

East Maricopa Floodway

Capacity Mitigation

and

Multi-Use Corridor Study

Conceptual Design Alternatives Report

Final Edition
August 2000



Collins/Piña

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Engineering
Planning • Surveying
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East Maricopa Floodway

Capacity Mitigation and Multi-Use Corridor Conceptual Design Alternatives Report

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August 2000

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1.0 Study Summary

1.1 Study Purpose

This Corridor Study of the East Maricopa Floodway--also referred to as the Superstition SanTan Corridor and Marathon Trail--presents and analyzes three alternatives, and provides a recommended plan for multi-use and recreation opportunities along the floodway, consistent with future flood control needs. The three alternatives presented in this report are a result of significant public input and professional scrutiny. The goal of the study is to identify opportunities for multiple benefits associated with the redesign of the EMF to increase its current capacity.

Summary of the Physical and Natural Environment

The EMF travels through three character areas—urban, transitional and agricultural. With the exception of two small undisturbed areas adjacent to the channel,

native vegetation is almost nonexistent. The lack of native habitat limits wildlife species diversity.

The EMF is a flat, man-made channel with various dimensions, most typically it is a wide, shallow trapezoidal cross-section. Channel composition varies from grass to rock-lined to concrete gunite. Rapid urbanization in the East Valley has made channel capacity inadequate to meet current runoff needs. These shortfalls increase as flood waters travel downstream.

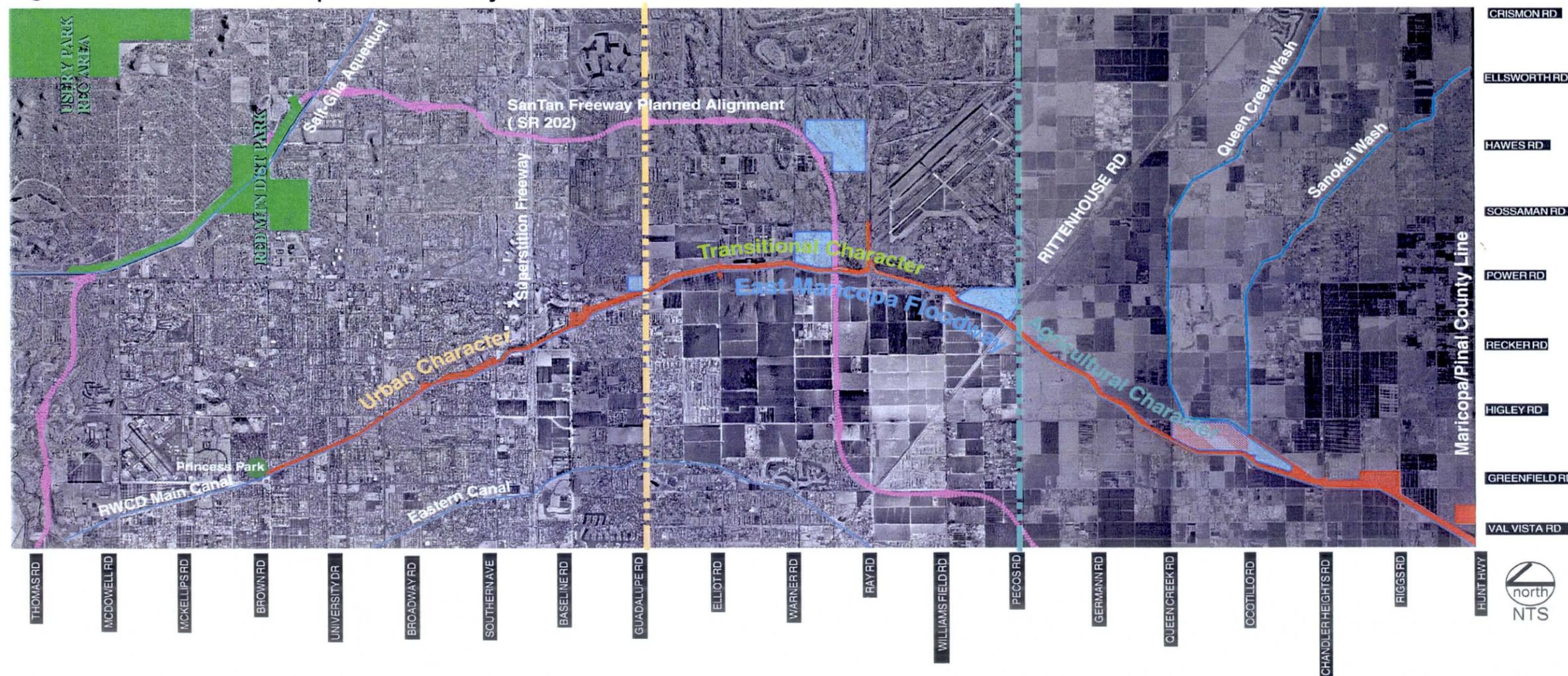
Summary of the Cultural and Socioeconomic Environment

Adopted public policy—the myriad of plans dealing with future land uses, open space, trails, transportation, and other public works—show community vision, public and elected official consensus. These regional plans are the blueprint for

sustainable, planned growth in the East Valley and the foundation for the Conceptual Design Alternatives for the EMF, which lead to the preferred alternative and recommended plan for the EMF.

The cultural environment includes visual resources—what we see as viewers in the landscape. In the case of the EMF and the adjacent Roosevelt Water Conservation District (RWCD) canal, the man-made ribbon of floodways and canal create a curvilinear counterpoint to the grid of section line roads that cover the valley floor. The close-up views of these flood control and irrigation infrastructures, and the distant vistas available because of the canal and EMF rights-of-way, offer opportunities for environmental enhancement, transformation, and preservation of existing views to distant mountains in the background.

Figure 1. East Maricopa Floodway



The EMF corridor has a consistent overall visual character – an “engineered floodway” that is an unnatural, modified landform on the uphill side of the RWCD main canal. For its entire 19.3-mile length, the floodway has a consistent trapezoidal shape, except at golf courses between Broadway and Guadalupe Roads. At these golf courses, approximately 3-miles in length, the landform is undulating and visually interesting with green lawns, shade trees and water features. Scenic viewing opportunities are limited in the urban area, and soon will be more limited in the transition and agricultural areas as new buildings and walls are constructed.

Opportunities and Constraints

Discussion of Opportunities

Floodway capacity mitigation can be undertaken through a number of design options including channel reshaping and detention basin development. Channel reshaping provides an opportunity to create a Sonoran Desert landscape with native and non-native uplands and riparian plant species for wildlife habitat and educational interpretation. Detention basin development offers an opportunity for recreational amenities such as sports fields and green open space. Since floodway inadequacies increase downstream, the majority of capacity mitigation techniques will be implemented in the transitional and rural reaches of the floodway. These areas currently offer the largest amount of undeveloped open space to accommodate design changes.

In the channel bottom, a small, narrow, meandering channel could be designed and graded. This would create visual interest and a meandering focal point that would lead the viewer’s attention to a detailed landscape feature. It would break up the strong axis line created by the engineered template of the existing channel. It would give an opportunity for water to be present for longer periods of time after rainstorms.

There is an opportunity to undulate the floodway bottom and perhaps to create basins of standing water within the floodway. This would create visual interest and new focal points of water – a distinctive scenic feature – in the desert. In addition to these new basins, it would be possible to widen the floodway and have a braided wash with small islands in the bottom.

In addition, there is an opportunity to regrade and reshape channel sidewalls to emulate more natural landforms in the desert, or to create a stylized desert landform.

The maintenance roads at the top of the embankment tops are flat on both sides of the EMF, and with the maintenance roads on one or both sides of the floodway, there is a strong sense of an industrial landscape that has no human scale to its features. The channel tops could be reshaped with mounds and other undulations to create visual interest and could also provide numerous elevated viewer platforms.

A desired future landscape character for the channel would include native and drought tolerant plants to create mosaic patterns of trees, shrubs and ground covers throughout the 19.3-mile long corridor.

In two locations, concrete structures have been placed in the floodway for energy dissipaters at grade changes. Additionally, there are 20-bridge/culvert overcrossings of the EMF. At each of these locations, there is an opportunity for public art to be placed on the concrete structures. Public art would increase visual interest, create new focal points in the landscape, involve members of the public and stakeholders, and mitigate the negative visual impacts of these concrete structures.

Archaeological sites offer an opportunity for expansion of educational and interpretive linkages between schools, historical museums, and cultural learning centers.

The Sanokai and Queen Creek Washes provide an opportunity for expansion of existing environmental linkages throughout the study corridor. These washes act as wildlife corridors from the surrounding mountains to the Gila River, as well as trail corridors for human use and enjoyment.

The EMF offers a variety of opportunities for educational outreach and recreational linkages. These opportunities include uniform signage, interpretive kiosks, and exhibit areas and public gathering places. The latter venues, strategically located near area schools, could be designed as outdoor classrooms or environmental laboratories to interpret the corridor’s natural or cultural resources. In addition to providing outdoor lecture space, teachers could incorporate ecosystem restoration, revegetation, and plant identification into course curricula.

Parks located in proximity to the EMF corridor offer a variety of recreational and multi-modal opportunities. Those parks adjacent to or in close proximity to the floodway can serve as trail staging and parking areas. Many of these parks already provide restrooms, parking, and other facilities, and are already linked via the arterial or collector roadway system to existing and future bike routes.

Multi-modal opportunities include improvements for public transit (e.g., Parks & Ride lots, light rail or other transit facilities) in proximity to the floodway. Additionally, the range of improvements is shown for non-motorized circulation, such as bike, pedestrian, and equestrian trails.

The District is exploring ways to partner with East Valley municipalities and other stakeholders in developing multi-modal and trails amenities on District property.

Discussion of Constraints

There are numerous utility and bridge crossings along the EMF. This infrastructure creates structural challenges for floodway expansion. Channel reshaping (widening or deepening) in areas with existing structures can cause undercutting of piers and foundations, or exposure of buried utilities, such as sanitary sewers, that will require mitigation.

Public liability and restricted access is a constraint according to District and RWCD policies. Additionally, lack of District land ownership at Leisure World and Superstition Springs Golf Course is a constraint to multi-use.

In two locations, the EMF channel is lined with concrete which creates a stark visual environment that is totally devoid of natural landscape elements. There are several locations where spillways entering the floodway are armored with concrete. These spillways are visually unattractive, yet these structures are necessary for energy dissipation.

In addition, there are several areas with electrical transmission lines or electrical distribution lines located between the EMF and the RWCD main canal. Utility companies have standards for landscaping beneath these utility lines that would be a constraint.

Although they can be valuable educational tools, archaeological sites must be carefully preserved to prevent loss or damage of significant material. Future habitat development along an active recreational corridor could create conflicts with environmental goals and users, such as airports and bird watchers.

The Preferred Alternative will address public input, District interests, and weigh the opportunities and constraints to create the most benefit for stakeholders and the public.

2.0 Study Overview

2.1 Purpose

The purpose of the East Maricopa Floodway Corridor Study is to identify and evaluate alternatives and select the best alternative for multi-use opportunities at the East Maricopa Floodway (EMF), consistent with flood control operations. Additionally, this study recommends implementation strategies and funding sources for the development of these multi-use opportunities.

This study provides the Flood Control District of Maricopa County (District) with alternatives and a recommended plan that will improve the aesthetics of completed projects and that are consistent with structural design parameters. The preferred alternative includes factors such as open space, parks, and multi-use trails. It identifies public benefits and potential constraints for the District. Additionally, this report identifies public and private stakeholders for potential improvements and the possibility of developing partnerships for cost-sharing.

2.2 Need

The need for this study effort is to provide the following:

- Improve the flood control capabilities of the East Maricopa Floodway.
- Identify multi-use opportunities consistent with flood protection.
- Identify opportunities for recreational amenities to serve the demands of an increasing population.
- Identify coordinated connections with established and future municipal facilities and regional trail systems in the East Valley.
- Identify opportunities for alternative mode links between public transportation facilities and major transportation routes for equestrians, bicyclists and pedestrians.

2.3 Location

As shown in Figure 2, the East Maricopa Floodway is located within Maricopa County, Arizona. It traverses portions of the Towns of Queen Creek and Gilbert, the City of Mesa and unincorporated portions of the County.



Figure 2 Location Map

2.4 History

Planning for the East Maricopa Floodway began in the late 1970's under authority of the Watershed Protection and Flood Protection Act. Formerly known as the Roosevelt Water Conservation District Floodway, the original project had two goals: to provide a structural solution that would protect the watershed, and to prevent flooding in eastern Maricopa County.

Watershed protection was needed to prevent erosion and improve water infiltration and crop production. Flood prevention goals were to reduce scouring, prevent erosion, and protect canals, roads and property.

Historical records indicate more than forty floods of varying magnitude have occurred in the study area since 1910. These floods damaged croplands, urban and commercial properties, roads and highways, irrigation canals and other built structures. The majority of these flooding events occurred during the summer months, often called the "Monsoon Season."

The Soil Conservation Service (SCS, now known as the Natural Resources Conservation Service) built the East Maricopa Floodway (EMF) between 1980 and 1989. The 27.4-mile floodway traverses the East Valley from north to south beginning at Brown Road in Mesa and ending at the Gila River in the Gila River Indian Community in Pinal County, as shown in Figure 1. This corridor study covers approximately 19.3 miles from Princess Park to Hunt Highway in Maricopa County.

The EMF is a regional outfall for flood control in Maricopa County. It intercepts runoff from three major watersheds: Buckhorn-Mesa, Apache Junction-Gilbert and Williams-Chandler. The watersheds include portions of the following communities: The City of Mesa, The City of Chandler, Town of Gilbert, Town of Queen Creek, unincorporated Maricopa County, Pinal County and the Gila River Indian Community. Within the study site, approximately 370 square miles drains into the East Maricopa Floodway.

The District initiated a study in August 1997 to assess the capacity of the East Maricopa Floodway (EMF) to determine if the existing floodway could convey the original design flows and to identify any problem areas for the existing and future flow conditions. The results of the previous efforts indicate that the EMF is under-capacity, requiring reconfiguration or redesign to convey flood flows. The District has authorized this study to evaluate the potential for combining flood control improvements in the context of multi-benefit opportunity development, such as habitat restoration, or recreational amenities, or improvement of landscape aesthetics.

2.5 Authorization

The Flood Control District of Maricopa County was authorized by its Board of Directors to proceed with development of the East Maricopa Floodway Capacity Mitigation and Multi-use Corridor Study under Resolution FCD 1999R014 dated December 15, 1999.

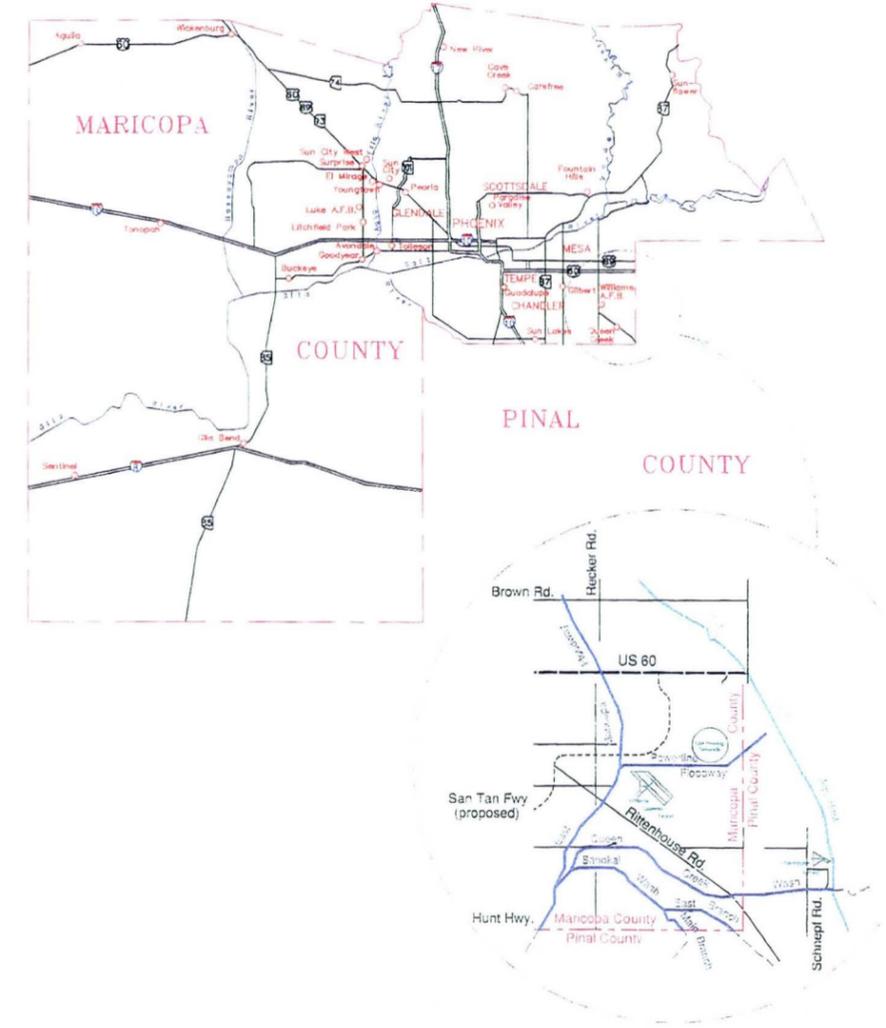


Figure 3 Vicinity Map

2.6 Public Participation

The goal of the public participation process is to provide opportunities for public review, foster an open dialog between public and private interests, and to collectively develop a corridor plan capable of being implemented.

Interagency Coordination

To promote the theme of East Valley partnerships, this study effort has been coordinated with community stakeholders through involvement in an oversight steering committee which has been an effective sounding board during development of the study. Committee members have provided information regarding their specific jurisdictions. The steering committee has representatives from:

Arizona Department of Transportation
 Maricopa County Parks and Recreation
 Maricopa County Department of Transportation
 Maricopa Association of Governments
 Cities of Mesa and Chandler
 Towns of Gilbert and Queen Creek
 Roosevelt Water Conservation District
 Gila River Indian Community
 Arizona Game and Fish Department
 Williams Gateway Airport Authority

Special Advocacy Groups

The study effort has identified the potential involvement of the following local and regional special interest groups:

City of Mesa and Towns of Gilbert and Queen Creek

Boys and Girls Clubs of Gilbert and Mesa
 Chambers of Commerce of Gilbert and Mesa
 Parks and Recreation Advisory Boards of Gilbert, Mesa and Queen Creek
 Boy and Girl Scout Troops

Towns of Gilbert and Queen Creek

Gilbert Riparian Institute	Gilbert Leadership Alumni
Queen Creek 4-H Club	Queen Creek Kiwanis
SanTan Historical Society	SanTan Mountains Pride
Will Rogers Equestrian Center	
Greater Queen Creek Horse Owners Association	

Regional Special Interest Groups

East Valley Runners	Sierra Club
Coalition of Arizona Bicyclists	Wildlife Federation
Maricopa Audubon Society	Red Mountain Cycling Club
Maricopa County Trails Commission	Maricopa Audubon Society
Metropolitan Canal Alliance	

Corporations

REI Recreational Equipment	Del Webb Corporation
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These groups expressed support for and interest in the development of multi-use facilities that include habitat restoration, recreational amenities, and educational/interpretive opportunities. All of the contacts were enthusiastic about creating a greenbelt corridor along the floodway. Depending on their individual mission, groups encouraged development of additional trails and recreational facilities. Several groups, such as the Boys and Girls Clubs and the Scouts, are interested in community service projects that allow hands-on participation. The Riparian Institute, located in the study area, may offer a potential linkage to their site, as well as numerous existing parks and trails.

Public Meetings

During the initial stages of the study, key stakeholders were identified and encouraged to routinely participate in the process. Numerous one-on-one meetings were conducted with stakeholders to gather written data and to solicit additional information. The following nine meetings were conducted with the intent of conveying and soliciting information as a part of the planning process:

- October 5, 1999, Stakeholders meeting.
- October 26, 1999, Supervisor Fulton Brock presentation.
- October 28, 1999, Supervisor Don Stapely presentation.
- November 2, 1999, Steering Committee meeting.
- November 16, 1999, Press conference with Fulton Brock, Don Stapely, and other public officials.
- December 7, 1999, Leisure World meeting.
- December 7, 1999, Steering Committee meeting.
- December 8, 1999, Williams Gateway Airport meeting.
- December 15, 1999, East Valley Recreation Coalition meeting.

To solicit public input into the development of the corridor, two series of public open houses were planned within the three adjacent communities. The goal of the first series of open houses was to outline the purpose and scope of the study. These open houses were held as follows:

- December 13, 1999, at the Red Mountain Multigenerational Center in Mesa
- December 15, 1999, at the Southeast Regional Library in Gilbert
- January 13, 2000, at the Town of Queen Creek Town Hall in Queen Creek

Generally, public feedback indicated that citizens are enthusiastic about open space and the proposed multi-use approach to the East Maricopa Floodway redesign. They suggested that the development of educational and interpretive centers along the floodway would be a great asset to the community. Participating developers expressed interest in the possibility of open space and interconnected and expanded trail systems being developed in the area. The participants encouraged the addition of equestrian trails, recreational amenities and alternative transportation methods.

Participants expressed concern over safety as it relates to recreational amenities within a flood water conveyance facility. They also questioned maintenance practices for proposed improvements. There was additional discussion over possible mosquito increases associated with riparian habitat development.

Other recorded comments included:

- Amenities along the EMF are a plus.
- Grass or other vegetative cover would help to mitigate the urban heat island.
- Equestrians would like to have more horse trails in the Floodway.
- Equestrians would like to have more loop trails linking to the Floodway.
- Equestrians would like to have facilities like hitching rails and water troughs along the Corridor.
- Increased recreation opportunities were encouraged.
- Alternative transportation methods were encouraged.
- Multi-use trails were thought to be a good idea.



Press Conference, November 16, 1999

After the alternatives were defined, a second series of meetings and open houses was held.

- May 18, 2000, Steering Committee meeting in Gilbert.
- July 5, 2000, Open House at the Southeast Regional Library in Gilbert.

Input from the Steering Committee and public helped direct the preferred alternative. Some members of the Steering Committee expressed concern for potential conflicts arising from aircraft operations and bird strikes at Williams Gateway Airport and Falcon Field, thereby suggesting constraints on standing water and wildlife habitat enhancements. At the Open House, there was strong support for the amenities shown in Alternative 2 -- Flood Control with Recreational Enhancements, especially for equestrian uses, facilities and themes. Steering Committee members suggested the preferred alternative be called "Flood Control with Multi-Use Enhancements." Public participation greatly aided in development of the East Maricopa Floodway Corridor Plan.

3.0 Corridor Study Area Existing Conditions

3.1 Physical and Natural Environment

3.1.1 Introduction

Engineers, hydrologists, planners, geographers, landscape architects and others have studied the existing conditions in the East Maricopa Floodway (EMF) Corridor. Each person has looked at the EMF and seen something different, based on the filters that each one uses to “see the world.” An engineer “sees” a flood control structure that is now undersized and has some subsidence problems

that have created a “backslope-gradient.” A geographer “sees” a long narrow channel that slices through the fabric of several communities and agricultural areas. The public “sees” a barren ditch with chain link fences and padlocked gates that keep them out. The public also “sees” a potential greenbelt that connects to a larger countywide system of trails and open space corridors.

Following is a description of *existing conditions*, found in and adjacent to the corridor. A clear, concise description of existing conditions will enable the reader to identify with the *issues, opportunities and constraints* described later in this report. The District, stakeholders and the general public can better understand the alternatives that will be explained later in this report with a clear understanding of the existing conditions, issues, opportunities and constraints.

