Gila River to Broadway Road*

The Avondale Mitigation Site is recommended to be restored as a park with a major trailhead and the initiation/terminus of a stabilized surface trail along the eastern edge of the river **(36)**. The riparian area at the confluence is recommended to be restored as a habitat/interpretive area. Interpretive signs describing the Agua Fria as a resource and a seam, created via the many river crossings, that joins the West Valley from east to west and via the course of the river north to south are recommended here as well.

1.5.5.2 *Broadway Road to MC 85 (Buckeye Road)*

An equestrian trailhead **(35)** is proposed at Lower Buckeye Road on the east side of the river. This trail will provide access for residents in the mostly rural areas adjacent to the river. Within this reach, the stabilized surface trail splits into two trails: a primary, paved surface trail **(15)** along the levee, and a stabilized surface secondary trail **(13)** that provides equestrian use in the river channel.

Shopping, dining, and strolling have become a form of recreation and entertainment. The Agua Fria River offers a tremendous opportunity to blend these types of recreation activities with more traditional recreation uses. To complement traditional recreation uses, a mixed use river-oriented development **(34)** is recommended on the west side of the River at Lower Buckeye Road on the City owned property, once the City vacates its offices and moves to a new facility.

WEST VALLEY RECREATION CORRIDOR

AGUA FRIA WATERCOURSE MASTER PLAN

PROPOSED ILLUSTRATIVE RECREATION CORRIDOR PLAN

PLAN Figure 3.5-3

LEGEND

- Floodplain
- Multiple Use Maintenance Road
- Alternative Trail



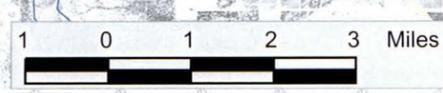
- Desert Hills Dr
- Joy Ranch Rd
- Cloud Rd
- Corofree Hwy
- Dove Valley Rd
- Lone Mountain Rd
- Dixileta Dr
- Dynamite Blvd
- Jomax Rd
- Happy Valley Rd
- Pinnacle Peak Rd
- Deer Valley Rd
- SR 101
- Union Hills Dr
- Bell Rd
- Greenway Rd
- Thunderbird Rd
- Cactus Rd
- Peoria Ave
- Olive Ave
- Northern Ave
- Glendale Ave
- Bethany Home Rd
- Camelback Rd
- Indian School Rd
- Thomas Rd
- McDowell Rd
- I 10
- Van Buren St
- Buckeye Rd
- Lower Buckeye Rd
- Broadway Rd
- Southern Ave
- Baseline Rd

Kimley-Horn and Associates, Inc.

CORNVOYER MEDBICK



- Tufhill Rd
- 195th Ave
- Perryville Rd
- Citrus Rd
- Colton Ln
- Sarival Ave
- Estrella Pkwy
- Bullard Ave
- Litchfield Rd
- Dysart Rd
- El Mirage Rd
- 115th Ave
- 107th Ave
- 99th Ave
- 91st Ave
- 83rd Ave
- 75th Ave
- 67th Ave



1.5.5.3 *MC 85 (Buckeye Road) to I-10*

South of Coldwater Park on the north side of Buckeye Road and I-10, an interpretive facility associated with the Santa Fe and Southern Pacific Railroad is recommended. This facility could include information about rail and its role in moving agricultural products that have been important throughout the development of the West Valley. On the vacant, City owned land just west of Coldwater Park, a mixed use river-oriented node is recommended **(33)**. This would provide a second commercial/entertainment venue within Avondale along the River.

The primary levee and secondary in channel trails are recommended to continue through this reach. A trailhead associated with the proposed rail interpretive facility north of Buckeye Road and Coldwater Station is recommended within this reach to provide access to the primary and secondary trails.

1.5.5.4 *I-10 to Indian School Road*

Connections from the private park associated with the Rancho Santa Fe master planned community to the primary west levee trail are recommended **(31)**. These connections would provide a direct route to Regional Park II on the east side of the river.

On the north side of I-10, at the Arizona Department of Transportation Outfall Channel, a habitat area with trails and open space interpretation is recommended **(32)**. Access under McDowell Road and across the River to Regional Park II is also important to provide users of the trail on the west side with access to Regional Park II.

A trail adjacent to the levee is planned to continue here along both sides of the river **(14)**.

A park associated with the reclaimed mine located south of the Roosevelt Water Conservation District Canal is also included in the plan **(30)**. A connection from the primary and secondary trails to the canal, and inclusion of the canal as a trail in the Avondale General Plan, is also recommended **(29)**.

1.5.5.5 *Indian School Road to the Confluence of the New River*

Connections at Indian School Road will provide on street bicycle route and sidewalk access to residents of Villa De Paz on the east side of the river **(28)**. The planned Camelback Ranch Park **(27)** will provide equestrian access and an open space node at the northeast intersection of Camelback Road and the river. North of the park, open space, associated with the planned Camelback Ranch community, is planned.