3.1.2 Floodway Dimensional Qualities

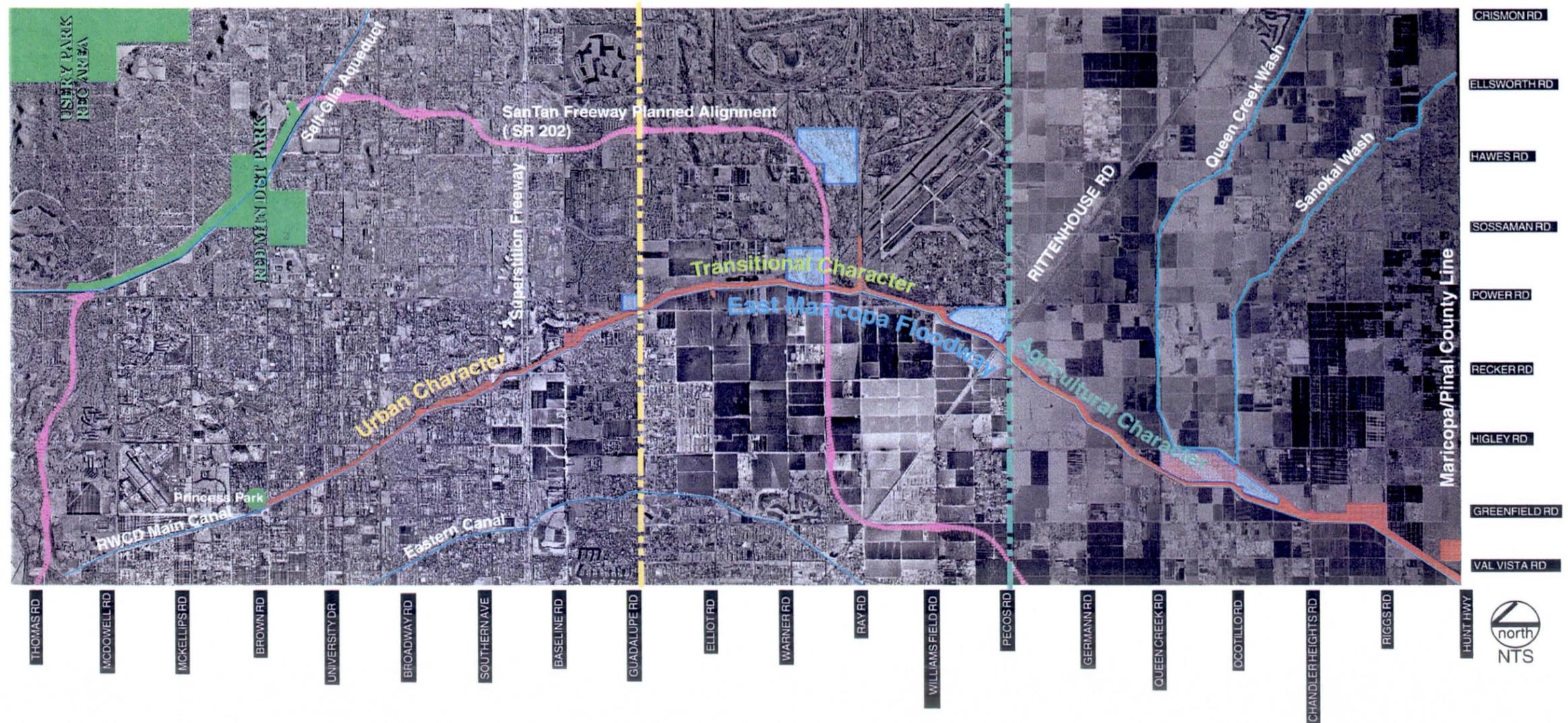
The East Maricopa Floodway consists of three basic areas, Urban, Transition and Agricultural.

The Urban Area, which is the northern most portion of the floodway, is typified with surrounding areas that are fully developed.

The Transition Area is the middle area, which is characterized by historical agricultural areas which are rapidly being converted to urban and suburban development.

The southern portion of the floodway is the Agricultural Area. This area is still active in agriculture with limited suburban development occurring at this time.

Figure 1. (Repeated) East Maricopa Floodway



Urban Area

The EMF starts as the outflow of a detention basin in Princess Park, northeast of the intersection of Greenfield and Brown Roads. At this beginning, the channel is earth-lined, trapezoidal-shaped, approximately 133-foot wide and 9-foot deep, as shown in Figure 4a, and is designed to carry approximately 1,200 cfs of water. Waters are carried under streets and roadways in concrete box-culverts.

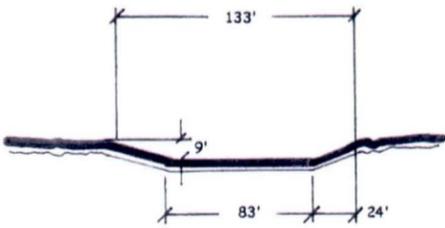


Figure 4a. Cross-Section at Brown Road

Between Broadway and Guadalupe Roads, the EMF channel is not trapezoidal in shape, but landforms have been shaped for recreational uses at Leisure World and Superstition Golf Courses, as shown in Figure 4b. The EMF channel becomes an undulating landform with several ponds – golf course water hazards that serve as “on-line detention basins.” Southern Avenue, the Superstition Freeway (US 60), and Baseline Road cross the EMF on multiple-pier, multiple-span, concrete bridges.



Figure 4b. Superstition Golf Course

Transition Area

From Guadalupe Road to Ray Road, the EMF channel is earth-lined, trapezoidal-shaped, 217-foot wide and 11-foot deep, as shown in Figure 5a, and is designed to carry approximately 5,100 to 5,900 cfs of water. Streets and roadways cross the EMF channel on multiple-pier, multiple-span concrete bridges.



Elliot Road Crossing

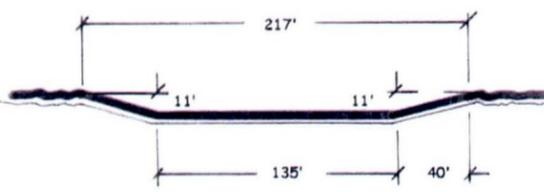


Figure 5a. Cross-Section at Elliot Road

From Ray Road past Williams Field Road to Power Road, the EMF channel is rock- or concrete-lined, trapezoidal-shaped, approximately 116-foot wide and 15-foot deep, as shown in Figure 5b, and is designed to carry approximately 7,780 cfs of water. Streets and roadways cross the EMF channel on multiple-pier, multiple-span concrete bridges.



William Field Road

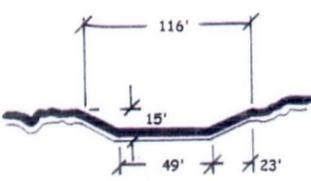


Figure 5b. Cross-Section at Williams Field Road

Agricultural Area

From Pecos Road to Hunt Highway, the EMF channel is earth-lined, trapezoidal-shaped, and approximately 268- to 283-foot wide and 10- to 15-foot deep, as shown in Figures 5c and 5d, and is designed to carry approximately 6,900 to 8,100 cfs of water. Southward from Hunt Highway is outside of the study area for this report.



Queen Creek Road

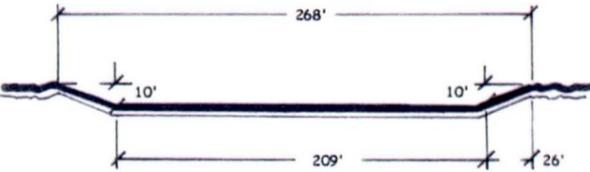


Figure 5c. Cross-Section at Queen Creek Road



Looking South at Hunt Highway

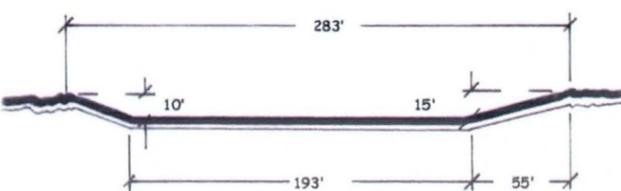


Figure 5d. Cross-Section at Riggs Road

3.1.2.1 Floodway Capacity

The EMF is a flood control conveyance system designed originally to protect agricultural lands in eastern Maricopa County. According to recent engineering studies, the EMF is currently undersized. Changes in runoff rates, caused by rapid urbanization and sub-urbanization, have made existing floodway capabilities inadequate. Because of changes in runoff rates, the EMF will not carry floodwaters that could occur in a major storm event, described in hydrologist's and engineer's terms as a "100-year, 24-hour event." The 100-year 24-hour event is a storm that statistically has a 1% chance of occurring in any single year. This event is the industry standard for flood control facility design and level of protection. In the Phoenix metropolitan area, this corresponds to approximately 4.2 inches of rain in a 24-hour period.

There are two general approaches to solving the undersize problem: (1) enlarge the channel by making it deeper and wider, or (2) store floodwaters in detention/retention basins. Both of these approaches have opportunities and constraints that are explored later in this report.

Several major drainage channels are tributaries to the EMF as shown in Figure 6. The Broadway Channel flows from the east to confluence with the EMF just south of Broadway. The Superstition Freeway Channel flows from the east to confluence with the EMF just north of the Superstition Freeway. The Guadalupe Channel flows from the east to confluence with the EMF just south of Guadalupe Road. The Powerline Floodway flows from the east to confluence with the EMF near Ray Road. The Rittenhouse Road Channel flows from the southeast to confluence with the EMF just north of Rittenhouse Road. Queen Creek and Sanokai Wash flow from the east to confluence with the EMF just north of Chandler Heights Road.

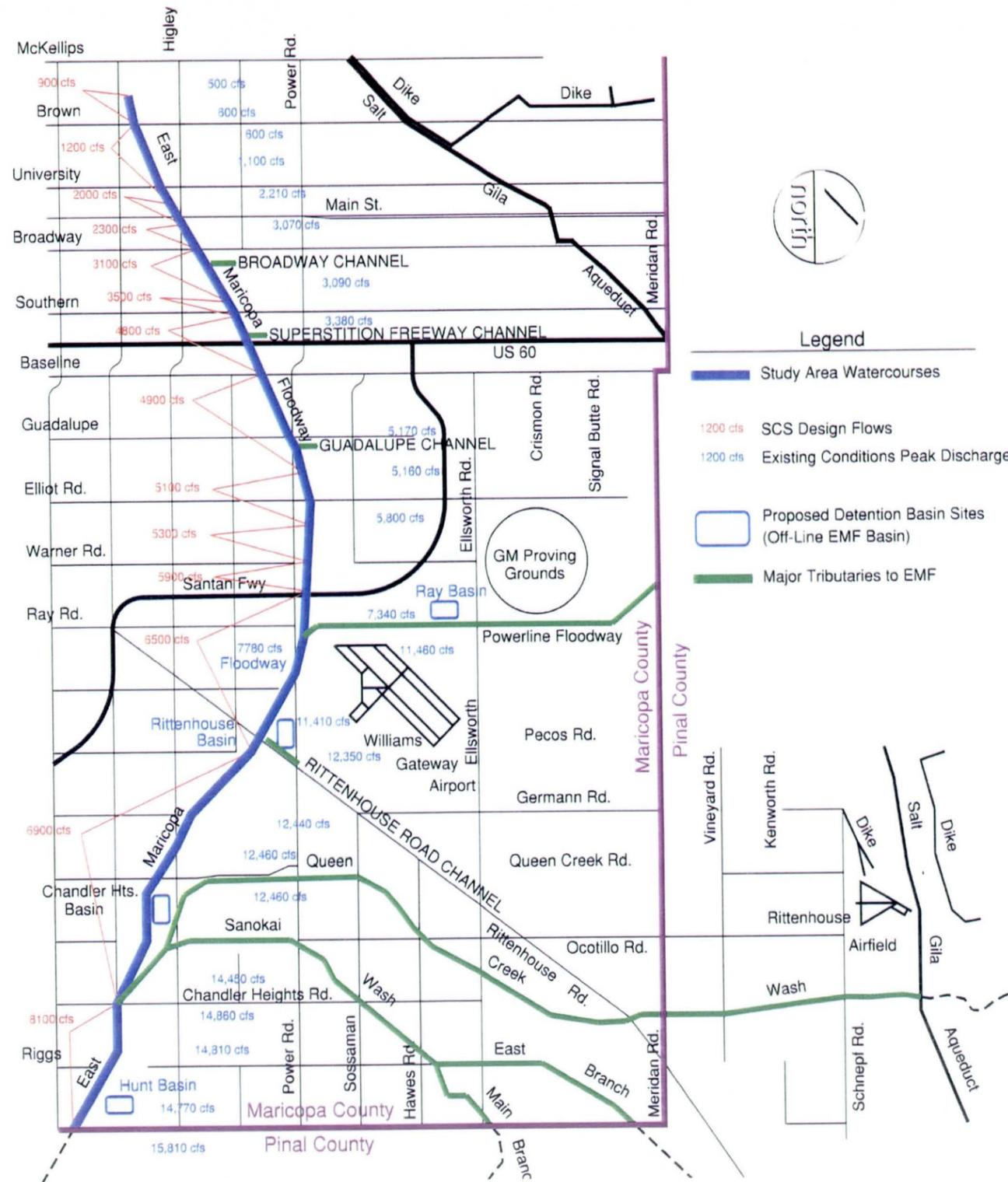
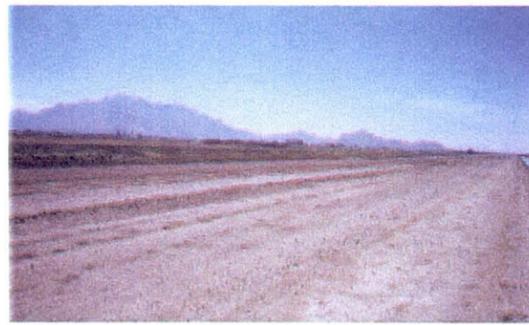


Figure 6. East Maricopa Floodway Capacity Mitigation Study

3.1.3 Topography

The study corridor is flat with slopes of less than 0.048% (dropping 48-feet in 100,000-feet). At Hunt Highway, the southern terminus of the study area, the floodway elevation is 1285 feet. The floodway and surrounding landform is consistently flat as it moves northward. The elevation at Brown Road, the northern terminus of the study area, is 1350 feet. With minor landform contouring at roadway crossings and golf courses, the study area drops only 65 feet over the entire 19.3-mile corridor.



Existing EMF showing limited vegetation

The geology in the general corridor area consists of sandy soils overlaying sedimentary rocks. There are no bedrock outcrops within the corridor study area. Soils within the area are primarily of the Gillman-Estrella-Avondale Association, which has characteristics of well-drained soils, loams, and clay loams on nearly level alluvial fans and floodplains. The Arizona Department of Mining and Geology does not classify the region as a geologic or seismic hazard area.

3.1.4 Wildlife

Wildlife habitat has declined in the EMF corridor due to urban/suburban development and agriculture. The EMF is a major open space but has limited value as a wildlife corridor due to the lack of cover vegetation. Species typically found along the EMF corridor include doves (*Scardafella inca*), woodpeckers (*Melanerpes sp.*), mice (*Perognathus hemionus crooki*) and an occasional Harris Hawk (*Parabuteo unicinctus*). Species common to the undisturbed Sonoran Desertscrub habitat include the black-tail jack rabbit (*Lepus californicus*), coyote (*Canis latrans*), javelina (*Dicotyles tajacu*), round-tail ground squirrel (*Spermophilus tereticaudus*), pocket mouse (*Perognathus hemionus crooki*), Inca dove (*Scardafella inca*), Gambels quail (*Lophortyx gambeli*), cactus wren (*Campylorhynchus brunneicapillus*), Harris hawk (*Parabuteo unicinctus*), western diamondback rattlesnake (*Crotalus atrox*), and southern desert horned lizard (*Phrynosoma platyhinus calidiarum*).

3.1.5 Biotic Communities

A non-intensive field survey, utilizing current aerial photography and on-site investigation, identified existing vegetative communities within and adjacent to the project area. Urbanization, agriculture and construction of the EMF have removed all native desert vegetation within the EMF right of way, and there are no naturally occurring areas of undisturbed native desert vegetation. Exotic vegetation within the EMF right of way provides little to no habitat – food, cover or roosting – for wildlife.

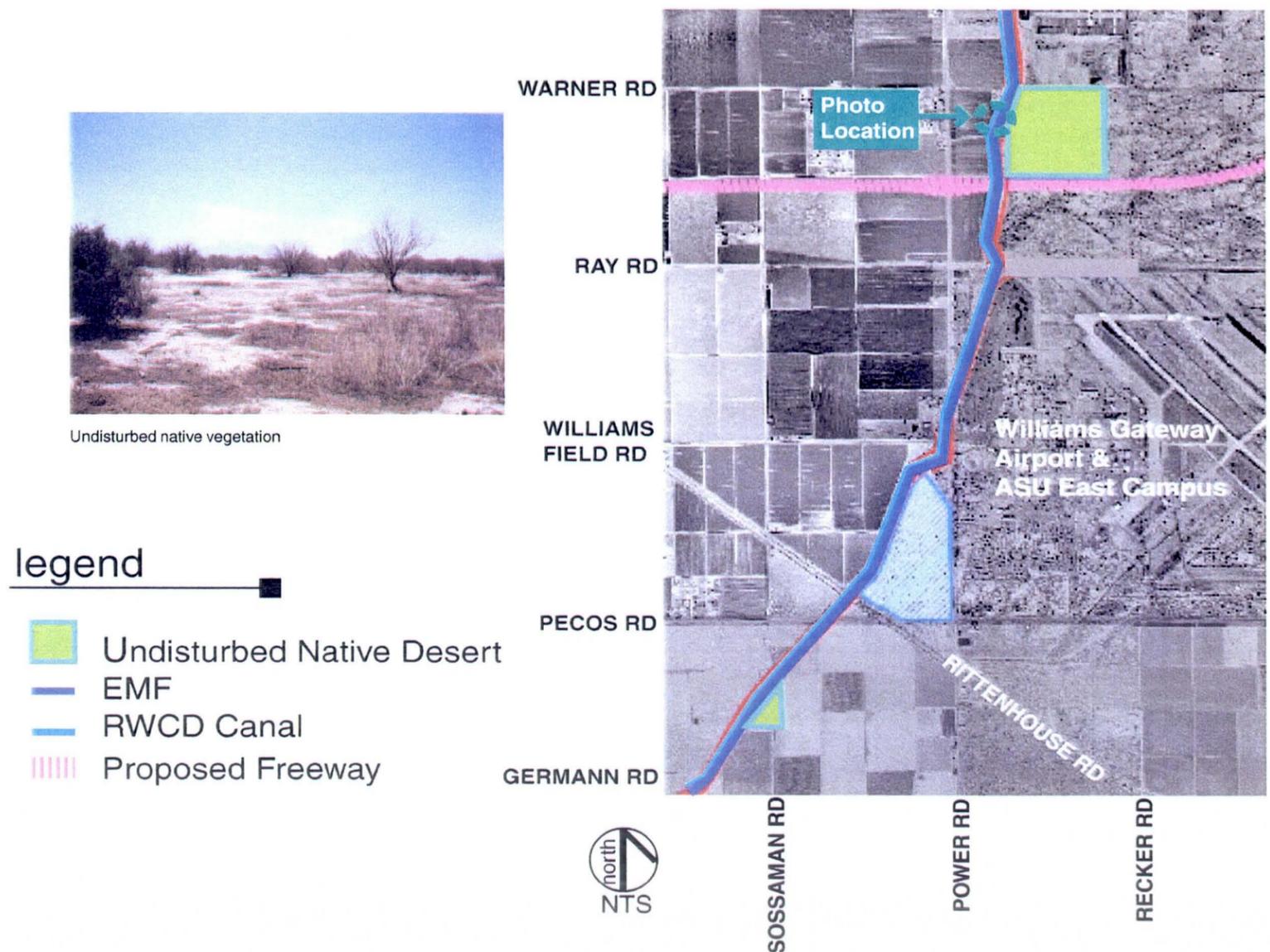
There are, however, two sites of undisturbed native vegetation adjacent to the southern portion of the floodway on private property. Figure 7 shows the location of the two remaining stands of Sonoran Desertscrub vegetation, which are small in area and unremarkable in character.



Undisturbed native vegetation

Vegetation near the study corridor was originally characteristic of the Lower Colorado River Valley Subdivision of the Sonoran Desertscrub biotic community (Turner and Brown 1994). This vegetative community includes various species of acacia (*Acacia spp.*), agave (*Agave spp.*), bursage (*Ambrosia spp.*), barrel cactus (*Ferocactus spp.*), ocotillo (*Fouquieria spp.*), cholla (*Opuntia spp.*), and mesquite (*Prosopis spp.*) Most naturally occurring vegetation has been removed in recent years by agricultural activities, development of residential properties, and construction of the EMF and RWCD Canal.

Figure 7. Biotic Community



3.1.6 Sensitive Species and Critical Habitat

The Arizona Game & Fish Critical Habitat and Special Status Species show that one special status species has been documented as occurring in the vicinity, but currently there appears to be no designated or proposed Critical Habitat in the EMF study area.

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>	<u>STATUS</u>
Sonoran desert tortoise	<i>Gopherus agassizii</i>	WC

WC status means "Wildlife of Special Concern in Arizona." Status (WC) indicates a species whose occurrence in Arizona is or may be in jeopardy, or with known or perceived threats or population declines, as described by the Department's listing of Wildlife of Special Concern in Arizona. Species included in WSCA are currently the same as those in Threatened Native Wildlife in Arizona.

3.1.7 Water Resources

3.1.7.1 Ground Water Recharge

In 1986, the Arizona legislature established the Underground Water Storage and Recovery Program to allow persons with surplus supplies of water to store the water underground and to recover it at a later time for reuse. The legislature added several other programs related to underground water storage. In 1994, the Arizona legislature enacted the Underground Water Storage, Savings, and Replenishment Act (UWS) and the Arizona Department of Water Resources (ADWR) administers the UWS program.

There are two primary types of facilities used to accomplish ground water recharge, constructed facilities and managed facilities. The constructed facility is typically associated with a series of basin-like structures. Water targeted for recharge is cycled into one basin at a time in depths of six to twelve inches and allowed to percolate into the ground water table. The managed facility is associated with washes or floodways like the East Maricopa Floodway. Establishing diversion dams, decreasing the invert slope and other methods to slow the velocity of water can modify a wash or floodway, allowing percolation. These facilities can easily double as wildlife habit ecosystems providing public education, bird watching and open space amenities. This is an opportunity in the EMF. Public observation should be encouraged, but intrusion into these facilities should not be allowed in order to achieve the best recharge results and gain maximum recharge credits.

If ecosystem restoration and water recharge were attempted within the Floodway, flood control analysis and comprehensive floodplain modeling of the entire study reach would have to be incorporated into any proposed profile or cross section alterations. This would ensure that any changes would not jeopardize the carrying capacity of the channel.

Ground water recharge is a valid and potential goal that can be targeted within or near the East Maricopa Floodway. Four East Valley communities have expressed interest in developing or partnering in the development of ground water recharge facilities along the southern portions of the floodway.

The City of Mesa and the Town of Gilbert are investigating options for effluent disposal from the Southeast Water Reclamation Plant (WRP) as well as the South WRP. The City of Mesa owns a 160-acre parcel of land between Queen Creek and Sanokai Washes adjacent to the 230-acre parcel owned by District. Their intent is to construct a series of injection wells for recharge. Currently the proposed facility is being considered independent from what might occur within District property. It is anticipated that the volume of processed effluent will exceed the ability to recharge within their 160-acres. This suggests the opportunity for Mesa and Gilbert to enter into an agreement with the District to develop an additional recharge facility on the District's 230-acres and within the EMF.

Two other stakeholders, Queen Creek and the City of Chandler, might also join Mesa and Gilbert in partnering to finance recharge facilities. An opportunity exists for these stakeholders to enter into an agreement with the District to investigate the feasibility of developing constructed and managed recharge facilities within the District's 230-acres or within the Floodway between Queen Creek Road and the Hunt Highway. Also, an opportunity exists for these stakeholders, along with the District to develop these recharge areas upon successful completion of an in-depth investigation of recharge potential for these two suggested sites.



3.2 Cultural and Socioeconomic Environment

3.2.1 Introduction

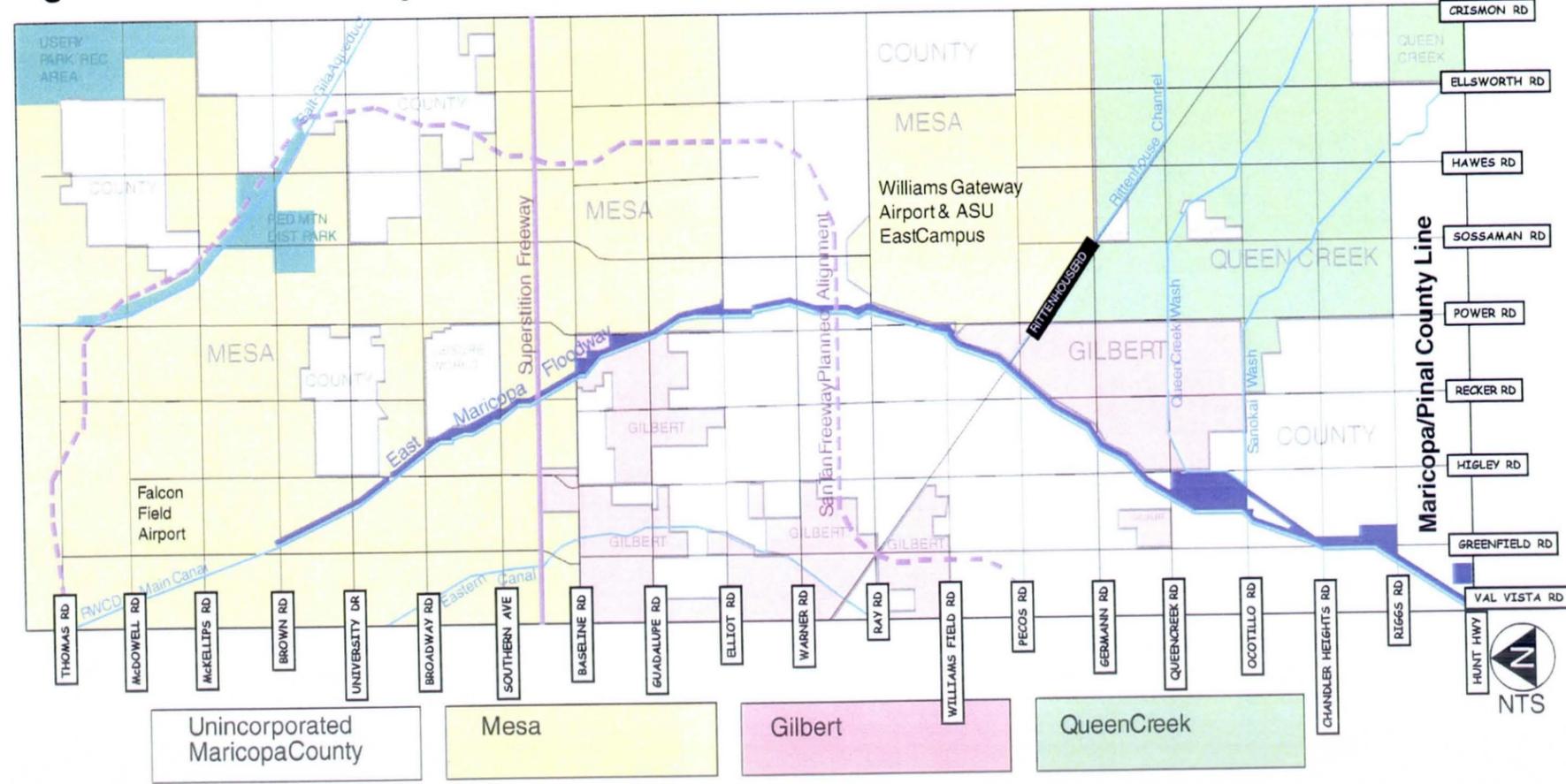
The cultural and socioeconomic context is often the starting point for community planning and design, especially in areas that are urbanized or undergoing growth and development. Sensitivity to the character of the existing built environment goes hand in hand with sensitivity to environmental and natural resources. In the case of the EMF, the character of the built environment—the existing urban fabric—is a major consideration in the northern reaches of the corridor from Brown Road on the north to Elliot Road on the south through the City of Mesa and the Town of Gilbert. Existing residential and commercial development, the network of transportation infrastructure, and related public facilities and services will determine, or even constrain, future land use development. In these urbanized areas, there are limited opportunities for creating amenity nodes such as pocket parks along the EMF because vacant land available for acquisition is scarce, and the floodway right-of-way is narrow. In contrast, the southern reaches of the

corridor traverse agricultural and very low-density residential areas. In these areas, there is a broader range of development and enhancement opportunities because land may be more available for acquisition for flood control and related public services and facilities.

This section of the report discusses several of the major cultural and socioeconomic factors that will affect the future enhancement of the EMF and development along the corridor. These factors include:

- Community vision, public policy, and planned land use.
- Population and growth trends.
- Environmental justice issues and the regulatory context.
- Existing land use, zoning and property ownership.
- The variety of public services and facilities, such as parks and schools.
- The location and condition of transportation improvements and planned multi-modal resources.
- Historic, archaeological, and architectural resources.
- Visual resources and landscape character.

Figure 8. East Valley Jurisdictions



3.2.2 Community Vision and Public Policy

The Comprehensive Plan for Maricopa County, and General Plans for Mesa, Queen Creek and Gilbert contain policies, goals and objectives for development and management of land within their jurisdictions. These plans constitute the communities’ vision and values, enacted by various boards, councils and commissions and based on the values of their constituents. In addition, master plans, drainage plans, transportation corridor studies, and trails and parks plans that address the study area and the EMF have been prepared by Maricopa County, the Maricopa Association of Governments (MAG), and East Valley jurisdictions. **Figure 8: East Valley Jurisdictions** shows municipal boundaries within the study area. This municipal “landscape” or “mosaic” is evolving in the East Valley, with many areas currently within unincorporated Maricopa County likely to be annexed by Mesa, Gilbert, or Queen Creek within the next 20 years.

The following highlights from community planning documents focus on policies that relate directly to the flood control or future multi-use character of the EMF corridor, and include:

- Vision for future land use (shown on *Figure 9a: Planned Land Uses*).
- Flood control, public safety and public facilities.
- Natural, cultural, and visual resources.
- Open space, trails, and recreation.
- Transportation infrastructure and multi-modal opportunities.

The first four issue areas will be addressed in this section in the context of community vision and policy direction. Existing and proposed transportation improvements and multi-modal issues will be discussed in the multi-modal section.

3.2.2.1 Vision for Future Land Use

Although all the elements of the various comprehensive and general plans need to be considered together to provide an integrated blueprint to guide future development, land use policies and mapped land use designations are the foundation for future planning. Recognizing the importance of regional consistency in planned land use designations, the County Comprehensive Plan looks to adopted general plans for plan guidance within incorporated areas and municipal spheres of influence (Municipal Planning Areas).

The *Planned Land Uses* shown on **Figure 9a** is a composite of the land use maps of each jurisdiction. Because the legends of these individual maps vary slightly, the composite map combines categories into a generalized legend that reflects the overall future development direction for the East Valley. As illustrated in this figure, that direction is to extend the existing urban pattern to the edges of the urban area. Existing agricultural lands are generally planned for residential uses. Williams Gateway Airport/Campus is shown as the largest future industrial and employment center. The *Gilbert General Plan* and *Williams Gateway Plan*

show the EMF and the RWCD canal as open space corridors, while the *MAG Desert Spaces Plan* shows the canal and drainage corridor as "retention areas," a category that includes areas with natural resources that have significant open space value. The *Queen Creek General Plan* shows both Sanokai and Queen Creek washes as open space.

3.2.2.2 General and Comprehensive Plans

Maricopa County

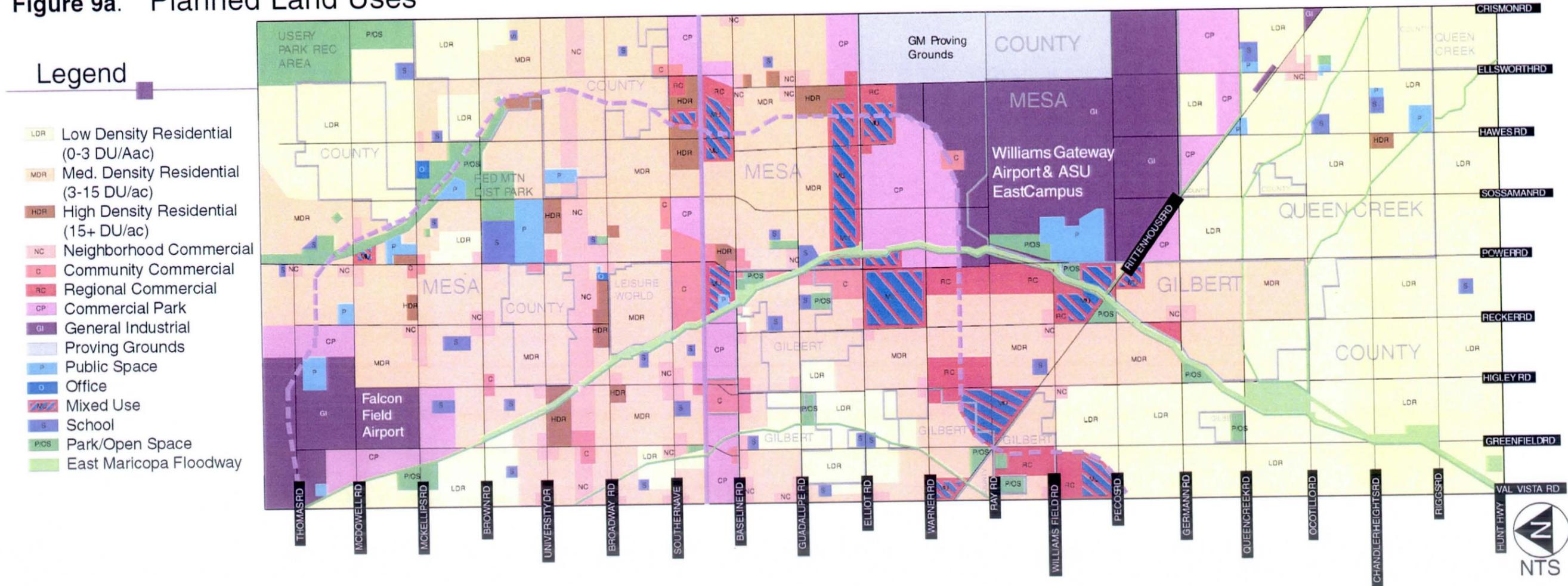
The *Maricopa County Comprehensive Plan—Maricopa County 2020, Eye to the Future*—was adopted by the County Board of Supervisors in October 1997. This action followed an intensive planning process that included over 120 public meetings, community workshops and focus groups to establish a vision for the County. This vision, stated below, continues to guide implementation of the plan:

Our overriding vision for Maricopa County is to accommodate growth in a fashion that will preserve our sense of community and protect and enhance our quality of life. Priorities include protecting our unique desert environment, cultural heritage, and southwestern lifestyle. These unique features define our region and provide an identity that is recognizable in the international arena. Recognition and enhancement of these characteristics are critical to our future success.

Overall goals for the four plan elements—Land Use, Transportation, Environment, and Economic Development—are based on this community vision and provide the basis for more specific policies and objectives, as follows.



Figure 9a. Planned Land Uses



Land Use—Promote efficient land development that is compatible with adjacent land uses, is well integrated with the transportation system, and is sensitive to the natural environment.

Transportation—Provide an efficient, cost effective, integrated, accessible, environmentally sensitive, and safe county-wide multi-modal system that addresses existing and future roadway networks, as well as promotes transit, bikeways, and pedestrian travel.

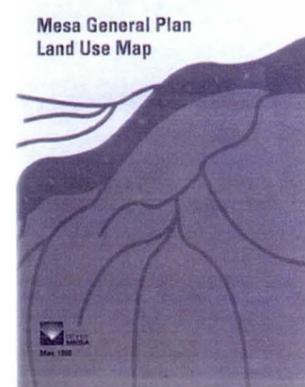
Environmental—Promote development that considers adverse environmental impacts on the natural and cultural environment, preserves highly valued open space and remediates areas contaminated with hazardous materials. A second goal states: *Improve air quality and reduce noise impacts.*

Economic Development—Promote a growing, balanced, efficient, and diversified economy, consistent with available resources, that enhances quality employment opportunities, improves quality of life, and is sensitive to the natural and cultural environment.

Several issues highlighted in the Comprehensive Plan are particularly important in the East Valley and within the EMF corridor. They include the historic and future role of agriculture, a regional open space and parks system, and habitat and visual resource values. The plan notes that although agriculture has been the county's most important industry, the agricultural base is being converted to urban uses. On the subject of open space and recreational resources, the plan references the County's extensive regional parks system (Dedicated Open Space), which includes San Tan Regional Park, located in Pinal County. The plan states that "canals and trails could connect the various components of Dedicated Open Space and possible future open spaces." Other river and wash policies include discouraging development within 100-year floodplains and maximizing wildlife habitat and native vegetation along waterways. The plan notes that "wildlife corridors can also function as paths for pedestrians, equestrians, and bicyclists to link open spaces" and that rivers and washes offer visual resource value by providing "uninterrupted views of mountains, vegetation, and wildlife native to the county."

Mesa General Plan

The City of Mesa General Plan, adopted in May 1996, presents the community's vision, outlines broad goals and policies, and establishes land use, circulation, and economic development plans and strategies. The following excerpts from Mesa's vision for the future describe "a world class progressive City" that "focuses on the family by ensuring quality recreational and cultural activities"...in a City that is "recognized for the quality of its built environment and the integration of the natural landscape."



These themes of integrating natural and built environments and providing recreational amenities to meet the demands of the City's diverse population are reiterated in specific community goals and policies.

Selected community goals, particularly relevant to the EMF address:

"A compatible mix of land uses which are adequately buffered and linked with a system of passive and active open space that traverses the City and ties into regional systems."

"A high standard for air and water quality/quantity that meets the needs of current and future residents while protecting the community against natural and man-made hazards."

"Convenient, functional, well-maintained, and operated public recreational and cultural facilities which meet the leisure needs of all age groups."

Specific land use objectives and policies address preservation and enhancement of the Sonoran Desert landscape, and include:

Policy 10g: Angular concrete, gunitite or other impervious surface drainage channels will be discouraged, particularly when visible from the street. Where the use of gunitite is necessary, the gunitite shall have an earth tone color and meander/undulate to emulate natural features. Rock outcroppings and natural vegetation shall be incorporated where appropriate, to enhance the "natural" character of the channel.

Policy 10h: Additional landscaping along natural drainage channels may be required and the use of natural materials including rocks and soil cement, where appropriate, will be encouraged.

Policies in the circulation element include Policy 8b, which identifies the opportunity for a network of biking and walking paths "linking open spaces, parks, recreational facilities, and schools throughout the City, including along canal banks."

The environmental conservation element addresses the potential for multi-use of canal banks, noting that "legal, safety, and financial issues remain as the most significant impediments...." The plan acknowledges that several cities in the Valley are in the process of developing "significant commercial and recreational attractions along or adjacent to canals", and notes that citizens of Mesa recognize the potential for these aesthetic, recreational, and economic benefits.

Policy 3b recommends that the City collaborate with federal, state, county, and municipal agencies in the "development of infrastructure improvements (such as the Red Mountain Freeway and flood control structures) to ensure that the potential to improve the visual, recreational or open space value of those improvements is realized."

Policy 3g in this section recommends that the City "develop a system of multi-use trails along the appropriate rights-of-way for canals and power transmission lines."

The recreational element reiterates the message of multi-use and recreational linkages with the following policies:

Policy 3a: Provide pedestrian, bicycle, equestrian, and recreational activities to serve residential and non-residential areas that effectively utilize canals, public utility easements, and freeway corridors.

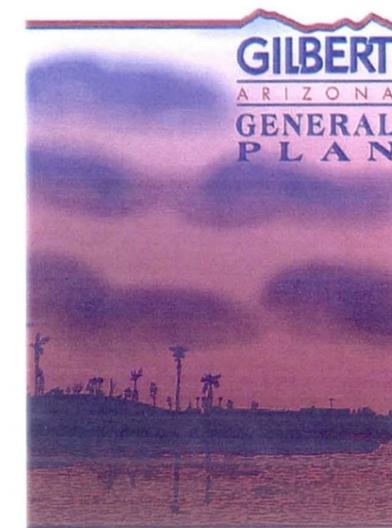
Policy 3b: Provide a safe and efficient system of sidewalks, bicycle facilities, trails, and scenic roads that serve to link the system of parks to each other and to the community regional open space network.

Although much of the City of Mesa is urbanized, the policies quoted above identify opportunities for enhancing the built environment, creating community amenities within areas already developed, and linking neighborhoods and activity centers in a recreational and open space network. For areas in southeastern Mesa that are transitioning from agricultural to urban and suburban uses, General Plan policies and planned land use will be very important in defining the intensity and quality of future development.

Williams Gateway Airport/Campus is an example of such an opportunity area. As noted in the *Mesa General Plan*, the *Williams Regional Planning Study* (1995), and the *Williams Gateway Airport Master Plan* (1999), the Williams Campus is planned as an educational, research, and training facility. Approximately 20,000 full-time students are anticipated for the Williams campus by the year 2020. Williams Gateway Airport is planned as a reliever airport and aerospace center for general aviation, air cargo, commercial passenger service, and aerospace manufacturing and maintenance. One million passengers are expected to use the airport by 2005, and 2.45 million by 2015. The Williams Gateway Airport/Campus is seen as the future hub of employment in the Southeast Valley. Because the EMF is adjacent to this major activity center, there is an opportunity to create circulation linkages, particularly for commuter bicycle use. At the same time, any future land uses, including recreational trails or bike paths and flood control retention basins, must consider aviation overflight areas and other related issues. These and other issues are discussed in more detail in the Opportunities and Constraints section of the report.

Gilbert General Plan

The *Town of Gilbert General Plan Update*, adopted in May 1994, contains a variety of policies that are relevant to EMF corridor planning issues. The general plan presents an overall vision that promotes sustainable development and the integration of economic, environmental, and social values. The "green" theme of the vision states that Gilbert's community vision "reflects the agricultural heritage of Gilbert's farming past. An open space system is proposed in the plan which utilizes parks, the existing canal system, and drainage areas as primary elements."



A Sample of Key Policies from Gilbert General Plan

Key policies that support multi-use and aesthetic enhancement of the EMF are included in the open space and recreation, circulation/transportation, public facilities and services, and environmental management elements of the general plan. The following policies provide a sample of overall public policy direction:

Developments should provide open space and facilities to serve new and existing neighborhoods. Designs should emphasize multi-use, public safety, low maintenance, and drainage.

Establish areas for district parks in advance of development, using drainage basin districts and purchase agreements to facilitate participation in district parks by all new development.

Develop design criteria and incentives to maximize usable recreation open space in areas used for storm water retention.

Take advantage of Gilbert's natural and man-made open space such as flood plains, canals, historic sites or unusual landscape.

Secure permanent interconnected open-space which provides visual and functional links with parks, schools, and neighborhoods. Utilize both sides of canals, railroad and electrical transmission line corridors, providing for hiking, bicycling, jogging, equestrian and non-motorized transportation.

Develop canal banks and adjacent retention areas, transmission line easements, railroad corridors, and drainage ways with paths for bicycle, pedestrian and equestrian use.

Secure pedestrian, equestrian and bicycle access across major barriers (canals, railroads) and provide bicycle routes along arterial and collector streets.

Establish programs such as "adopt-a-trail" to assist with trail development and maintenance.

Orient equestrian trail development to accessing equestrian subdivisions, low-density areas and Rodeo Park, and limit conflicts with street traffic.

Consider multiple use of facilities when planning resource conservation programs, including the integration of recharge sites with natural habitat.

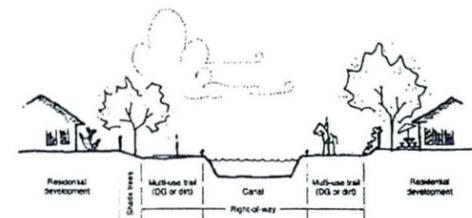
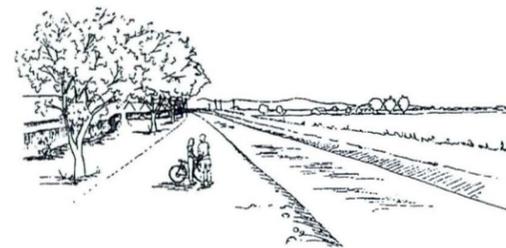
Promote use of native, drought tolerant plant materials to conserve energy and water in parks and rights-of-way.

Queen Creek General Plan

The *Town of Queen Creek General Plan*, adopted in November 1996, provides the policy basis for land use and economic development, circulation, public facilities, town center design, and open space and trails. The overall goal of the general plan is to "provide a quality rural living environment with a focus on improving social, environmental, economic, cultural, and aesthetic factors." Goals and individual policies strike recurrent themes, and emphasize rural character, land use compatibility (especially with existing rural neighborhoods), and

environmentally sensitive development. Scenic quality and a network of open space and pedestrian, bike, and equestrian trails figure prominently in the general plan. More detailed information on parks and recreation is provided in a separate *Open Space and Trails Plan*.

A number of general plan policies dealing with public facilities are relevant to current planning for the EMF corridor since they address issues dealing with multi-use or adaptive reuse of facilities. For example, policies recommend the reuse of the Maricopa County Landfill located on Riggs Road for reuse as open space. Hydrology policies recommend the recharge of groundwater, and the use of drought-tolerant and low water consumptive plants. Flood control policies support the Flood Control District Queen Creek Area Drainage Master Plan, recommend the adoption of grading and drainage ordinances for development adjacent to washes, and promote integration of retention and conveyance facilities in Queen Creek and Sanokai Washes with linear park goals. Vegetation and Wildlife policies include the repair and/or preservation of existing riparian habitats.

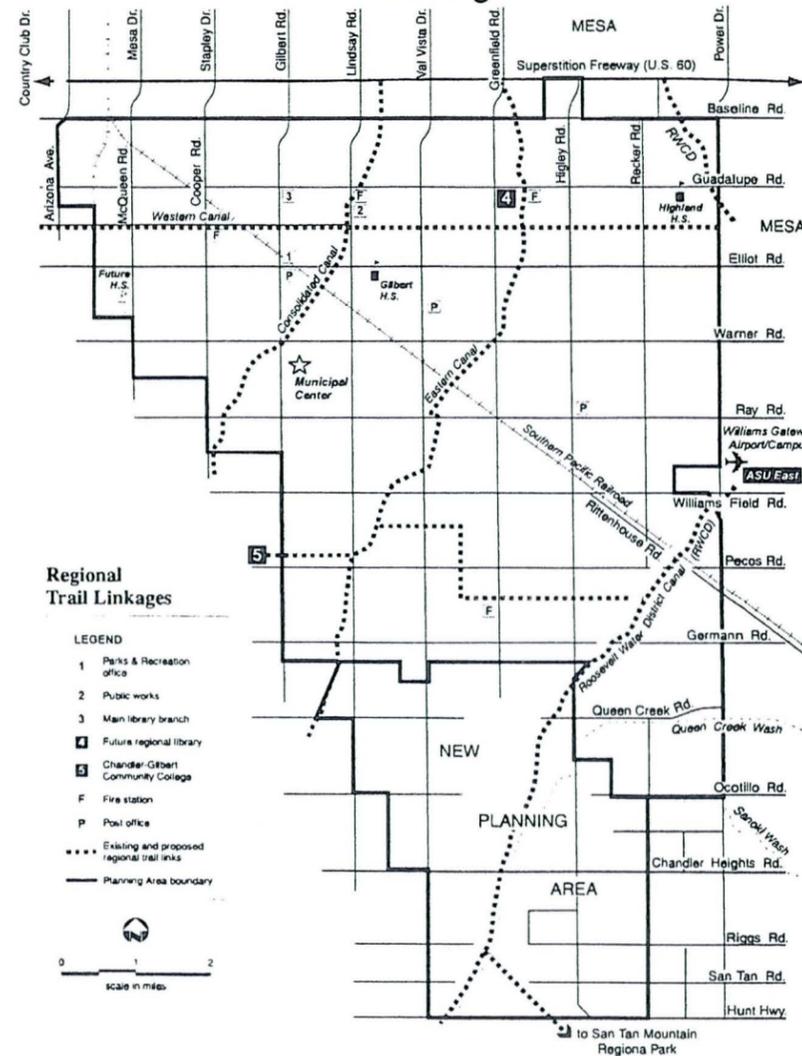


3.2.2.3 Open Space and Trails Plans

In addition to the various general plans, many of which address open space, trails, and other recreational issues, the communities of Gilbert and Queen Creek have prepared separate open space and trails planning documents. These plans expand on general plan policies.

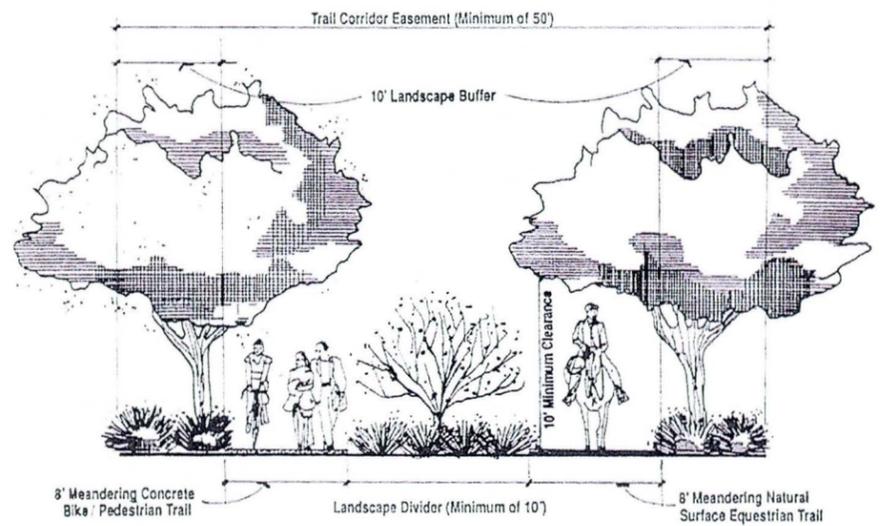
The *Town of Gilbert 1996-2001 Parks, Open Space and Trails Plan*, adopted in November 1996, offers the most complete picture of future trail linkages. Open space and trails are seen in a regional context, with the implementation of the Sun Circle Trail through Gilbert along the Western and Consolidated canals, and connections to San Tan Mountain Park using the Roosevelt Water Conservation District (RWCD) canal. Three canals run diagonally through the Town and are referred to in the Plan as "Gilbert's three rivers." According to the Plan, they offer water-oriented recreational opportunities. As noted earlier in this study, the RWCD canal is located parallel and to the west of the EMF. Regional trail and open space opportunities identified for the canal can also be applied to the EMF, provided trail and other multi-use activities do not conflict with flood management. The sketches and "regional trail linkages" map shown above and to the right, in figure 9b, are taken from this plan and graphically portray the Town's overall open space and trails vision.