Because the levees end in this subreach, the primary and secondary trails are recommended to merge at Camelback Road and continue along the New River to Olive Avenue to avoid existing mining operations.

3.5.6 Recreation Components in the Middle Reach (Confluence of New River to Bell Road)

The middle reach of the Agua Fria River currently consists of urban activities in close proximity to general industrial uses such as sand and gravel mining, the Glendale airport, landfill, and wastewater treatment plant, and the El Mirage landfill. Recreation Plan elements are summarized in detail in the following subreaches.

1.5.6.1 *Confluence of New River to Olive Avenue*

Due to heavy industrial activities that span the entire reach of the river, no recreation activities are recommended. Alternative trail access is recommended along the New River **(26)** to Olive Avenue. On street bicycle routes and sidewalks will provide bicycle and pedestrian access from the New River back to the Agua Fria river corridor. A trailhead at Olive Avenue **(10)** could mark re-entry to the Agua Fria River trail.

1.5.6.2 *Olive to Cactus Road*

The primary and secondary trails are proposed to continue along the west side of the river to Cactus Road. Within this reach, a park associated with the existing vegetation at the El Mirage Wastewater Treatment Plant is proposed **(11)**. Connections to the Youngtown Maricopa Lake Park, constructed as part of bank stabilization on the east side of the river, are also recommended **(25)**. At Grand Avenue, the primary and secondary trails are recommended to merge and continue on-street on the east side of the river to Bell Road.

1.5.6.3 *Cactus Road to Bell Road*

No recreation facilities are proposed here. The merged trail is recommended to continue on street to Bell Road **(24)**.

3.5.7 Recreation Components in the Upper Reach (Bell Road to New Waddell Dam)

For the most part, the northern reach of the river remains pristine Sonoran Desert open space. The land use zone transitions to suburban zone approximately at Dove Valley Road down to approximately Deer Valley Road. The area below Deer Valley Road transitions to the urban zone. Plan elements within this reach of the river are summarized in detail by the following subreaches:

1.5.7.1 *Bell Road to Beardsley Road*

A vacant parcel owned by the Arizona State Land Department located at the northwest corner of Bell Road and the Agua Fria River offers an opportunity to provide a trailhead with equestrian access to the river **(23)**. North of Bell Road, the primary trail could continue on the western bank and the secondary trail could continue in the river along the west edge of the floodplain **(8)**. Both trails could

converge **(7)** at a park proposed for the McMicken Dam Outfall, located just north of the Union Hills Drive alignment on the west side of the river **(5)**.

1.5.7.2 *Beardsley Road to Twin Buttes Wash*

North of Beardsley Road, the merged trail continues from the McMicken Dam Outfall park through an elevated creosote flat with views of the floodplain. The flat is located on the western bank of the river bordering the north side of the McMicken Dam Outfall **(6)**. The trail crosses the river at Rose Garden Lane, and continues north along the east bank of the river. A trailhead on the west side of the river at Beardsley Road is recommended.

1.5.7.3 *Twin Buttes Wash to Calderwood Butte*

A connection from the merged trail is recommended to Twin Buttes Wash **(22)**. Besides the merged trail and associated markers and vegetation, no developed recreation improvements are recommended in this portion of the river. A riparian area is recommended in association with planned recharge basins south of Jomax Road **(21)**.

1.5.7.4 *Calderwood Butte to the CAP Canal*

The plan recommends working with property owners to create interpretive areas at Calderwood Butte, Casa de Piedras, the CAP Canal, and Beardsley Canal **(4)**. Within this area of the river, the primary and secondary trails would stay merged until north of Calderwood Butte. South of Casa de Piedras, the trails are recommended to split, with the primary trail on the east terrace and a secondary trail in the river at the east edge of the floodplain **(2, 3)**. An open space area is recommended north of Casa de Piedras **(20)**.

1.5.7.5 *CAP Canal to Cloud Road*

Connections to the three major washes on the west side of the river in this area should be created from the secondary trail **(18)**. The river would remain an open space corridor accessed by the secondary trail. The primary trail would continue on the east terrace above the river. A trailhead in conjunction with the proposed City of Peoria Regional Park is proposed at Lake Pleasant Road south of SR 74 and on the west side of the river at SR 74 **(19)**.

1.5.7.6 *Cloud Road to the New Waddell Dam*

A connection to the planned Maricopa County on-street bicycle route along SR 74 and to the Lake Pleasant Park is recommended at the SR 74 Bridge **(17)**. A trailhead is also recommended at this location **(1)**. Interpretive areas on the west side of the River north of SR 74 are also recommended.

The George's pond area is recommended to be conserved as a habitat/open space/interpretive area with access trails and connections to Morgan City Wash **(16)**.