Figure 9b. Town of Gilbert Regional Trail Linkages

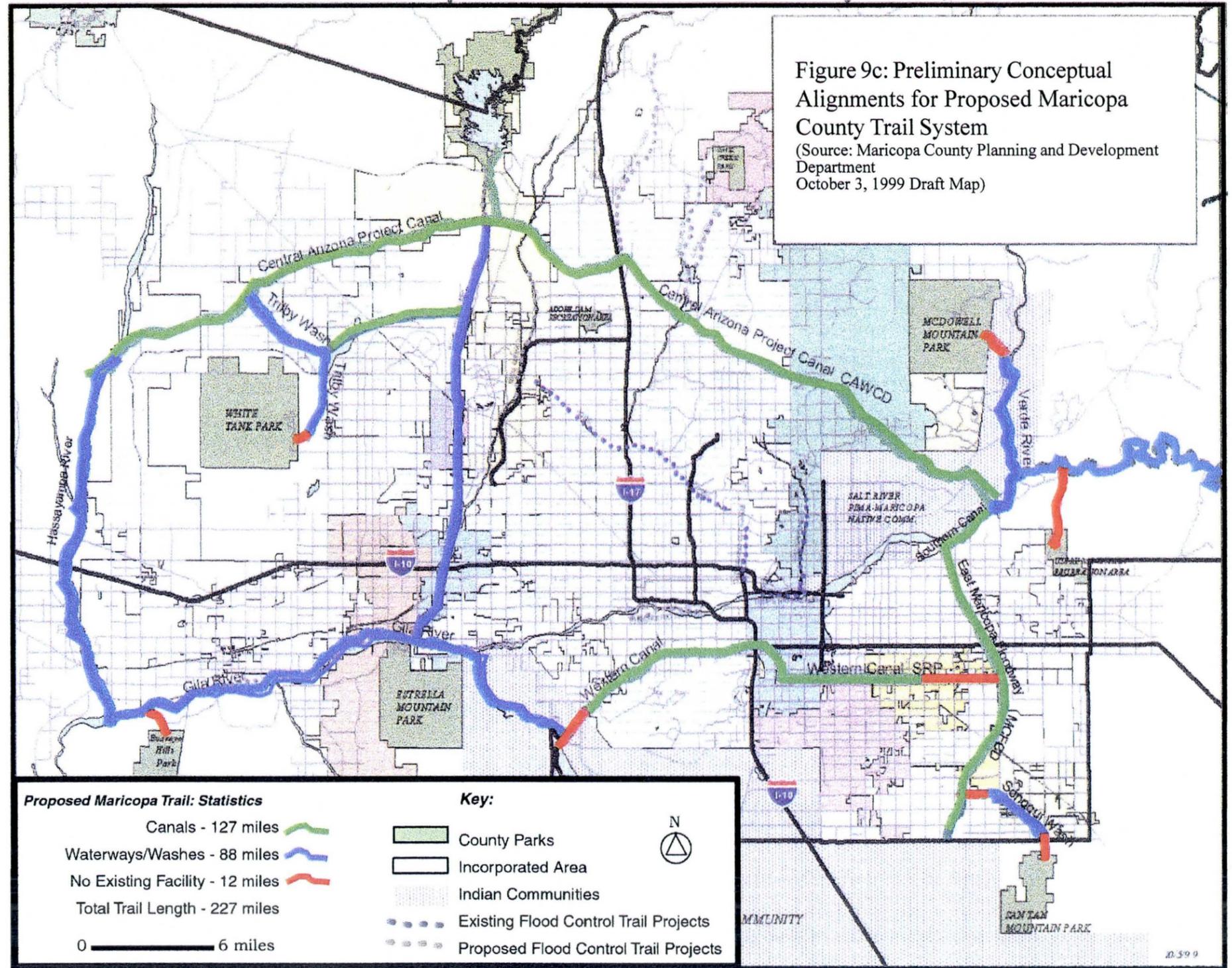
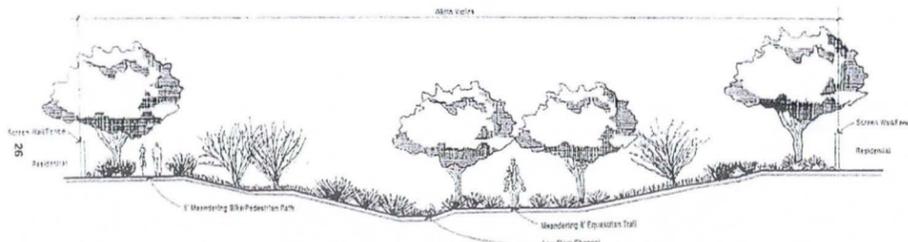


The Town of Queen Creek adopted an *Open Space and Trails Plan* in October 1994. This document includes several maps, exhibits, and tables that support a comprehensive approach to recreational resources. Specific policies relevant to current EMF planning include many previously noted in the Queen Creek General Plan. The theme is integration of functional with recreational and aesthetic amenities. For example, public facilities policies "encourage new development to incorporate flood control measures that integrate recreational opportunities" (Policy 1i) and "support public agency coordination to provide a balanced system of recreational opportunities" (Policy 1j). Equestrian trail system goals are addressed by Policy 2a: "establish direct access to the San Tan Mountains Regional Park"; Policy 2b: "establish an equestrian trail linkage between the north and south Planning Area boundaries"; and Policy 2d: "establish policies for the improvement and dedication of Queen Creek and Sanokai Washes." The graphics below, excerpted from the adopted plan, depict multi-use connector and wash trails.

In addition to separate trails and open space planning being done within incorporated communities in the East Valley, Maricopa County has been involved in regional trails planning for many years, as shown in Figure 9c. In fact, Maricopa



Equestrian and Bike / Pedestrian Trail Corridor (Typical)



County's trail program began in 1964 when the Board of Supervisors adopted a plan for 720 miles of hiking and equestrian trails. One of the early trails was designated the *Sun Circle Trail*, a 110-mile National Recreation Trail looping around the Phoenix Valley. The County Trails Committee is considering the EMF corridor as an important portion of the Legacy Trail.

3.2.3 Population and Growth Trends

The Southwest "Sunbelt" is the fastest growing region in the United States, with Arizona and Maricopa County leading the way. Between 1990 and 1997, Maricopa County experienced the largest increase in population of any county in the United States. The majority of new residents have moved from California and a number of Midwestern states. The Sunbelt age distribution is comparable to that of the United States as a whole. Contrary to popular belief, persons over the age of 60 comprise only 16 percent of the County's residents, compared to 16.8 percent nationwide. Hispanic and Native American residents are double that of the rest of the nation.

3.2.3.1 Population

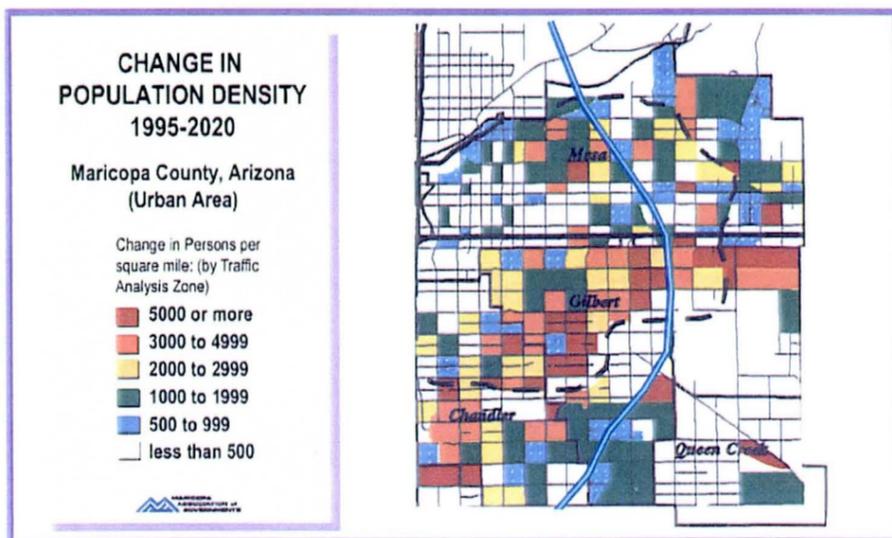
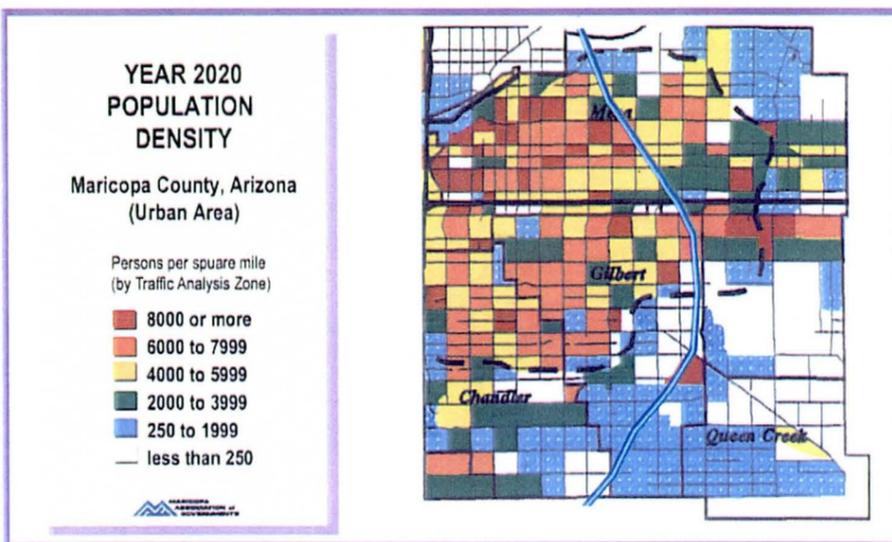
Maricopa County has maintained a dramatic growth rate over the past decade. In the past ten years, the population grew almost 40 percent from 1,837,956 to 2,551,765. According to the *Maricopa Association of Governments (MAG) - 1998 Urban Atlas*, the growth rate is projected to increase throughout the region with existing transitional and rural areas absorbing the majority of this increase. The highest population density is currently contained within the existing or planned freeway system. The Superstition Freeway and the proposed San Tan Freeway traverse the East Maricopa Floodway and account for a large portion of the area's projected growth.

Projected Population Growth by Municipality

Municipality	1995	2020	% Change
Maricopa County	2,551,765	4,516,100	57%
Mesa	372,378	593,962	60%
Gilbert	65,460	244,842	274%
Queen Creek	5,108	20,505	301%

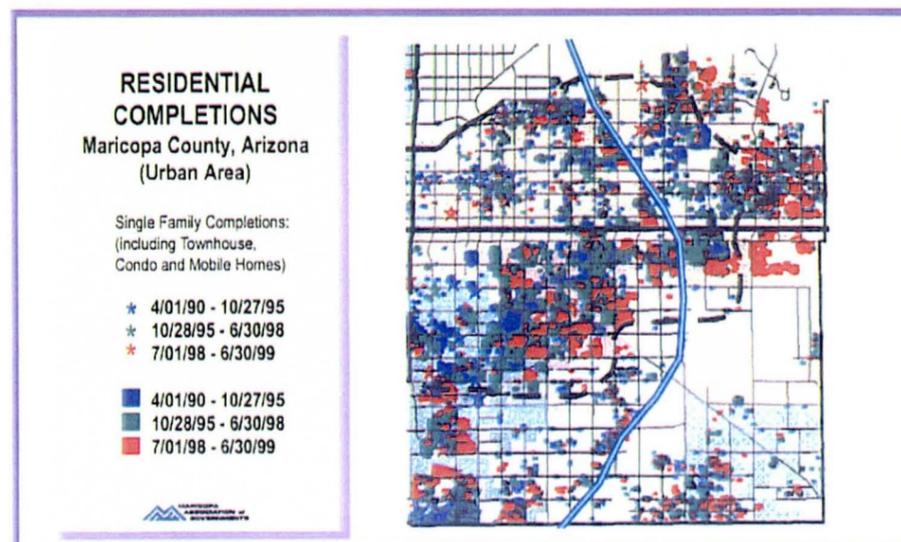
The study area is divided into three character areas -- urban, transitional, and rural. The City of Mesa is the County's second largest municipality after Phoenix. The population density in this area is reflective of its urban character. The majority of the growth in the City of Mesa will occur in emerging urban areas, specifically adjacent to the Williams Gateway Airport. The Town of Gilbert is classified, for purposes of this study, as transitional. The dramatic population growth in this area is also anticipated adjacent to the Williams Gateway Airport and the proposed San Tan Freeway. The Town of Queen Creek is classified as rural. Specific regions with the Town are anticipated to grow significantly.

The following table identifies a sampling of areas along the East Maricopa Floodway and within these three municipalities. The data is taken from the *MAG Socioeconomic Projections Interim Report - June 1997*. Population projections are reported by Regional Analysis Zone (RAZ) and Traffic Analysis Zone (TAZ).



Projections Population Growth by RAZ/TAZ

Municipality	1995	2020	% Change
Mesa			
RAZ 321	6,134	43,424	608%
RAZ 322	313	39,735	12,594%
Gilbert			
RAZ 312	5,304	51,738	876%
RAZ 319	781	21,751	2,685%
RAZ 329/TAZ 1572	118	2,517	2,033%
Queen Creek			
RAZ 339/TAZ 1589	479	8,049	1,580%
RAZ 339/TAZ 1591	68	6,010	8,738%

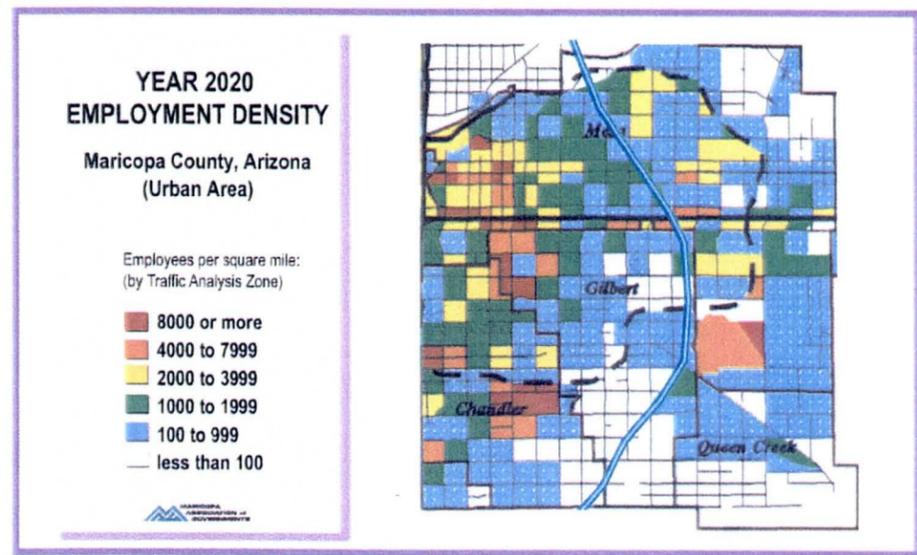
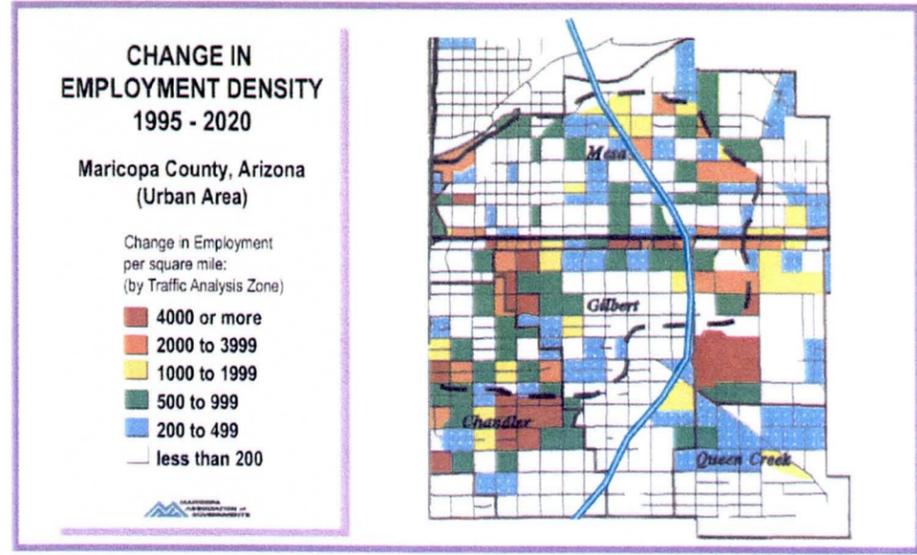


Housing development and associated infrastructure improvements are anticipated to follow in the projected growth regions. In the rural character area that includes the Town of Queen Creek only one park currently exists. Four parks are proposed for this region. In the transitional character area, there are currently three existing parks, with two additional parks proposed. To meet the demands of the projected population, the East Maricopa Floodway provides an opportunity for a major north-south connector in the future network of recreational resources and facilities.

3.2.3.2 Employment

The unemployment rate is a key indicator of economic health. Maricopa County's rate has remained below the national average for over five years. Employment and population are integrally linked. People are attracted to the region, in part, by increasing employment opportunities. The increasing population, in turn, increases employment opportunities. According to the *MAG - Urban Atlas 1998*, between 1990 and 1997 employment increased by 27 percent to 1.4 million jobs. The major employment core corresponds to the Phoenix Central Business District. Other major employment cores with more than 5,000 jobs per square mile are found in the city centers of Scottsdale, Tempe and Mesa, and also along Camelback Road between 7th Avenue and 32nd Street. Employment growth is projected to increase in the East Valley due to the proposed development of the Williams Gateway Airport and ASU East Campus. Major employment cores are routinely surrounded by areas with densities of 2,000 to 5,000 jobs per square mile. These areas tend to follow highway corridors. The region surrounding Williams Gateway Airport is anticipated to meet these expected growth rates.

Each of the East Valley communities has adopted plans with elements encouraging development of multi-modal facilities. As the area becomes increasingly urbanized, the need for these types of facilities will increase. The East Maricopa Floodway has significant potential for adaptive reuse as a multi-modal linkage.



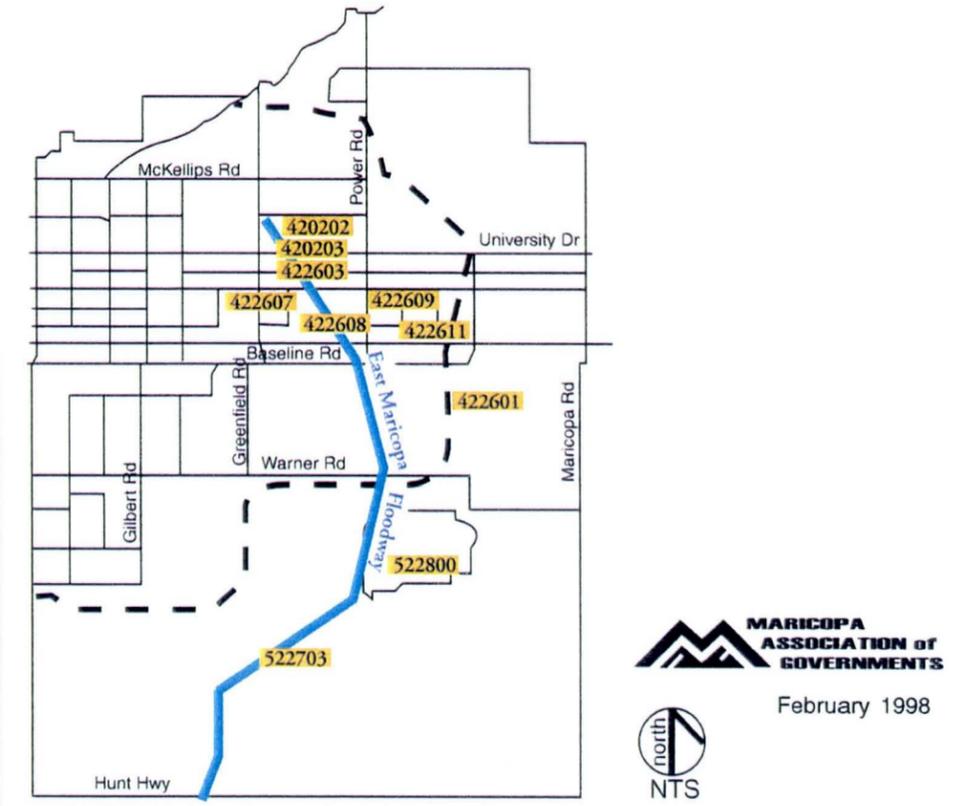
Study impacts were reviewed to determine whether low-income or minority neighborhoods would be disproportionately affected by the proposed action. The proposed action does not generate environmental justice impacts. No low-income or minority neighborhoods were identified following the review of population demographics and field investigations (see *Figure 10*). The East Maricopa Floodway is an existing facility and the proposed modifications will predominately occur within the existing right-of-way. The only exception will be proposed detention basins. Final location of basins and property acquisition have not been completed. Location selection will not inequitably affect any low-income or minority neighborhoods. In addition, basin projects and the development of a multi-modal trail system and habitat restoration will create environmental and social value and will not negatively impact environmental justice.

The following Census Tracts (see *Figure 10*) were reviewed for Environmental Justice impacts:

Census Track No.	Total Count	White	Black	American Indian	Asian	Hispanic	Other
420202	16025	13704	217	82	199	1102	721
420203	4878	4563	15	9	4	160	127
420603	3958	3599	33	27	48	208	43
422601	17640	15030	145	90	168	1338	869
422607	4403	4305	4	4	8	55	27
422608	7203	6573	64	27	59	339	141
422609	4116	3397	53	24	37	350	255
422611	7817	6356	48	30	38	947	398
522703	22045	15184	214	126	287	3938	2296
522800	483	370	14	1	0	59	39
	88568	73081	807	420	848	8496	4916
		82.5%	1.0%	0.5%	1.0%	9.5%	5.5%

Source: U.S. Department of Commerce: Bureau of Census, 1995. Provided by M.A.G.

Figure 10. Maricopa County Census Tracts



*The highlighted areas are the tracts that affect the East Maricopa Floodway.

3.2.3.3 Environmental Justice

Title VI of the Civil Rights Act of 1964 and Executive Order 12898 require Federal agencies to ensure that actions do not exclude persons and populations from participation, deny persons and populations of the benefit of the proposed action/activities, or subject persons and populations to discrimination because of race, color, or national origin. Executive Order 12898, "Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations," reaffirms the principles of Title VI and related statutes. The Executive Order requires the consideration of low income, as well as/or in addition to, minority, disabled, women, and elderly populations. A minority population means a person who is African American, Hispanic, Asian American, Native American, or Alaskan Native. Low income means a person 18 and older who is below the poverty level estimated from the 1990 Census. Elderly refers to individuals older than 60 years of age.

3.2.4 Environmental Plan Approvals

Modifications to the East Maricopa Floodway may require authorization from numerous environmental agencies. Each agency will require an analysis of the proposed modification's impact on the surrounding environment as it relates to the agency's specific mission and purview.

The following is a preliminary list of agencies that will require permits or approvals in relation to any proposed modifications to the EMF:

- **Arizona Game and Fish Department** – Native Plant Protection Permit and Sensitive and Critical Species coordination.
- **Arizona Department of Agriculture** – Salvage Plan before removal of native desert vegetation at new detention basins.
- **Federal Aviation Administration** – FAA has established zones regarding bird strikes that apply constraints on EMF study features, such as basins that would attract migratory waterfowl to areas within flight patterns. The FAA may require a wildlife management plan to address potential impacts to Williams Gateway Airport.

The following is a preliminary list of agencies that may require permits or approvals in relation to any proposed modifications to the EMF, depending upon the US Army Corps of Engineers' decision regarding whether or not the EMF is included in "waters of the United States." Currently, the District expects that the EMF will be declared waters of the U.S. below the confluence of Queen Creek Wash and the EMF.

- **U.S. Army Corps of Engineers** – Section 404 of the Clean Water Act jurisdictional determination. If jurisdictional waters are identified, pre-application consultation should be conducted to review potential impacts to waters and determine whether Nationwide Permit program can be utilized or an individual permit is required.
- **U.S. Fish and Wildlife Service** – Coordination, if threatened or endangered species or critical habitat is present within EMF or new detention basin areas.
- **Arizona Department of Environmental Quality** – State requirements may include an Aquifer Protection Permit for new detention basins.
- **Arizona Department of Environmental Quality** – Clean Water Act 401 Certification. NPDES permit may need to be reviewed to ensure the proposed improvements are in compliance.

In addition, each municipality or jurisdiction will require specific information prior to authorizing modifications. The goal of each agency is to avoid or minimize negative impacts. A rigorous formulation of alternatives will assist the permit applicant in establishing that avoidance was the initial plan. Only when study objectives cannot be met is a mitigation analysis performed to lessen the impacts. Since modifications will occur throughout the existing study and the study is a regional facility, it is important to develop a holistic approach to mitigation measures. Within each of the affected municipalities the applicant may need to address changes in zoning, transportation disturbances and neighborhood acceptance.

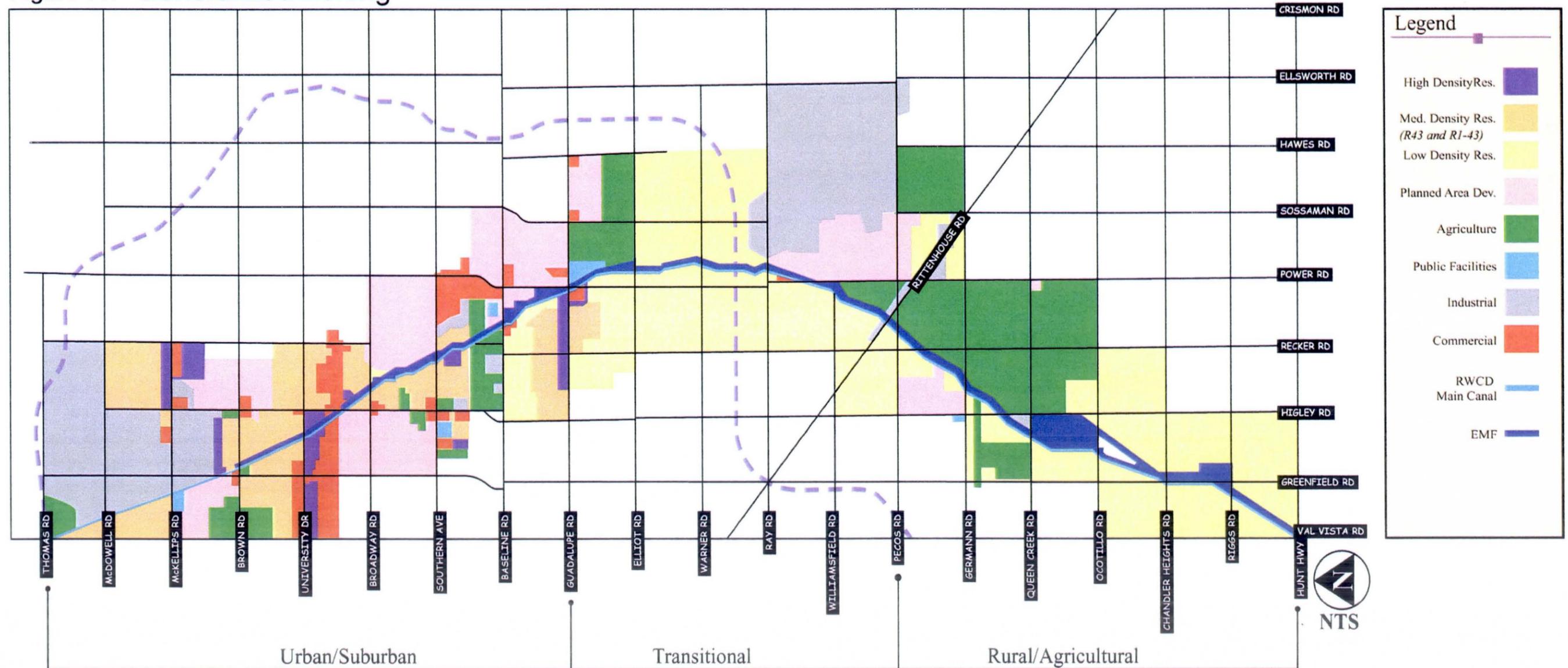
3.2.5 Land Use and Zoning

Zoning categories have been simplified for *Figure 11: Generalized Zoning* in order to reflect the overall patterns. This map provides an overview of existing zoning and landscape character along the EMF corridor. For example, in the northern portion of the study area, within the City of Mesa, land uses and zoning are a mix of single family residential zones, complemented by higher density multiple family, and commercial zones and uses. Trailer parks, RV resorts, and other retirement and/or senior citizen Planned Area Developments (PADs) have created a distinct urban pattern. Two large areas are zoned industrial and located in the vicinity of Falcon Field Airport and Williams Gateway Airport. A major regional shopping center, Superstition Springs Center, is located just east of the EMF near the Superstition Freeway. This major commercial development is complemented by smaller community commercial uses (shown in red on *Figure 11*) located along major arterials or at the intersections of arterials.

Large planned residential and golf course developments in Mesa, such as Leisure World and Superstition Springs Golf Club, are located along the EMF corridor. Leisure World, a gated community located between Broadway Road and Southern Avenue, owns the floodway land within its Residential Planned Development (RPD) and provides the Flood Control District with an easement through the property. The issue of public access across this property has been discussed previously by the District, property owners, and elected officials. The lack of land ownership at Leisure World poses a constraint on the District's multi-use of the corridor, and will be discussed in the opportunities and constraints section of this report. Similar existing land uses and public access problems exist along the corridor in the Superstition Springs Golf Club, located between Southern Avenue and Guadalupe Road.

While the existing land use and zoning patterns are indicative of future land uses in the northern ("urban") portion of the study area, existing low-density rural zoning south of Guadalupe Road can be seen as transitional zoning. Within the Towns of Gilbert and Queen Creek or in unincorporated Maricopa County low-density rural residential zoning (R-43, one residence per acre) or agricultural zones are "a holding zone." The area between Guadalupe Road and Williams Field Road along both sides of the EMF corridor are primarily agricultural. The area south of Williams Field Road along the EMF corridor and within the Town of Queen Creek is transitioning to low-density residential uses, with recent planned developments and large subdivisions.

Figure 11. Generalized Zoning



The Town of Queen Creek is not physically adjacent to the floodway, but future growth and municipal expansion will affect recreational and multi-use of the EMF corridor. As noted in the discussion of general plans, the Town has directed growth to enhance and encourage the area's rural character and to provide high quality of life for residents. The majority of Queen Creek is agricultural with scattered residential and undeveloped areas. Large farms grow a variety of crops including citrus, pecans, cotton, corn, wheat, barley, soybeans, and alfalfa. Several grain elevators operate to service agri-businesses. Existing residential development is typically low density. There are a few light industrial sites located along Rittenhouse Road. A 138-acre landfill located at the northeast corner of Hawes Road and Riggs Road is scheduled for closure and possible reclamation for open space/park uses. Commercial uses are located in the vicinity of the town center (near Ellsworth south of Ocotillo) and are mostly neighborhood commercial uses, such as restaurants and convenience stores. In addition, public uses such as the library, post office, town hall, community center, and the fire station are also located in this vicinity.

Like Queen Creek, the Town of Gilbert is transitioning from agricultural to residential uses while attempting to maintain its rural, farming heritage. A number of residential and commercial developments and public projects and plans are relevant to the EMF corridor. The Town is eager to work with the District to develop 230 acres at the southern end of the floodway, and is considering development of a multi-use recreation facility that includes ball fields, sports courts, a playground, an amphitheater for 10,000 to 20,000 people, and a satellite recreation center. A large subdivision is being planned for the area immediately west of Williams Gateway Airport. This development will allow space for a new district park. The Southern Pacific Railroad right-of-way is seen as a future pedestrian/equestrian link to the floodway. The Town may not extend Pecos Road across the canal and railroad. A regional mall is planned near the proposed San Tan Freeway south of Crossroads Park, which is located near the intersection of Greenfield Road and Ray Road.

The long-term development potential in these areas is more accurately depicted on **Figure 9a: Planned Land Uses** than on the existing zoning graphic. The contrast between urban/suburban, agricultural, and transitional land uses and landscape character will be described in more detail in the visual resources section of the report.

The influence on jobs, housing growth, transportation and related infrastructure of the Williams Gateway Airport/Campus has been noted earlier in this report in the discussion of general plan policies and population trends. The zoning for the Williams Gateway complex is industrial, as is a strip of industrial zoning along part of Rittenhouse Road. Adjacent PF (Public Facilities) zoning is located between the floodway and the Williams complex. Williams Gateway Airport has been declared a Superfund Site listed on the National Priorities List on November 21, 1989 (EPA ID. # AZ7570028582). A proposed detention basin (Rittenhouse Basin) is located in proximity to an airport wastewater treatment plant that has caused ground water contamination.

Since the floodway is located immediately west of Williams Gateway Airport, airport operations now and in the future are important to future planning for the EMF. The location of detention basins, or other land uses and activities in approach or overflight zones, will need to be evaluated. The Federal Aviation Administration's Advisory Circular FAA 150-52-33 gives guidelines for construction around airports. The FAA has established Wildlife Hazards Zones within 10,000 feet of runway sides and within a five-mile distance of runway ends. Based on preliminary communications with Airport staff, the location of detention basins—and potential hazards because of standing water, which attracts birds—will need to be reassessed. This issue will be further evaluated in the Alternatives Formulation and Evaluation section of the report.

Two other significant land use conditions affecting the EMF are the Roosevelt Water Conservation District (RWCD) canal which runs parallel to and immediately west of the floodway for the entire length of the EMF, and the Southern Pacific Railroad (SPRR) which is parallel to Rittenhouse Road and crosses the floodway and the canal. The current and future status of the railroad is discussed in the multi-modal section of the report.

As noted earlier in the discussion of regional trails planning, canals have been identified for recreational uses in general and specialized planning documents. In fact, many miles of canals are currently used for pedestrian, equestrian, and bike trails throughout the metropolitan area. Currently, the RWCD's Governing Board has not allowed public access to the canal or maintenance road due to potential liability. If this policy can be amended to allow public access in selected areas along the canal where floodway public access is currently not possible, trail continuity could be assured. For example, an alternate route around Leisure World and a connection from Princess Park to the Salt River via the RWCD canal are needed to create a contiguous trail system for the 19.3-mile corridor. Since RWCD will begin construction improvement along the entire canal later this year, amending policy direction and retrofitting for public multi-use may be appropriate.

3.2.5.1 Educational Facilities

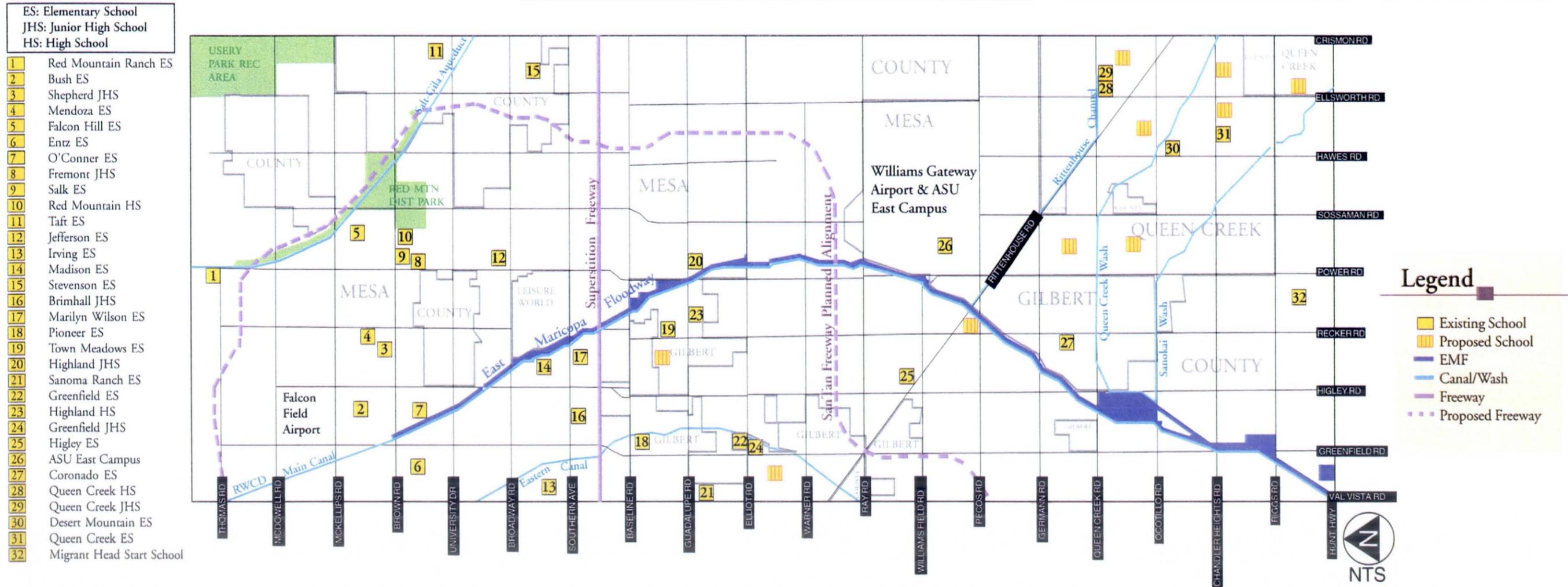
There are 32 schools within the EMF study area (See *Figure 12: Educational Facilities*). Seven of these schools are adjacent to or within one-half mile of the floodway. Six of these are between Brown and Guadalupe Roads. They are O'Conner Elementary, Madison Elementary, Marilyn Wilson Elementary, Town Meadows Elementary, Highland High School, and Highland Junior High School (Mesa and Gilbert Unified School Districts). The proposed Coronado Elementary School at Germann and Recker Roads (Higley Unified School District) will be open in September 2000 with an estimated enrollment of 600 students. Each of these schools has easy access to the floodway via streets and in some cases bike lanes to support a myriad of future interpretive, educational, and recreational opportunities within the floodway corridor. These opportunities and study recommendations are described in detail in the Alternatives Formulation and Evaluation section of this report.

The following chart provides additional information on study area schools:

Number	School Name	Grade Level	City
1	Red Mountain Ranch ES	K-6	Mesa USD
2	Bush ES	K-6	Mesa USD
3	Shepherd JHS	7th.-9th.	Mesa USD
4	Mendoza ES	K-6	Mesa USD
5	Falcon Hill ES	K-6	Mesa USD
6	Entz ES	K-6	Mesa USD
7	O'Conner ES	K-6	Mesa USD
8	Fremont JHS	7th.-9th.	Mesa USD
9	Salk ES	K-6	Mesa USD
10	Red Mountain HS	10th.-12th.	Mesa USD
11	Taft ES	K-6	Mesa USD
12	Jefferson ES	K-6	Mesa USD
13	Irving ES	K-6	Mesa USD
14	Madison ES	K-6	Mesa USD
15	Stevenson ES	K-6	Mesa USD
16	Brimhall JHS	7th.-9th.	Mesa USD

Number	School Name	Grade Level	City
17	Marilyn Wilson ES	K-6	Mesa USD
18	Pioneer ES	K-6	Gilbert USD
19	Town Meadows ES	K-6	Gilbert USD
20	Highland JHS	7th.-8th.	Gilbert USD
21	Sanoma Ranch ES	K-6	Gilbert USD
22	Greenfield ES	K-6	Gilbert USD
23	Highland HS	9th.-12th.	Gilbert USD
24	Greenfield JHS	7th.-8th.	Gilbert USD
25	Higley ES	K-6	Higley USD
26	ASU East Campus	College	State of AZ.
27	Coronado ES	K-6	Higley USD
28	Queen Creek HS	9th.-12th.	Queen Creek
29	Queen Creek JHS	6th.-8th.	Queen Creek
30	Desert Mountain ES	K-5	Queen Creek
31	Queen Creek ES	K-5	Queen Creek
32	Migrant Head Start School	Pre-K	State of AZ.

Figure 12. Educational Facilities

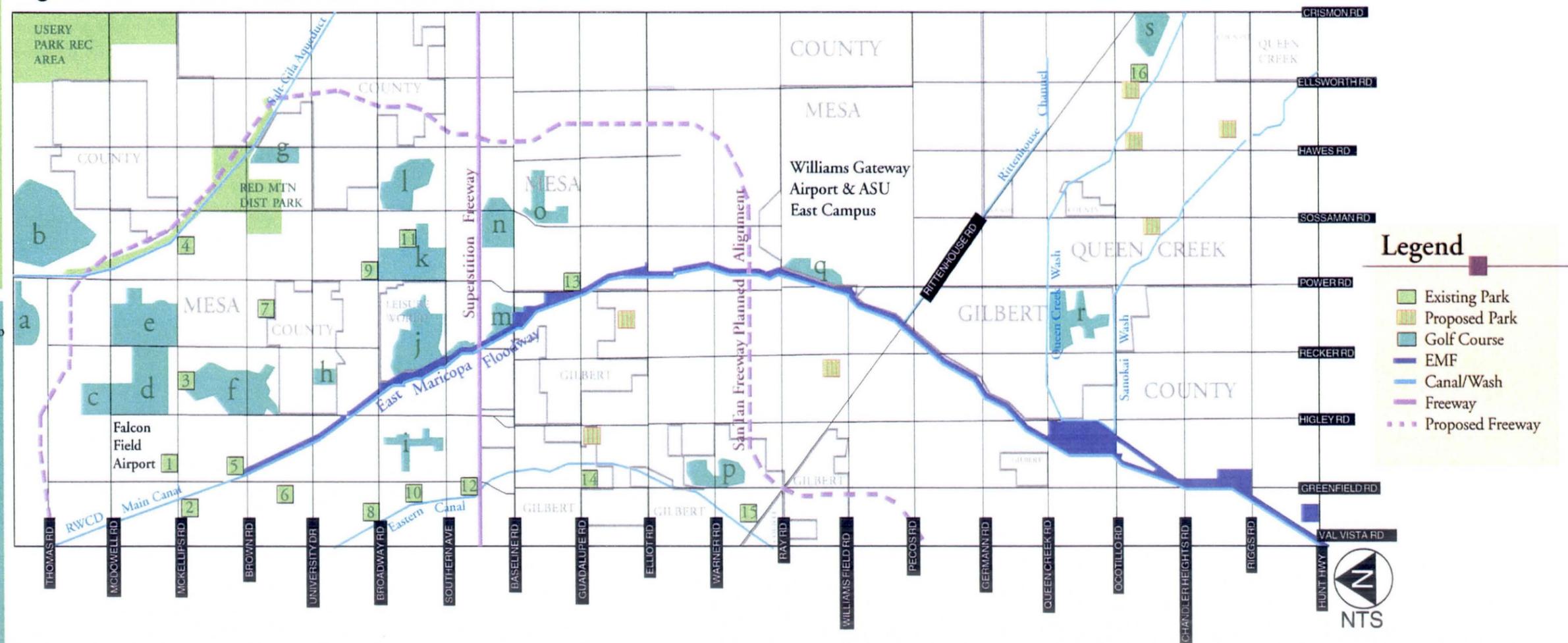


3.2.5.2 Recreational Facilities

There are sixteen identified existing parks in proximity to the EMF corridor (See Figure 13: Recreational Facilities). Two of these (Princess and Monterrey Parks) are adjacent to the floodway; the remainder are a mile or more away. Bike lanes connect some of these parks to the floodway but few east-west connections exist. The following matrix of the sixteen existing parks identifies existing park amenities. Based on this information, it is apparent that the East Valley lacks soccer fields. Population growth in the East Valley has also put pressure on other existing facilities, and the District and other public agencies and jurisdictions are seeking partnerships and multi-use recreational planning.

- | PARKS | |
|-------|---------------------------------|
| 1 | Falcon Field Park |
| 2 | Gene Autry Park |
| 3 | Alta Mesa Park |
| 4 | Falcon Hill Park |
| 5 | Princess Park |
| 6 | Ensenada Park |
| 7 | Pequeno Park |
| 8 | Chelsea Park |
| 9 | Jefferson Park |
| 10 | Greenfield Park |
| 11 | Golden Hills Park |
| 12 | Holmes Park |
| 13 | Monterrey Park |
| 14 | Riparian Preserve at Water Park |
| 15 | Crossroad Park |
| 16 | Founder's Park |
-
- | GOLF COURSES | |
|--------------|----------------------------------|
| a. | Red Mountain Ranch Country Club |
| b. | Las Sendas Golf Club |
| c. | Longbow Golf Club |
| d. | Apache Wells Country Club |
| e. | Painted Mountain Golf Club |
| f. | Alta Mesa Country Club |
| g. | Viewpoint Golf Resort |
| h. | Dreamland Villa Golf Club |
| i. | Sunland Village Golf Club |
| j. | Leisure World Country Club |
| k. | Arizona Golf Resort |
| l. | Fountain of the Sun Golf Course |
| m. | Superstition Springs Golf Course |
| n. | Desert Sands Golf Course |
| o. | Sunland Village East Golf Course |
| p. | Greenfield Lakes Golf Club |
| q. | Williams Golf Course |
| r. | Meadow Brook Golf Course |
| s. | Chuparosa Golf Course |

Figure 13. Recreational Facilities



No.	Park Name	Municipality	Acres	Ramadas	Softball Baseball	Soccer	Play Area	Restrooms	Basketball	Volleyball	Horseshoe s	Lake	Tennis
1	Falcon Field Park	Mesa	3	7			Yes	Yes	1, lights	1, sand, lights	Yes		
2	Gene Autry Park	Mesa	47	5	3, lights		Yes	Yes		4, sand, lights			16, lights
3	Alta Mesa Park	Mesa	8	2			Yes		1, lights	1, sand, lights	Yes		
4	Falcon Hill Park	Mesa	22	2			Yes		1, lights	1, sand			
5	Princess Park	Mesa	5	1			Yes		1, lights	1, hard surface, lights			
6	Ensenada Park	Mesa	8	2			Yes						
7	Pequeno Park	Mesa	1				Yes		1, lights				
8	Chelsea Park	Mesa	5				Yes		2, lights		Yes		
9	Jefferson Park	Mesa	17	4	1, softball, lights		Yes	Yes	2, lights	1, sand	Yes		
10	Greenfield Park	Mesa	20	2			Yes					Yes	
11	Golden Hills Park	Mesa	11										
12	Holmes Park	Mesa	17										
13	Monterey Park	Mesa	21	2			Yes		1, lights	1, hard surface			
14	Riparian Preserve at Water Park	Gilbert	110	2				Yes				Yes	
15	Crossroads Park	Gilbert	50	3	4, lights	3	Yes	Yes	1/2, lights	1, sand, lights		Yes	
16	Founder's Park	Queen Creek	20	1	2, lights	1, lights	Yes	Yes	1, lights	1	Yes		2, lights

By charter, the District works with County residents to provide flood control. Although recreation is not part of the District's authorized responsibilities, the District can work in partnership with local agencies to encourage construction of recreational and multi-use facilities. Opportunities for multi-use of floodway facilities are discussed in more detail in the Alternatives Formulation and Evaluation section of this report.

3.2.5.3 Property Ownership

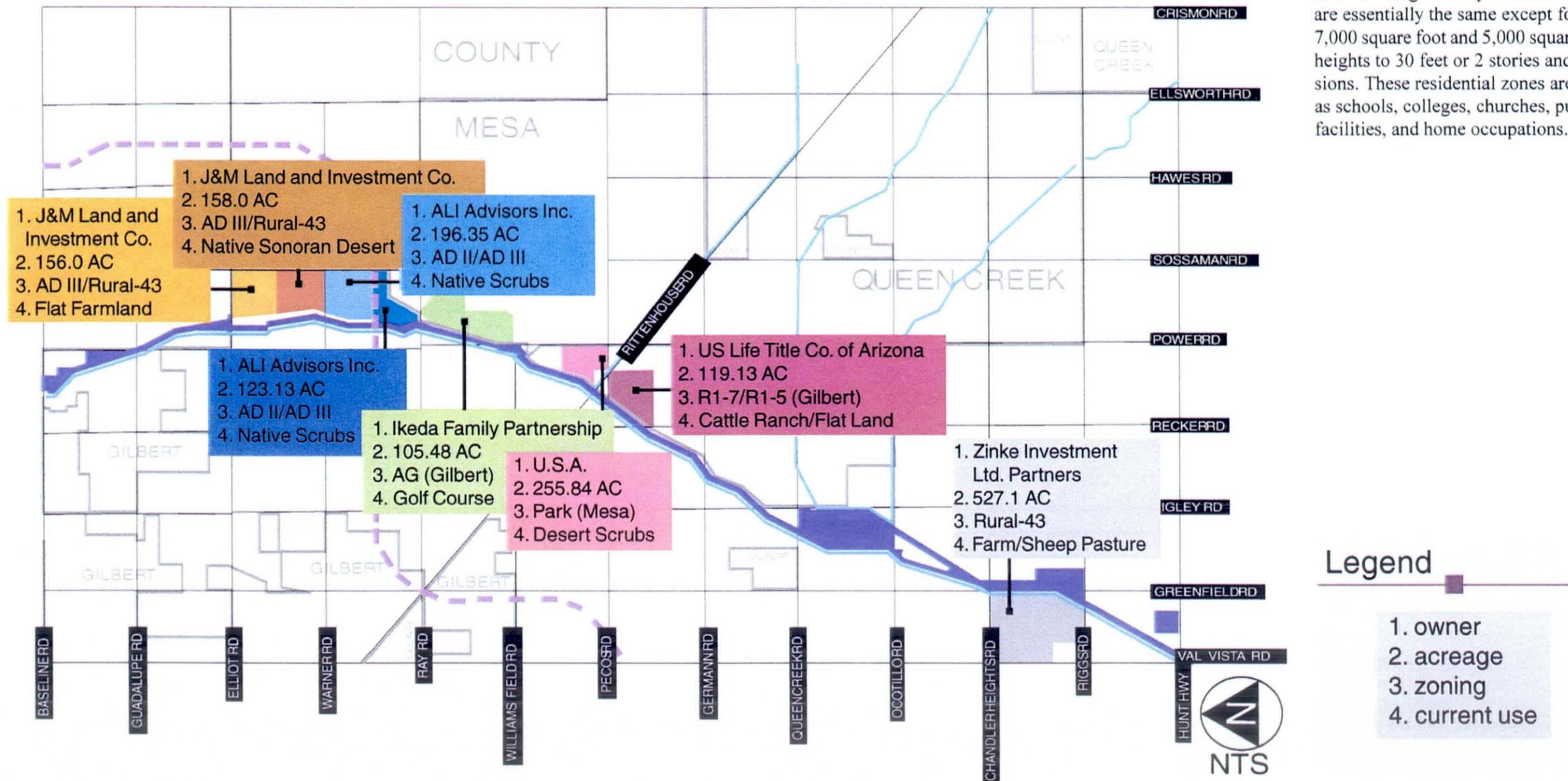
Adjacent land along the EMF corridor varies in use, zoning, and ownership. This study investigated major parcel ownership of land (over 100 acres) and specific zoning regulations applicable to those parcels. Eight such land parcels not already owned by the District border the study. This inventory is valuable for the District, agencies, municipalities and others in the event that any entity wants to acquire lands for further development of multi-use and recreation facilities. In addition, identifying large parcels under single ownership may be relevant to future opportunities for PADs or planned mixed use development. Two of the eight parcels fall within the Town of Gilbert; one site is within the City of Mesa; and the remaining five are located within currently unincorporated Maricopa County. (See Figure 14: Property Ownership).

Zoning designated for the Maricopa County sites is Rural-43, ADII, or ADIII. The Rural-43 zone has a maximum density of one dwelling unit per acre. In addition to density requirements, development standards for this zone include building heights restricted to less than 30 feet, yard regulations, parking restrictions, and usage limited to single family dwellings, churches, farms, group homes of less than ten persons, public schools, private/charter schools, wildlife and forest reservations, golf courses, municipal buildings (fire/police/post office), and community buildings (libraries, museums, park shelters, playgrounds, or other recreational use structures).

ADII and ADIII are described as Airport Development areas. Airport District II is the area within a three thousand by five thousand-foot rectangle adjacent to the end of 3,000-8,000 foot runways. ADIII is the area within three thousand by seven thousand-foot rectangle off the end of 8,000-15,000 foot long runways. Both zoning designations have building height limitations (restricted to less than 30 feet), yard regulations, parking, and use restrictions. ADII is more restrictive than ADIII.

The single site located within Mesa is designated as park/open space on the City zoning map. The parcel is currently used as a golf course adjacent to the Williams Gateway Airport. Gilbert zoning describes the last two sites as AG and R1-7/R1-5 respectively. Agricultural zones, or AG, are permitted for uses of single family dwellings, crops, golf courses, and animal farms. Minimum lot size is 10 acres with regulations on yard sizes, 30-foot tall building heights and 50 feet tall secondary structures. The parcel that straddles zones of R1-7 and R1-5 is designated for single family residential homes. Zoning designations of R1-7 and R1-5 are essentially the same except for the square footage of minimum lot size, being 7,000 square foot and 5,000 square foot respectively. Both zones limit building heights to 30 feet or 2 stories and have yard regulations and minimum lot dimensions. These residential zones are permitted for single family dwellings, as well as schools, colleges, churches, public buildings, parks, playgrounds, recreation facilities, and home occupations.

Figure 14. Property Ownership



3.2.6 Multi – Modal

Transportation planning for the East Valley requires coordinated efforts by all the jurisdictions involved to unify all forms of transportation and connect with the greater Phoenix region. The anticipated growth and population increase in this area has a major impact on the East Valley’s existing and future transportation system. As recognized previously in this report, the multi-modal system may be described according to the character of the three predominant reaches in the project: urban, transitional and rural. The jurisdictions in the East Valley are committed to a multi-modal transportation system but its implementation is years in the future, based on today’s vision, goals, and plans. As the area develops, multi-modal forms of transportation are being planned so in the future this region will connect to a network of bicycle, bus, trails, transit and vehicular system improvement.

In general, the northern urban portion of the study area has its infrastructure in place. The urbanized area includes the City of Mesa and stretches into the Town of Gilbert as far south as Guadalupe Road. In the urban section of the study area, the arterial grid pattern is in place. The communities are continually upgrading

their roadways to meet the increase in traffic demands due to the rapid growth and development in the area. Mesa’s objective is “to plan and provide travelers with a choice of modes of travel.”

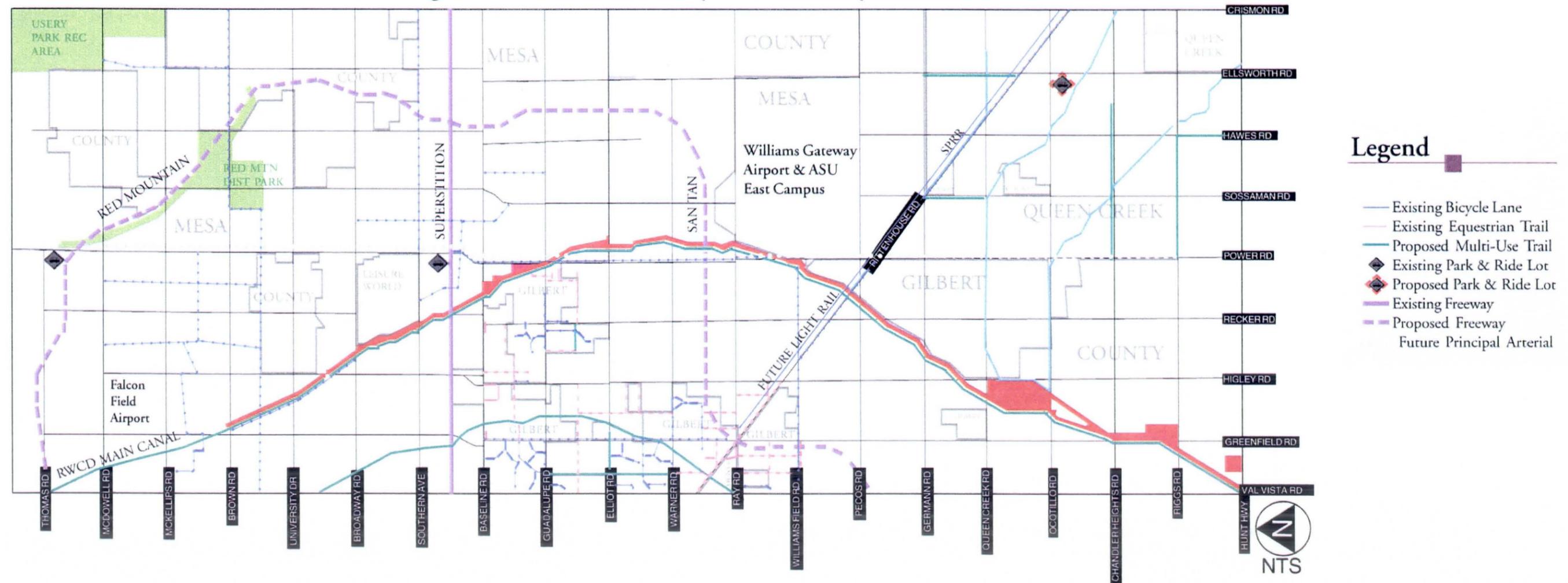
The City of Mesa *General Plan* has an adopted regional Transit Plan but as of 1996 does not have the funding appropriated to implement it. One of the City’s objectives is “to implement the City’s adopted Transit Plan.” Mesa is implementing the Transit Plan by designing new roadway improvements to accommodate transit buses and, where rights-of-way allow, bike lanes. Mesa Policy 4g states: “The City shall continue the concept of a grid network local bus system with connections to regional transit service. The scarce available transit resources should be directed toward the goal of expanding total transit ridership.”

Sidewalks are standard in all the urbanizing areas. Mesa capitalizes on opportunities that will link different modes of transportation together, such as bicycle and mass transit, and is looking to the future in developing a transit rail system

that will connect the Williams Gateway Airport/Campus (Williams Area) to other communities and regional facilities. Gilbert follows the same philosophy to actively participate in establishing an integrated public transit system throughout the East Valley communities. Gilbert has a *Mass Transit Master Plan* and, like Mesa, sees an opportunity in planning a rapid rail corridor on the existing Southern Pacific Railroad (SPRR).

The only existing park and ride lot in the study area is north of the Superstition Freeway at Power Road. Future plans for all the jurisdictions include multi-modal transportation systems with ride share programs, park and ride lots along the Superstition and SanTan Freeways, mass transit systems and safe and convenient environments for bicyclists and pedestrians. Maricopa Association of Governments (MAG) proposes that telecommuting be an option as well to reduce traffic congestion and air pollution in the Phoenix Valley. Mesa’s Policy 4h encourages the use of alternative modes of transportation to reduce vehicular traffic; it states: “The City shall develop transit/HOV passenger transfer faci-

Figure 15. Multi-Modal, Existing and Planned Transportation Improvements



ties and park-and-ride lots as needed to make transit ridership more safe, comfortable, and convenient." The goal of Maricopa County's Transportation System Plan is to "Provide an efficient, cost effective, integrated, accessible, environmentally sensitive, and safe County-wide multi-modal system that addresses existing and future roadway networks as well as promotes transit, bikeways, and pedestrian travel." Gilbert's General Plan transportation goal aims to "Provide for ease of movement and safety for auto, bicycle, pedestrian and equestrian modes of transportation."

Moving south, into the central "transition" area of the project site, the existing Superstition Freeway provides east-west access into the Phoenix Metropolitan area from the north-south arterials. In this transitional area, the arterials move traffic from pockets of urbanization and planned area developments. Many of the Planned Area Developments have not been built out yet but their development will have a major traffic impact on the arterials in the area. This area of our project passes through Mesa, Gilbert and Maricopa County. The Williams Area is in Mesa and is the largest planned community in the study area. As the area urbanizes, the future SanTan Freeway passes through this area and will be critical in meeting the needs of future traffic demands. The SanTan Freeway will be very important in connecting the Williams Area to Metropolitan Phoenix. All the jurisdictions are continuously maintaining, improving and upgrading their arterials to keep ahead of the increasing traffic demands. Even with the completion of the SanTan Freeway, it is anticipated that most of the travel will continue to be carried on the arterials.

Power Road, which follows north and south along the EMF corridor site is currently a two-lane road through this area. Gilbert's future plans show Power Road to be a principal arterial with a 150 foot right-of-way; Maricopa County notes it as a high priority for a future corridor study. Higley Road through the study area is proposed to be a major north and south arterial. The east-west major arterials through Gilbert will be Baseline, Elliot, Warner, Williams Field, and Germann Roads. MCDOT has defined Power, Ellsworth and Riggs Roads as roads of regional significance which generally include bicycle paths. Both Mesa and Gilbert advocate "to complete the planned freeways as quickly as possible."

In this central transition area there is another very important mode of transportation that will have an effect on future travel in the area and that is Williams Gateway Airport. This Airport is within Mesa's city limits and is planned to be a reliever airport for Sky Harbor International. More air traffic in this area will create more traffic congestion on the ground. The road network will be in continuous upgrade until the area is built out. The transition area from agricultural land to urban development will also require improvements to the existing road infrastructure.

Unincorporated Maricopa County and Queen Creek are the primary jurisdictions in the southern section of our study area. This area is currently very low density residential and agricultural. Queen Creek has a similar transportation goal. In its General Plan, as with other jurisdictions in the area, Circulation Goal 1 states: "Provide a safe, efficient, and convenient transportation system for the movement of people and goods to, from and throughout the Town of Queen Creek." Queen Creek is also interested in working cooperatively with Maricopa County, Pinal County and the other surrounding communities to develop an

adequate roadway network to support future growth in the area. In this area of Queen Creek the major arterial grid is established but it will have to be maintained and upgraded to respond to the future Planned Area Developments which are starting to sprout up in this predominantly agricultural part of their community. A future goal for Queen Creek includes establishing a hierarchy to its road network and prioritizing roadway improvements based on existing and future demands. Like its larger municipal neighbors, Queen Creek is interested in utilizing the SPRR for public transportation to connect the Town with the greater Phoenix Metropolitan Area. The Town also would like to "Establish park-and-rides within the Queen Creek area to facilitate public transportation and carpooling." At this time locations have not been determined.

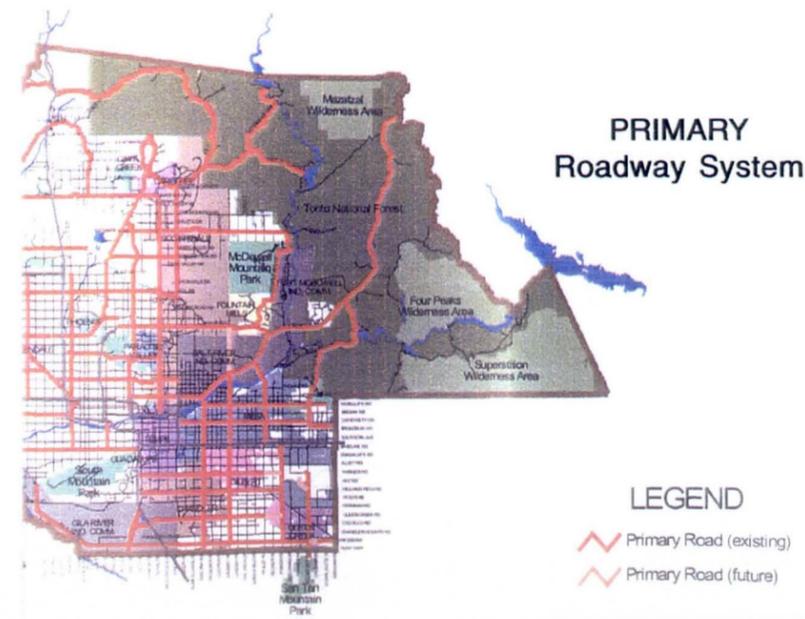
New developments underway in this southern portion of the project are SanTan Ranch, Meadowbrook Golf Course and Meadowbrook Master Planned Community. Other Planned Area Developments have been sited but are not yet under construction. These developments collectively will have a major impact on the future traffic demands in this portion of the study area.

3.2.6.1 Vehicular and Public Transit

Although the study area is currently auto-oriented, all the EastValley communities have considered or have adopted Public Transit plans for future implementation. In the urban areas, funding sources seem to be the greatest limiting factor in implementing transit plans. In the transitional and agricultural areas the user demand is not yet there. Transit is definitely a part of the long range transportation goals for the East Valley communities.

Major Streets

The study area extends for 27 miles and within this area, there are 17 major east-west and 5 north-south arterials which cross the EMF. Maricopa County, Mesa and Gilbert share a similar hierarchy for the arterials in the area: Primary Arterial, Major Arterial, Minor Arterial, Collector Street and Local Street. All the commu-



nities have targeted Power Road to be a Primary Arterial, a major spine road for future development in this area. It is planned to be a divided, 4 to 6 lane road. Power Road crosses the EMF at Guadalupe and Williams Field Road. This north-south arterial will provide important access for many of the master planned communities such as those in the Williams Area, Superstition Springs, and Leisure World. The SanTan Freeway proposes interchanges in this area at the Williams Field, Higley, and Power Roads.

Freeways

Currently, Superstition Freeway is the only freeway that crosses the EMF corridor in the study area. This is a six-lane freeway that currently serves the urban portion of the study area, primarily Mesa and Gilbert. The City of Mesa extends north of the Superstition Freeway with the exception being that Mesa dips down to the Williams Gateway Area east of the EMF corridor. Portions of Superstition Freeway are Gilbert's northernmost boundary. Queen Creek is further south. The Superstition Freeway is located between Baseline Road to the south and Southern Avenue to the north. Both roads are major arterials that serve Gilbert and Mesa respectively. On-going improvements are funded for this freeway through to the year 2007.

The proposed SanTan Freeway alignment will loop east-west through Gilbert and continue north through Mesa crossing the Superstition Freeway and connecting to Red Mountain Freeway for a total of 24 miles. This freeway loop will be important in connecting the outlying, rural areas to the Phoenix Metropolitan Area. The freeway is planned to be 4-lanes between Arizona Avenue and Power Road and 6-lanes for the remainder. The first section of the SanTan Freeway is scheduled for completion by 2003 and the last section targeted for completion by 2007, according to the Maricopa Association of Governments, Long Range Plan, June 1999.

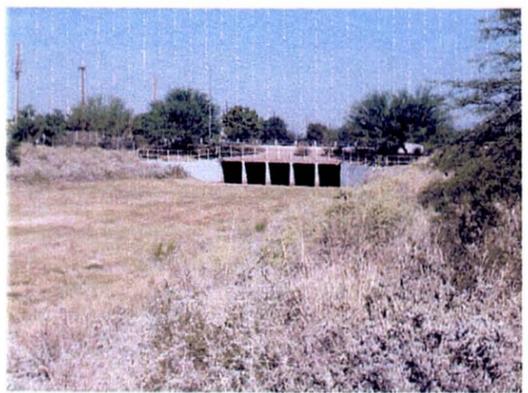


Bus Service

The only bus service route in the area is the Express Bus along the Superstition Freeway. At this time the only planned bus service through the area will use the Superstition and SanTan Freeways. Park and Ride lots are planned along the route for Express Bus pick up and drop off points. All the jurisdictions are looking to the future to implement a bus system that will connect to the existing system in the Phoenix Metropolitan Area. A future all-inclusive bus network is important to the East Valley communities' commitment to developing multi-modal transportation systems.

Bridge Crossings

As the arterials in the area are improved, the jurisdictions are committed to designing the roads to all weather standards. Several of the arterials currently meet this standard with bridge crossings at the EMF. Those arterials that do not cross the EMF are Warner Road, Pecos Road, Germann Road, and Ocotillo Road. All other arterials in the study area bridge over the EMF. Brown Road, University Drive, Broadway Road and Southern Avenue overcrossings do not have sufficient head space for pedestrians, bicyclists or equestrians, as shown below. Surface street crossings would be required at these locations.

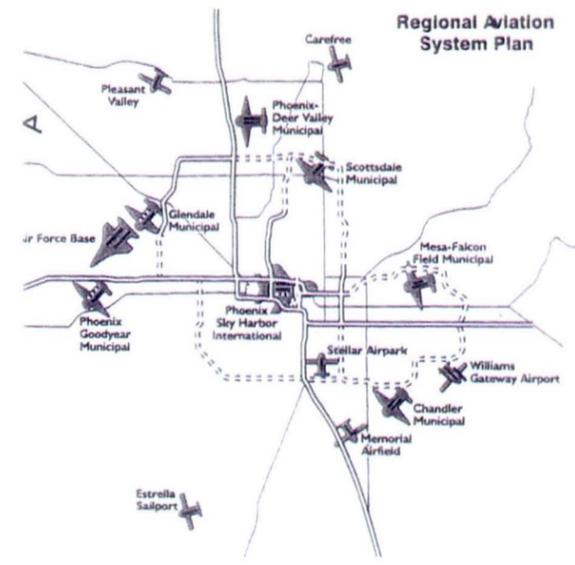


From Guadalupe Road to the County line, all bridges would have sufficient head space for pedestrians, bicyclists and equestrians, as shown below.



3.2.6.2 Railways and Airports

Railways and airports provide other forms of multi-modal transportation. There is an existing railroad (SPRR) that crosses the EMF corridor diagonally along Rittenhouse Road. There are two airports in the study area that primarily serve industrial uses. They are Mesa's Falcon Field Airport and Mesa's Williams Gate-way Airport.



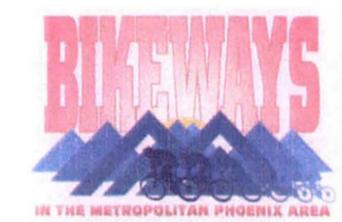
As noted previously, East Valley communities have either adopted transit plans or have included them in their general plan goals. Maricopa Association of Governments (MAG) Long Range Transportation Plan proposes a Light Rail System to connect the outlying suburbs. At this time, the system does not extend into the EMF corridor area. The communities in the EMF study area foresee opportunities to connect to the future Light Rail system. However, at this time, they have not designated any light rail transit routes or rail stations. The Williams Gateway Center Transportation Plan anticipates a future light rail connection.

The existing SPRR right-of-way that runs along Rittenhouse Road may present future opportunities for reuse or modification to light rail. This opportunity is evaluated in the Alternatives Formulation section.

3.2.6.3 Non-Motorized Circulation: Trails and Bicycles

All communities in the EMF corridor area have goals and objectives that provide a connecting network of trails, paths, sidewalks and lanes for pedestrians, bicyclists and where applicable equestrians. Pedestrian and equestrian trails have been discussed in depth in the earlier **Open Space and Trails Plan** section of this report. Bike routes and bike lanes will be addressed in more detail in this section.

Extending the Metropolitan Phoenix bicycle network is a goal for all of the East Valley communities. Making the streets safe for bicycle use to schools, work, and recreation is important to Mesa, Gilbert, Queen Creek and Maricopa County. Mesa has existing bike lanes and routes along its collector streets. The City is continuously evaluating the safety of designing bike lanes into its arterial improvements, has weighed the factors and is now committed to implementing bike lanes



in arterials where right-of-way can accommodate them. By retrofitting bike lanes on existing arterials, Mesa hopes to achieve greater continuity of bike routes throughout the community. The City also encourages the use of canals and transmission easements for possible bike paths and linkage opportunities.

Maricopa County has an extensive bike system planned with many arterials planned as bike routes with

marked lanes. Gilbert has bike lanes on many of its roads and will continue to accommodate bike lanes as new roads are built and existing ones are upgraded. Queen Creek has bike lanes as an important component in its general plan. All these jurisdictions are committed to implementing a bikeway network that goes beyond their boundary responsibilities and are working with Maricopa Association of Governments to see that this happens.

Maricopa County has proposed bike lanes for several major arterials within its jurisdiction including Guadalupe, Higley, Riggs, Val Vista, Queen Creek and Williams Field Roads. With inter-governmental cooperation, all the communities can work together to provide bike continuity throughout the East Valley.



3.2.7 Archaeological and Historical Resources

As part of this study, a partial Class I (Existing Data Inventory) cultural resources inventory of the 19.3-mile-long floodway was performed. The Class I inventory was conducted to determine whether previously identified historic or prehistoric cultural resources were present within the floodway corridor or the five parcels proposed for detention basins. As noted in the ARS findings, cultural resources within these areas could be subject to direct or indirect negative impacts from activities associated with further development of the East Maricopa Floodway, including changes to channel design, operation, and management. The report notes the locations of previous archaeological projects within or immediately adjacent to the study corridor and five basin parcels, and describes the results of these projects. These data will be used by the District to make informed decisions regarding the East Maricopa Floodway project area in order to avoid impacts to important, previously identified cultural resources.

The following information is excerpted from Archaeological Research Services, Inc., Project Report No. 99:118. The report in its entirety is available from the District in a separate Technical Appendix to this study.

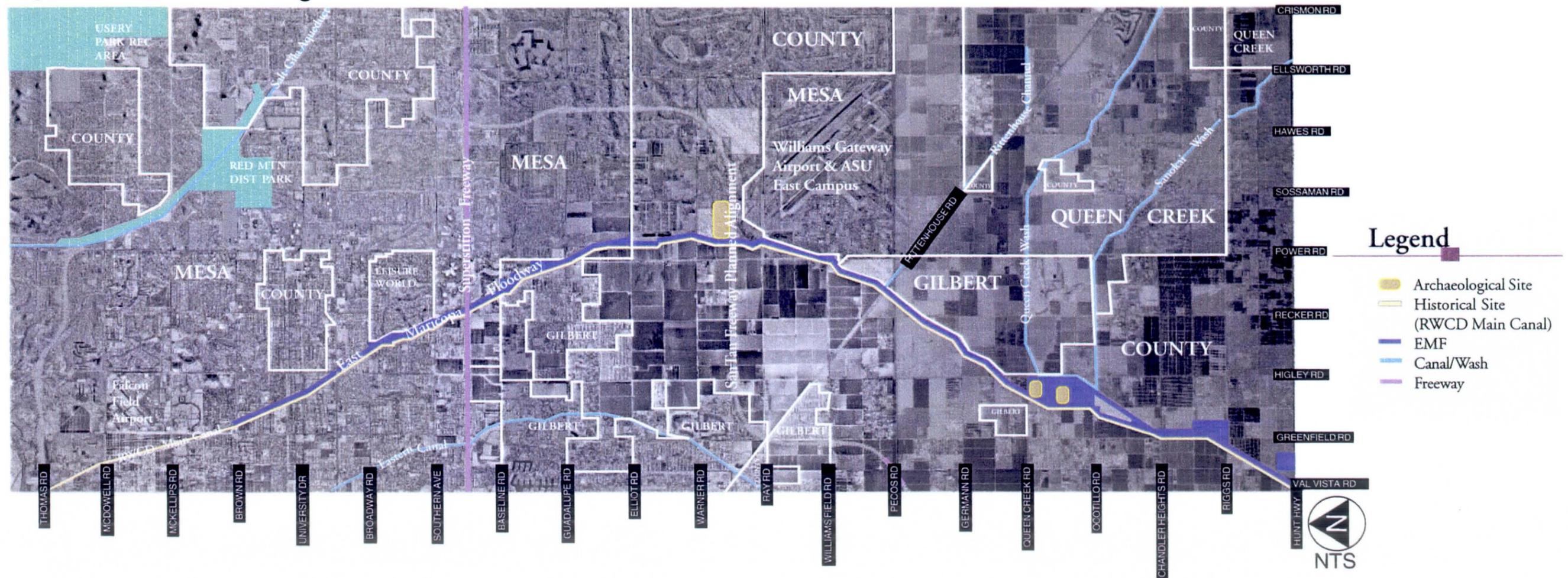
It was determined that 22 cultural resources projects have been performed either within or immediately adjacent to the floodway corridor and five detention basin parcels. Three archaeological sites have been identified within or immediately adjacent to the study area as a result of these projects. Two of the sites, AZ U:10:15 and 16 (ASU), are prehistoric artifact scatters. The third site, AZ U:10:26 (ASM), is a multicomponent site containing a prehistoric artifact scatter and a series of historic agricultural features dating to the early and middle twentieth century. For the purposes of this overview, all three sites are considered potentially eligible for listing on the National Register of Historic Places, and all three sites are potentially subject to project-related negative impacts from proposed detention basin construction. In addition, the Roosevelt Water Conservation

Canal is a historic (1920s) feature that should be considered potentially National Register-eligible.

The East Maricopa Floodway corridor was subjected to a thorough cultural resources survey prior to its construction (Rodgers 1975). Although the survey was completed 25 years ago, it effectively demonstrated that few sites were located in or near the project area, and it cleared a corridor that was subsequently used for construction of the flood control channel. A new survey of this heavily-disturbed corridor would be unlikely to yield any significant new data pertaining to cultural resources.

The RWCD Canal is also considered a potentially important historic resource. Constructed in the 1920s and still in use, this canal has played a major role in the growth and development of the Southeast Valley/Queen Creek area.

Figure 16. Archaeological and Historical Resources



3.2.8 Visual Resources

The East Maricopa Floodway (EMF) is situated in the Sonoran Desert Landscape Character Type, which is typical of a ‘Basin and Range Landscape Province.’ Extensive areas of flat, sandy plains and scattered, isolated, steep, barren mountain ranges are typical in this basin and range landscape. The EMF study area is located in the ‘plains landscape’ of the Sonoran Desert Landscape Character Type.

The Visual Resources section first will discuss the overall EMF corridor, then will discuss three areas in detail. The EMF corridor has a consistent overall visual character – an ‘engineered floodway.’ However, it can be subdivided into three areas based on similar scenic attributes of the landscapes surrounding the corridor based on human uses and alterations – (1) urban area to the north, (2) transition area in the middle, and (3) agricultural area to the south. In prehistoric and historic times, overall visual character for the entire 19.3-mile EMF corridor would have been the same. Changes in the landscape caused by human activities

– canal building, road building, farming, city building – have dramatically altered the landscape.

In the north, the urban area has a coarse visual texture with many types and sizes of buildings, streets and roadways. A city park and two golf courses draw the viewer’s attention with axial views to open spaces with green, fine-textured lawns and fairways, scattered coarse textured, brown palm tree trunks with coarse textured fronds, fine-textured light-green desert shade trees and a few scattered ponds. In residential areas, there is a regular pattern of single story buildings. Some neighborhoods have red tile roofs and stucco walls and stucco privacy screens, others have white metal walls, flat-topped mobile home parks with no privacy walls, set in a grove of palm trees.

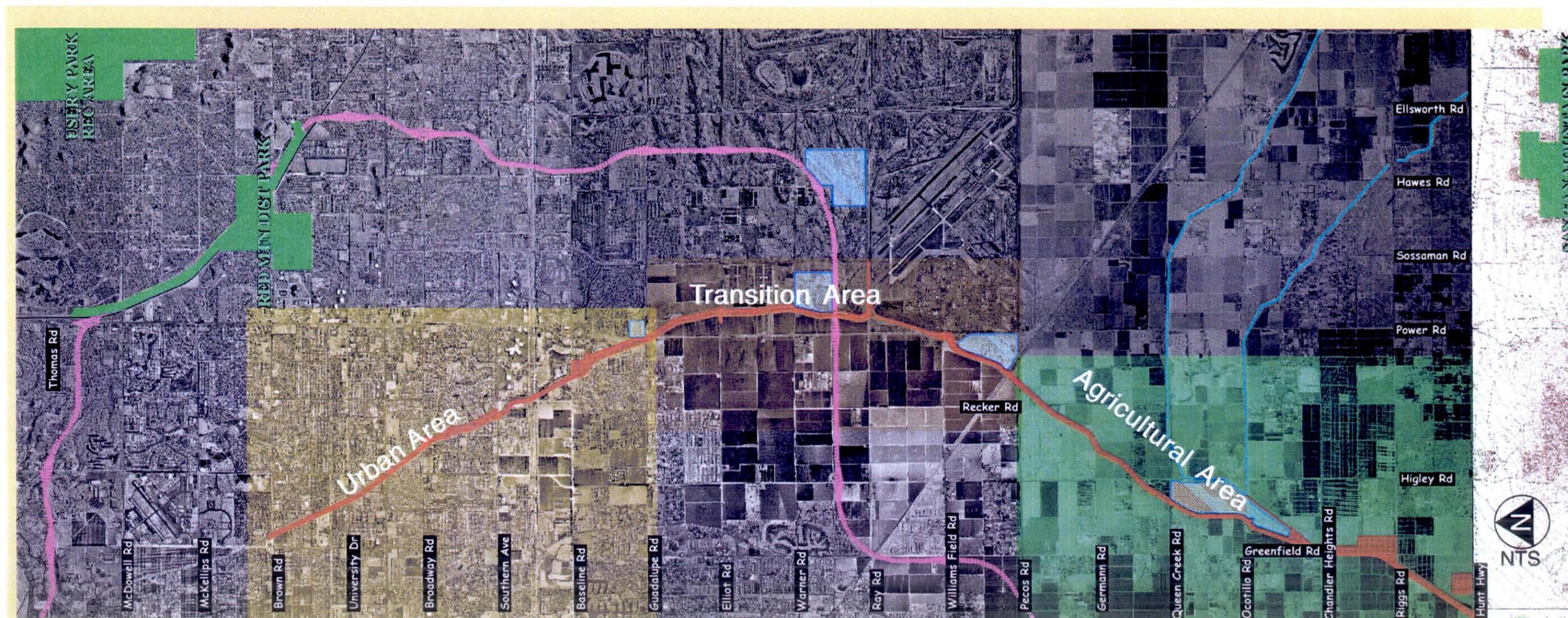
In the south, the agricultural area has 360-degree panoramic views to the surrounding mountain ranges. Agricultural fields are flat, smooth textured, and

seasonally change color from green to brown to tan as crops are grown and harvested. Farm buildings and homestead windbreak plantings are the only vertical, cultural elements in this landscape. In the agricultural area, there are some scattered pockets of suburban residential neighborhoods emerging from the farm fields, but agricultural uses are predominant.

In the middle of the EMF corridor, the transitional area, there is a transition occurring from agricultural landscapes to urban landscapes as the population of Maricopa County increases, especially around Williams Gateway Airport/Campus. Therefore, there is a mix of all the lines, forms, colors and textures of both the north and south areas in the transition area.

The consultant team performed an on-site visual resource assessment of existing conditions in and near the EMF corridor. The team analyzed four scenic factors for the visual resource assessment: (1) landscape character, (2) scenic quality, (3) visual condition, and (4) visual sensitivity.

Figure 17. Landscape Character Areas



3.2.8.1 Landscape Character

Biological, physical and cultural factors interact to determine landscape character. Landscape character¹ is an overall visual and cultural impression of landscape attributes – the physical appearance and cultural context of a landscape that gives it an identity and “sense of place.”

Landscape character can be described in terms of visual dominance elements² (line, form, color and texture) of landform, rockform, vegetation, waterform and the built environment. Landscape character also can be described based on its landscape composition.³

Natural Landform

The East Maricopa Floodway traverses a flat, sandy Sonoran Desert landscape for 19.3 miles from Princess Park in Mesa at the north to the Gila River in the Gila River Indian Community at the south.

Prior to construction of the Floodway, the landform would have been described as a flat, sandy plain,

interrupted by numerous, shallow, rock-bottomed, braided desert washes visible in the foreground. Mountain ranges, viewed as middleground and background, would have been very visually dominant—South Mountain to the west, McDowell Mountains to the north, Utery and Goldfield Mountains to the northeast, Superstition Mountains to the east and San Tan Mountains to the south.



Cultural Landform

Cultural elements – sometimes called the built environment – can create significant differences in landscape character. Except at the Leisure World and Superstition Golf Courses, the Floodway was created using a standardized trapezoidal “engineering template” which totally altered the natural desert plain landform within the EMF corridor. The Floodway now can be described as a “manmade river” with a smooth, wide, flat, sandy bottom and uniform, sidewalls of sloping earth, armored with concrete in some places. Because the Floodway follows the contour, it has a very shallow gradient (the EMF drops approximately 65-feet in 19.3-miles) and its bottom appears as a very flat landform. The Floodway collects water from numerous culverts and channelized desert washes. Its depth and width increase as water volumes increase. The Roosevelt Water Conservation District (RWCD) main canal – a smooth textured, light gray concrete channel – is adjacent to and parallel to the EMF’s entire length, creating an overall uniform “engineered-look” to the landform of the entire EMF corridor that visually contrasts with the natural landform of the Sonoran Desert.

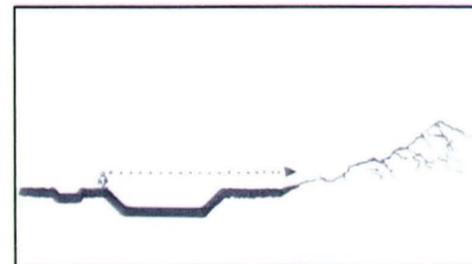
Predominant landscape **lines** are the horizon, the linear channel of the floodway itself, access/maintenance roads on the flat areas on either side of the EMF Floodway, the berms and maintenance roads on both sides of the RWCD main canal, and the line of water flowing in the canal. When viewed as foreground from one of the maintenance roads, or from the bottom of the Floodway, all of these manmade lines dominate the landscape.

Observer Position

When on the EMF maintenance road, the viewer is level with the landscape (or “observer normal”), and the Floodway landscape seems to be at a human scale.



Observer Normal

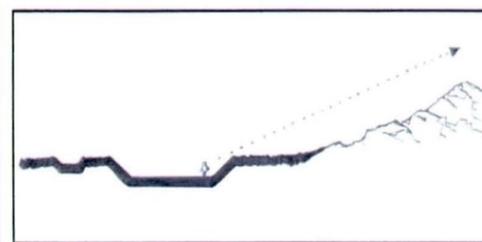


Observer Normal

When at the bottom of the Floodway, the viewer is below the landscape (“observer inferior” position) and from this vantage point, the artificial Floodway lines and landforms dominate and are larger than human scale.



Observer Inferior



Observer Inferior

Landscape Composition

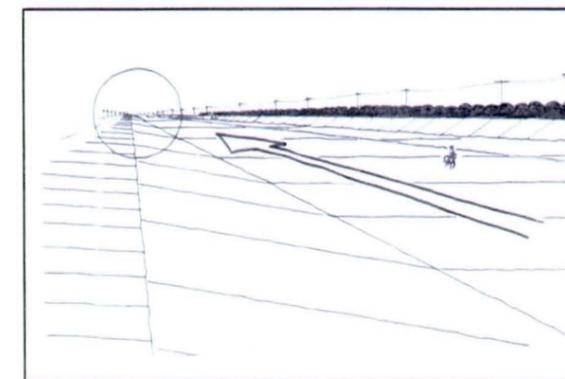
Landscape composition deals with the arrangement and organization of visual elements in the landscape. In 1968, Professor Burton Litton suggested that landscapes can be seen to have certain characteristics of composition and can be classified into these landscape composition types.⁴

- Panoramic landscape
- Feature landscape
- Enclosed landscape
- Focal landscape
- Undergrowth landscape
- Detail landscape
- Ephemeral landscape

Because the EMF creates a strong visual line in the landscape, an additional landscape composition type is suggested – the “axial landscape.”

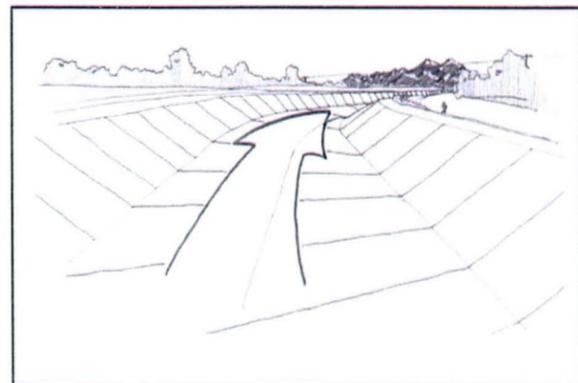
John Simonds wrote about “axis” in his book entitled “Landscape Architecture:”

“...there is little of polite gentility to the axis. It is forceful; it is demanding; and as a result, things usually go its way. An axis is directional. An axis is orderly. An axis is dominating. An axis is monotonous. This is not to say that the axis is always best avoided. It is only to suggest that none of these attributes are conducive to relaxation, pleasant confusion, appreciation of nature, freedom of choice, or any other such experiences that we humans tend to enjoy.”⁵



When standing in the Floodway corridor and looking upstream or downstream, the strong lines of all these engineered features create an “axis” and lead the viewer’s eyes to a focal point on the horizon, at the convergence of all these lines. Usually, there is no dominant visual element, or feature terminus, at this focal point. Hikers, bicyclists and equestrians view the corridor as a strong axis in the foreground.

The EMF is not a straight line from end-to-end; it makes a giant lazy-C-curve when viewed from the air or on a map. When viewed from on the ground, the Floodway has many short segments with doglegs, creating a sense of mystery and a continually moving focal point at the axis of these continually moving and continually converging lines. Occasionally, there is a view of one of the background mountain ranges at the axis terminus that creates a strong, dominant focal point landscape composition.



Natural Rockform

The East Maricopa Floodway corridor contains no natural rockforms, only smooth textured soils. If any rockforms existed previously, such as rocky bottom desert washes or large boulders, urbanization, agriculture or construction of the Floodway has removed them. The Floodway bottom, sidewalls and maintenance roads have natural earth surfaces that are smooth textured and light tan or light brown in color.



Cultural Rockform

The Floodway has several areas where rockform has been introduced as a natural material, lending natural colors and textures in the landscape. River-washed rocks have been set in concrete at isolated locations to armor the channel side slopes or to serve as energy dissipaters where major Desert washes enter the Floodway. The textures and colors of the rockforms are natural and create focal points in the landscape, although the landscape settings (rocks placed

in concrete) are not natural appearing. The concrete surrounding these rockforms is smooth textured and lighter in color than the surrounding desert soils. Additionally, concrete has been used to armor Floodway sidewalls in numerous locations, adding unnatural appearing focal points in the landscape.



Natural Vegetation

The East Maricopa Floodway study area has no native, undisturbed Sonoran Desert plant communities as discussed earlier. Just outside and adjacent to the Floodway corridor, there are two isolated areas where native Sonoran Desert plant communities exist. These areas are shown in Figure 7, Biotic Community.



Cultural Vegetation

Generally the Floodway's wide, flat bottom and sloping sidewalls are covered with low growing, fine textured, green or brown herbaceous plants, but are devoid of trees and shrubs. This lack of tall vegetation creates a smooth visual texture and accentuates the strong lines and forms of the engineered earthwork. In the transition and agricultural areas, there are no trees or shrubs in the Floodway corridor, and only herbaceous plants are present. Here, the absence of trees and shrubs creates expansive views to panoramic landscapes dominated by numerous large mountain ranges, seen as middleground or background. This creates a decision point: to add shade trees as shaded areas for pedestrian refuge; or to maintain panoramic landscape views by not planting shade trees.



However, in the northern 2½ miles, the EMF corridor is landscaped for a multiple-use trail on the flats at the top of the Floodway. Various drought tolerant or native Desert shade trees and shrubs predominate – fine-textured, light-green mesquite trees with dark-brown bark, palo verde trees with their smooth-textured, light-green trunks and branches, and fine-textured, light-green willow and acacia trees. This canopy of trees creates a partially enclosed landscape and some enframed views, plus providing cooling shade for viewers.



Natural Waterform

Currently, no natural waterforms exist in the East Maricopa Floodway corridor. Desert sheet flows and small desert washes may have existed in the vicinity previously. Now the EMF intercepts channelized waterforms at Princess Park, at Sanoki Wash, Queen Creek and other smaller washes, transporting water southward to the Gila River. If any natural waterforms, such as desert washes, existed previously, urbanization, agriculture or construction of the Floodway has removed them.



Cultural Waterform

The RWCD main canal, the East Maricopa Floodway and various side channels that feed water into the EMF have created new waterforms in the Desert. In several locations, there is standing water in the bottom of the EMF, with associated riparian vegetation, thus creating numerous focal points of detailed landscapes. Waterfowl, upland birds and animals are drawn to these ponds, creating movement and increasing visual variety and interest. There is an opportunity to create water features in the EMF corridor by creating additional basins in the bottom of the floodway, similar to this water feature in the Leisure World golf course.



During rainy seasons, or during a flood, water fills the various side channels and the EMF. Usually this water is silt- and debris-laden, so the color and texture of the water is judged as "dirty." However, any water in the desert is unusual and therefore becomes a focal point. During floods or runoff events, viewers come to the EMF and its side channels to see the moving waters. The EMF carries brown floodwaters during and after rainstorms, as shown in the photos below.

There is consistently water in the RWCD main canal. The color and texture of the clear, cool, fast moving water in the canal is a natural scenic attraction. Any clear blue water in the desert is distinctive and a natural attraction to humans and animals alike.

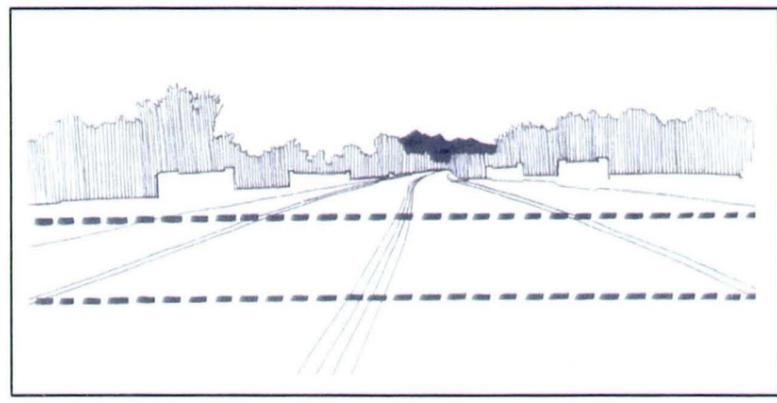


Cultural Elements

The built environment, specifically structural elements, can create significant differences in landscape character.

Generally throughout the EMF, the one-mile grid of paved arterial roadways that intersect the EMF corridor create a strong linear overlay. People using this grid roadway system naturally view the landscape along the axis lines of the highways and roads. The strong axis of these roadways draws attention away from the East Maricopa Floodway.

Because the EMF corridor is aligned north and south, it generally crosses the east- and west-road system every one-mile, and in some cases such as at the Superstition Freeway, every one-half-mile. Considering the speed of traffic on these roads (35-55 mph or greater), motorists generally do not view the East Maricopa Floodway for more than a few seconds, if at all. Many motorists are probably not aware of the East Maricopa Floodway because of its alignment perpendicular to these roadways.



EMF Overcrossings

Throughout its 19.3-mile length, there are numerous overcrossings of the East Maricopa Floodway – roads, highways, a freeway and a railway. The character of the structures varies greatly, from long, dark box culverts that inhibit people's access and viewing (from Princess Park to Main Street), to multiple-piling bridges that invite people's continuing access along the EMF, whether on foot, bicycle or horseback (from Southern Avenue to Riggs Road). Landscape character of each of these overcrossings also varies. This is the Superstition Freeway overcrossing of the EMF.



Box Culverts

In the urban area, box culverts are common. They have smooth textured, light gray concrete with bright reflectivity from the sunlight, contrasting dramatically with the black darkness of their "tunnels." Their straight vertical walls and flat floors and ceilings create an "engineered" look.



Roadway and Railway Bridges

Many roadway bridges and one railway bridge cross over the EMF. The strong horizontal line created by the bridge contrasts with the trapezoidal shape of the floodway, creating a focal point in the landscape at each bridge. The vertical lines created by the support "legs" of each bridge contrast with the horizontal lines of the bridge deck. Smooth textures and light gray colors also contrast with natural textures and colors of the landscape.



High Voltage Transmission Lines

There are several different high voltage transmission lines in the EMF corridor. In the urban area, there is a transmission line between the RWCD main canal and the floodway. The transmission line has steel towers that are tall, slender, and silver-colored. The transmission line adds visual clutter to the landscape. There is no transmission line in the Leisure World or Superstition Golf Courses.

In the transition area between Guadalupe and Pecos Roads, there is a transmission line between the RWCD main canal and the floodway. In places, the transmission line is tall steel towers similar to the urban area. In other places, the transmission line has wooden poles that are tall, slender, and dark-brown in color.

In the agricultural area, there is a transmission line between the RWCD main canal and the floodway. The transmission line has steel towers that are tall, slender, and silver-colored. In the panoramic landscapes of the transition and agricultural areas, the vertical lines of these transmission lines dramatically interrupt the skyline in an otherwise horizontal landscape. They are visually discordant elements, with contrasting line, form, color and texture to the natural and historical landscape character. One slight benefit of these overhead transmission lines is that they give a sense of direction and predictability to the EMF. Once a viewer sees the overhead utility lines, and their consistent location between the EMF and RWCD, these transmission lines can be used to predict where the EMF is located in the flat, featureless landscape.

Cultural Elements in Urban, Agricultural and Transition Areas

The East Maricopa Floodway has been subdivided into three areas based on similar cultural elements. The scenic attributes of the landscapes surrounding the corridor differ in the northern urban area, the transition area in the middle and the southern agricultural area.

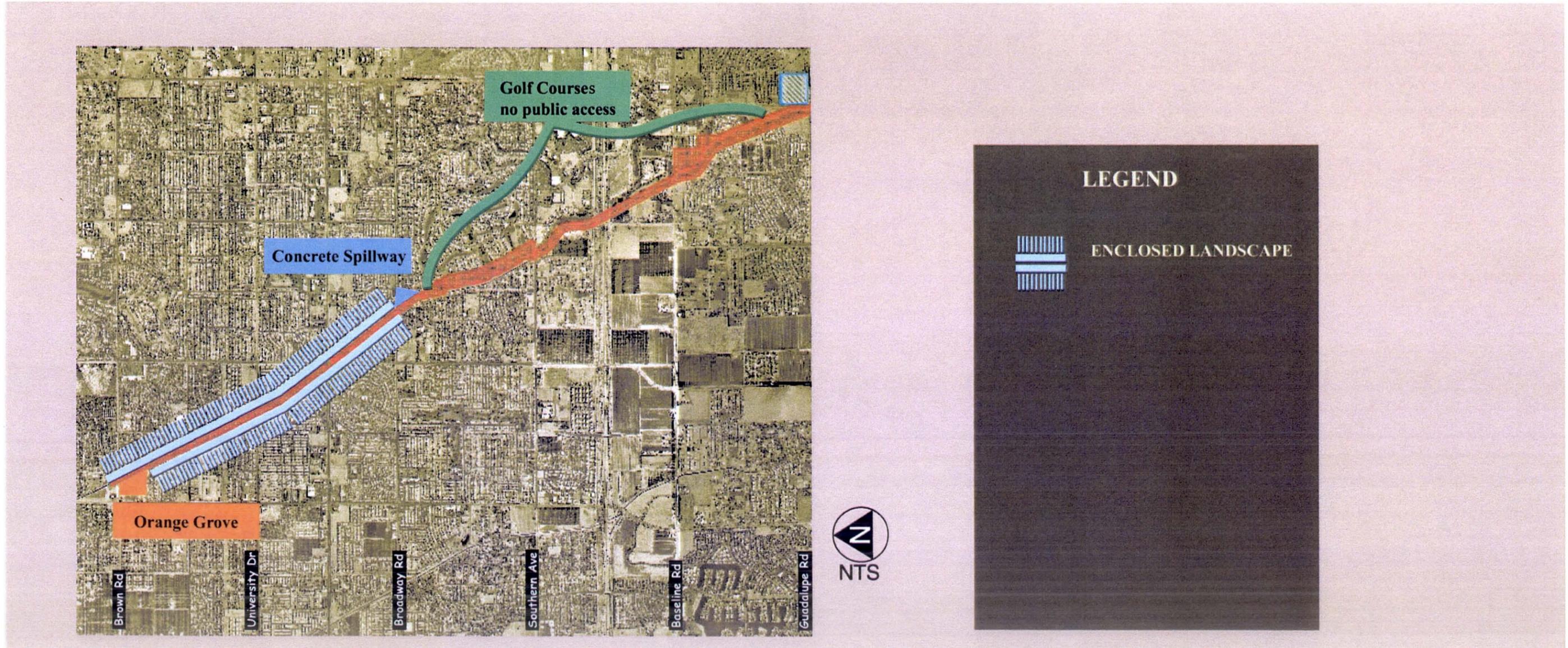


In the urban area, the landscape surrounding the EMF corridor is typical of a desert urban area in Maricopa County, with walled and un-walled residential areas, golf courses, commercial and industrial areas, and an urban park. Building walls and privacy walls generally have similar line, form, color and texture. Residential buildings range from single-story stucco



buildings with red, sloping tile roofs to tightly spaced single-wide mobile homes without privacy screen walls. The park and golf courses have smooth-textured, dark green, mown and irrigated lawns. Some residential areas have smooth textured, tan or white concrete block or stucco privacy walls.

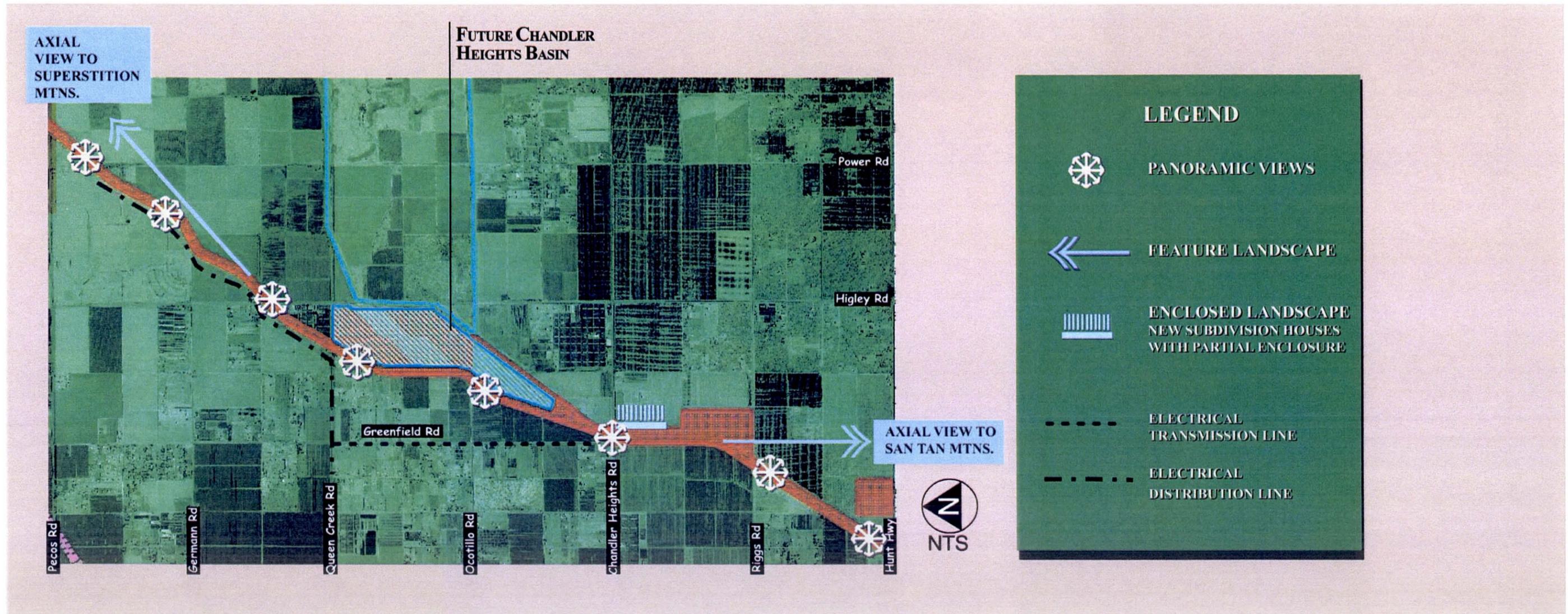
Figure 18. Urban Area



In the agricultural area to the south, fields and scattered farm buildings have totally modified and dominate the natural desert landscape character. In the agricultural area, paved two-lane rural roads occur on a one-mile grid, creating strong lines in the landscape. Fields are rectangular or square in form, and landforms have been graded to be level. Vertical lines and forms are found at farmsteads, with coarse textured, green shade trees, palm trees and windbreaks, houses, barns and wooden sheds painted white or red.



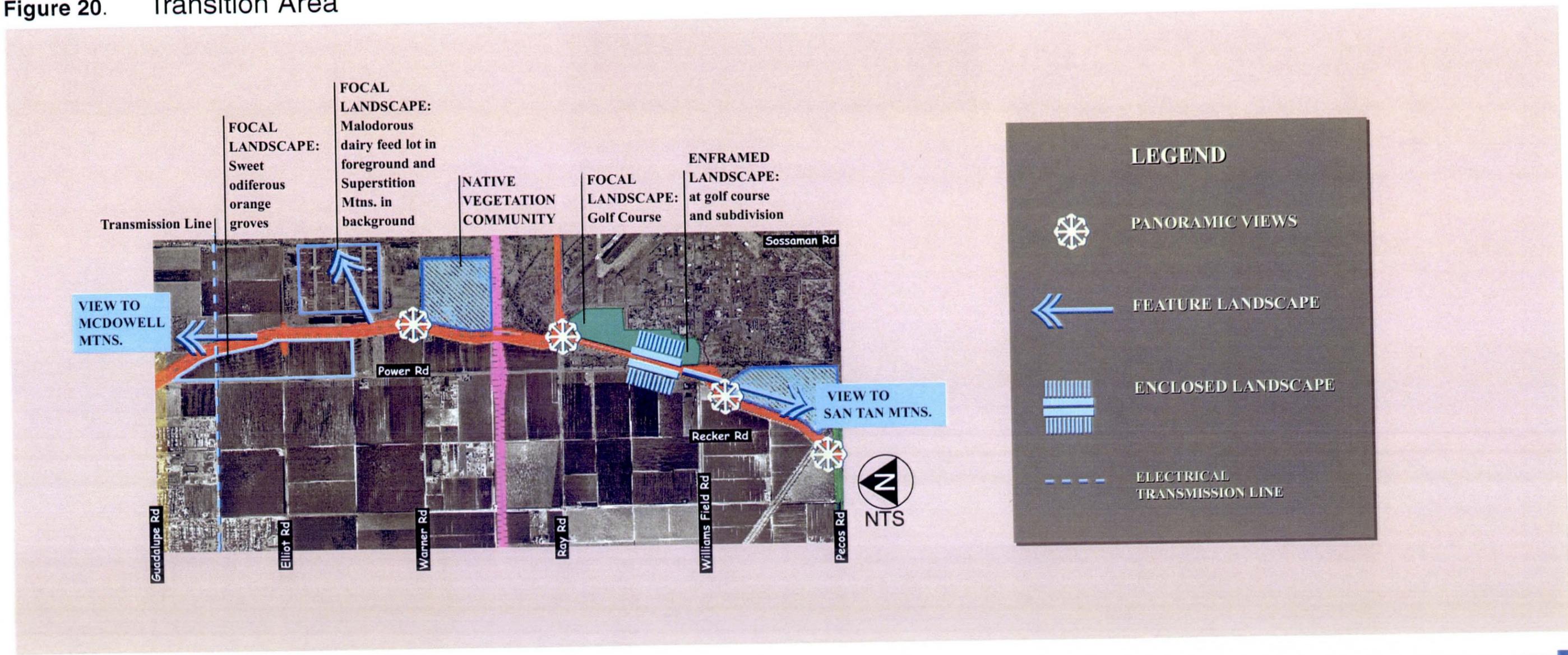
Figure 19. Agricultural Area



In the transition area between the urban and agricultural areas, characteristics of both areas are found. The lines created by the one-mile grid roadway system dictates land development patterns, and therefore creates dominant lines and forms. Agricultural fields in the transition area are being developed as housing "planned area developments" (PADs). Therefore, the flat, sandy plains of farm fields are becoming stucco-walled communities with red tile roofs, or neighborhood commercial centers. Williams Gateway Airport/Campus has an existing golf course, with smooth textured, dark green lawns and shade trees immediately adjacent to and contrasting with the light gray, smooth textured, concrete-lined EMF. The narrow, deep, concrete lined channel extends for one-mile from Ray Road to Williams Field Road.



Figure 20. Transition Area



3.2.8.2 Scenic Quality

Scenic quality is a human perception of the intrinsic beauty of landform, rockform, waterform, vegetation and cultural landscapes. Assessment of scenic quality in a landscape reflects varying visual perceptions of variety, unity, vividness, intactness, coherence, mystery, uniqueness, harmony, balance and pattern.

When viewed by people, high scenic quality in a landscape elicits psychological and physiological benefits to individuals, and therefore, to society in general. Researchers have shown that landscapes with high scenic quality, especially those that appear natural and are near large urban populations, enhance people's lives and benefit society. Research findings support the logic that scenic quality and naturalness of the landscape directly enhances human well being, both physically and psychologically, and contribute to other important human benefits.⁶ Specifically, these benefits include people's improved physiological well being as an important by-product of viewing interesting and pleasant natural appearing landscapes with high scenic diversity.



Findings from psychological and physiological studies of people under stress, people recovering in hospitals, people in recreation settings, and people in other various settings, prove that natural landscape scenes have restorative and other beneficial properties. This is particularly important when contrasted with built urban environments such as high-density housing or commuter traffic routes.



Within the East Maricopa Floodway corridor, there are no distinctive landscapes. The construction and maintenance of the floodway have modified all of the natural appearing landscape attributes. Alongside the East Maricopa Floodway, there are two remnant areas of native plant communities. These areas are not highly scenic, but they are rare because of landscape modification caused by urbanization and agriculture.

As viewed from the EMF corridor, there are several panoramic landscape views to nearby mountain ranges that are distinctive. As the viewer proceeds along the EMF corridor, mountain ranges come into closer view, with increased clarity of brown and tan rockforms, coarse textures of bedrock.



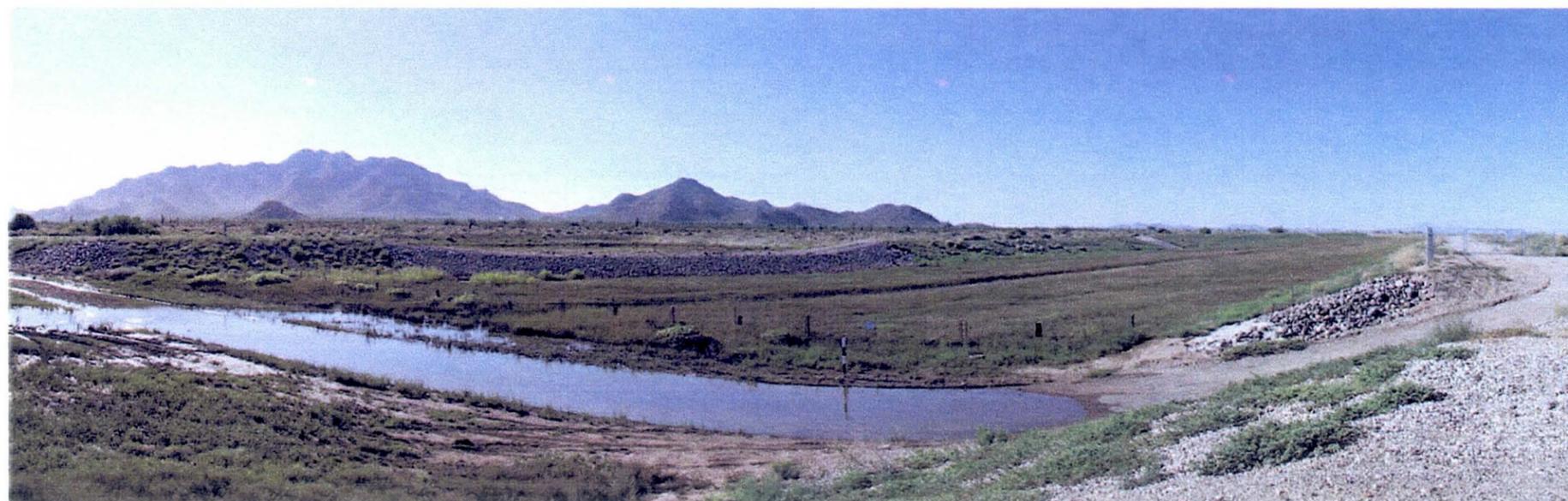
Scenic quality can be ranked into three classes:

- A – Distinctive
- B – Typical or Common
- C – Undistinguished

Basically, the scenic quality inside the existing EMF corridor is Class C – undistinguished because of its uniform and boring manmade landform and its strong axis composition. However, because surface, running water is so rare in the desert, the presence of water in the adjacent RWCD main canal – its attractiveness, movement and clarity – increases the scenic quality of the EMF study area to distinctive. However, the setting for the canal waters – a smooth-textured, light-gray, concrete-lined channel – has poor scenic quality. Therefore the overall scenic quality of the EMF corridor is classified as a paradox, with elements of both Classes C and A scenic quality, with elements that both attract and repel viewers of scenery.



At Hunt Highway, the San Tan Mountains dominate the landscape with scenic desertscrub vegetation – saguaro, cholla and barrel cactus.



Scenic Quality in Urban Area

Visual perceptions of variety, unity, vividness, intactness, coherence, mystery, uniqueness, harmony, balance and pattern are greatest in the urban area. The shorter views, created by the curved alignment of the EMF, create a sense of mystery. The buildings, privacy walls and tall vegetation along the corridor create a sense of enclosure, pattern, coherence and intactness. Both golf courses and the city park create a great deal of visual variety, vividness and uniqueness as compared to the rest of the EMF.

Scenic Quality in Agricultural Area

Panoramic views from the agricultural area to surrounding mountain ranges are unique. There is a sense of intactness, with the landscape being bounded, or contained, by the mountains. The pattern created by the one-mile grid of roadways, and the resulting pattern of fields, is uniform, balanced and creates a sense of harmony in the flat landscape. Colors are vivid in the foreground, becoming muted in the middleground, and hazy in the background, creating a sense of mystery and a desire for exploration of the higher ground.



Scenic Quality in Transition Area

Scenic quality in the transition area is currently similar to the agricultural area, but as urbanization continues, it will become more like the urban area to the north.



Distinctive Features for Preservation

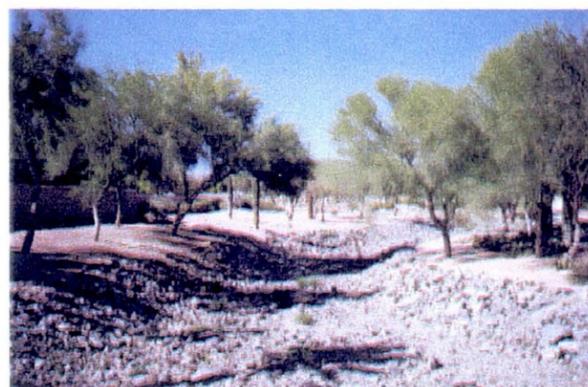
There are no areas within the EMF corridor that warrant preservation due to their scenic quality. However, there are two areas adjacent to the corridor that have remnants of the native Sonoran Desert scrub, and because of their rarity, they warrant preservation. These areas have been discussed earlier in Biotic Communities, and are shown on Figure 7 and the photo adjacent.



Enhancement Opportunities

Except for the two golf course locations, which have interesting landforms, waterforms and vegetation patterns, the entire Floodway corridor has a uniform, boring landform. The constant "engineered-look" throughout the EMF visually contrasts with landforms of the natural Sonoran Desert. Therefore, from a visual resource standpoint, most of the 19.3-miles of the East Maricopa Floodway qualifies for landscape enhancement.

Working as an interdisciplinary team, landscape architects, hydrologists and engineers can design new landforms that would be both aesthetically pleasing and safe conduits for floodwaters. This redesign would involve reshaping the sidewalls of the EMF floodway for its entire length, introducing new landforms and rockforms, plus introducing new vegetative patterns in selected locations.



Enhancement Opportunities

It may be possible to create a narrow, curvilinear channel capable of carrying small quantities of running water in the flat bottom of the EMF channel. This would allow waterforms to become a feature attraction in the corridor, increasing riparian herbaceous vegetation and wildlife viewing opportunities.

It may be possible to create basins in the bottom of the floodway without disrupting the hydrologic integrity of the EMF. If so, the introduction of standing water in basins within the floodway, with associated riparian waterfowl habitat, would greatly enhance its visual condition and scenic quality.

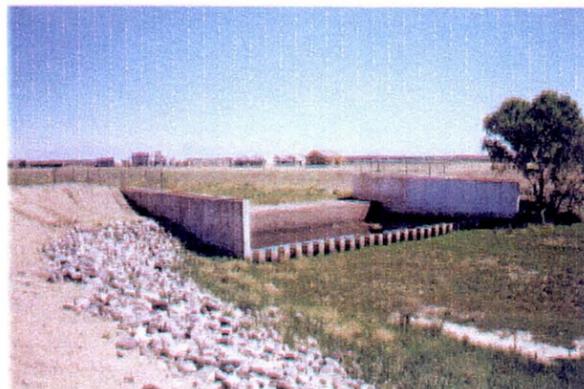


Enhancement Opportunities



3.2.8.3 Visual Condition

Visual condition, also known as scenic condition or scenic integrity, is the state of naturalness or, conversely, the state of disturbance created by human activities or alterations in a landscape.



Visual condition is stated in terms of degrees of deviation, or contrast, from the natural landscape character or historic landscape character.

Dominant human alterations override the natural character of a landscape and are very noticeable. Subordinate human

alterations blend with the natural character of a landscape, are secondary to the natural landscape character or are not noticeable.

In 1917, Henry Vincent Hubbard and Theodora Kimball⁷ wrote about the pressures of living in an urban setting, devoid of linkages to natural landscape character:

"But the modern city-dwelling race of men, if it is to exist at all for any length of time, must obtain in unspoiled landscape some relief from insistent man-made conditions."

Visual condition of the natural landscape within the East Maricopa Floodway has been dramatically altered by human activities. The created landscape has no resemblance to the natural visual conditions of the native Sonoran Desert. All landforms, rockforms, waterforms and vegetation patterns in the EMF are artificial, manmade and "engineered" in appearance. Therefore, the existing visual condition of the EMF corridor has low scenic integrity.



Visual Condition in Urban Area

Visual condition of the EMF has been improved slightly by the addition of trees and shrubs and the hiking/bicycle trail. However, the strong "engineered" landform still remains as a stark contrast throughout the 2-1/2-mile section of landscaped corridor. Therefore, the overall effect is a human-dominated landscape with little relationship to natural landscape character.



At the golf courses, interesting landforms, waterforms and vegetation have combined to create a pleasing visual condition. Human alterations are dominant, yet the stylized landscape is very desirable for scenic viewing.



Visual Condition in Agricultural Area

In the agricultural area, there is one new subdivision that has been built immediately east of the EMF. The rooftops and earth-berm separating the subdivision and EMF create a strong, unnatural contrast to the historic landscape character of the agricultural area. Other future subdivisions in the agricultural area could continue to erode the historical agricultural landscape character.



Visual Condition in Transition Area

Visual condition is changing most rapidly in the transition area, where the historic landscape character of agricultural fields and farmsteads is giving way to new subdivisions and commercial centers near Williams Gateway Airport/Campus. This creates contrasting visual conditions, and this situation will continue until urbanization is complete in the area.



3.2.8.4 Visual Sensitivity

Visual sensitivity considers important views of and from the study area, features that serve as primary focal points within and adjacent to the study area, and opportunities for enhancement of scenic viewing. Visual sensitivity also considers the visual characteristics of landscapes seen from different distances.

Viewing distance zones are defined as:

Immediate Foreground – 0- to 300-feet

Foreground – 300-feet to ½ mile

Middleground – ½-mile to 4-miles

Background – 4-miles to infinity

Visual Sensitivity in Urban Area

Scenic viewing opportunities are limited in the urban area. If a viewer wants to see the nearby mountain ranges, or view a sunset, it is only possible along the axis of a roadway or the EMF. If a person wants to view stars and planets in the nighttime, urban street lighting and the cities' glare obliterates the night sky. If the viewer platform could be elevated, such as building 20-foot- or 25-foot-tall mounds of earth with vista points on top, scenic viewing opportunities could be greatly enhanced in the urban area. However, the narrowness of the EMF channel prohibits any such mound building activity. It would be possible, however, to build "lookout towers" in the urban area of the EMF for increased scenic viewing opportunities.



Visual Sensitivity in Agricultural Area

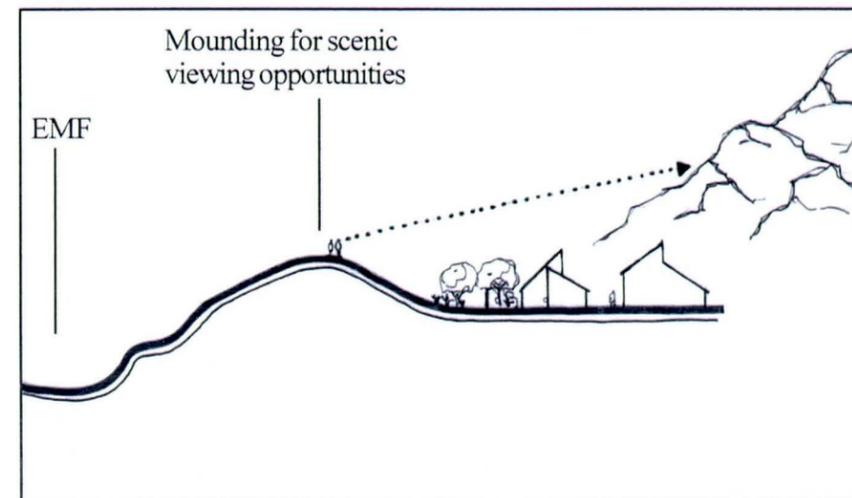
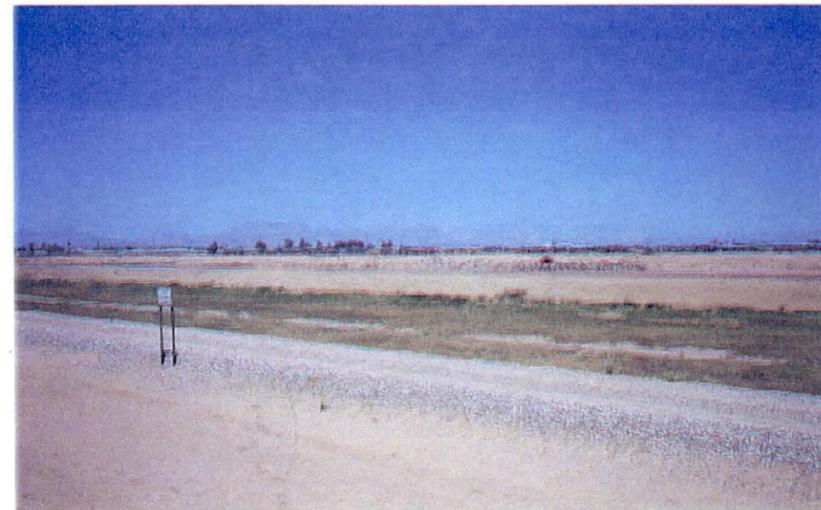
Scenic viewing opportunities are almost unlimited in the agricultural area, with its panoramic landscape views. If a viewer wants to see the nearby mountain ranges, or view a sunset, it is not only possible, it is almost impossible not to! At night in the desert, viewing stars and planets is a common occurrence. Pockets of suburban developments are appearing in the agricultural area of the EMF.



This is a threat to the visual sensitivity, and the historic landscape character, of the area.

Visual Sensitivity in Transition Area

In the transition area, scenic viewing opportunities are similar to the agricultural area, but they are fast becoming similar to the urban area. Long lines of sight are becoming short lines of sight as subdivisions and shopping centers are constructed in the flat landscape. There is an opportunity to create elevated viewer platforms along the EMF in the transition area. Before urbanization is complete, the right of way for the EMF could be expanded and mounding could occur, sufficient for scenic viewing over the rooftops of yet-to-be-built subdivisions.



Summary of Visual Resources

The EMF corridor has a consistent overall visual character - "an engineered floodway" that is an unnatural, modified landform on the uphill side of the Roosevelt Water Conservation District main canal. For its entire 19.3-mile length, the floodway has a consistent trapezoidal shape, except at golf courses between Broadway and Guadalupe Roads. At these golf courses, approximately 3-miles in length, the landform is undulating and visually interesting with green lawns, shade trees and water features. Scenic viewing opportunities are limited in the urban area, and soon will be more limited in the transition and agricultural areas, by new buildings and walls. There is very little or no landscaping within the southern 2/3 of the EMF corridor.

Selected References

¹ USDA Forest Service. 1974. The Visual Management System. Agriculture Handbook Number 462. 47 p.

² USDA Forest Service. 1973. National Forest Landscape Management Volume 1. Agriculture Handbook Number 434. 77 p.

³ Litton, R. Burton, Jr. 1968. Forest Landscape Description and Inventories – A Basis for Land Planning and Design. Research Paper PSW-49. USDA Forest Service. Berkeley, CA. 64 p.

⁴ Ibid. Page 23.

⁵ John Ormsbee Simonds. 1961 (Revised 1983). McGraw-Hill, Inc. "Landscape Architecture" 331 p.

⁶ USDA Forest Service. 1995. Landscape Aesthetics: A Handbook for Scenery Management. Agriculture Handbook Number 701. 250 p.

⁷ Hubbard, Henry V., and Kimball, Theodora. 1917. An Introduction to the Study of Landscape Design. New York, NY The Macmillan Company.

3.3 Summary of Existing Conditions

As engineers, hydrologists, planners, geographers, landscape architects and others have studied the existing conditions in the EMF Corridor, each person has seen something different, based on the filters that each one uses to “see the world.” The report has described existing conditions in detail, based on the perspective of each individual’s specialty.

3.3.1 Summary of the Physical and Natural Environment

The EMF travels through three character areas — urban, transitional and rural. Prior to settlement and agricultural development, the region was characteristic of the Sonoran Desertscrub biotic community. Today, with the exception of two small undisturbed areas adjacent to, but outside the EMF corridor, native vegetation is almost non-existent, thus affecting the genetic pool for vegetation. The lack of native habitat limits wildlife species diversity. The EMF is a flat, man-made channel with various dimensions; most typically it is a wide, shallow trapezoid. Channel composition varies from grass-lined earth, to rock-lined, to gunit-concrete-lined. Rapid urbanization in the East Valley has made channel capacity inadequate to meet current run-off needs. Capacity shortfalls increase in the downstream channel. At Hunt Highway, the study area’s southern boundary, the existing channel accommodates approximately one-half the existing condition flow. Opportunities for channel expansion and reconfiguration, and/or off-channel storage increase in the downstream areas (transitional and rural). In looking at the entire study area, and the possibility for water resource associated benefits, local municipalities are interested in exploring opportunities for groundwater recharge within the EMF. Recharge may provide mitigation for local subsidence and create financial incentives to offset water costs for the participating municipalities.

3.3.2 Summary of the Cultural and Socioeconomic Environment

The discussion of the cultural and socioeconomic environment provides an overall picture of the political and social landscape: its several jurisdictions, community stakeholders, emerging growth centers, and key issues in regional development and quality of life. Understanding social and cultural factors, and viewing them along with natural resource issues, provides a holistic, interdisciplinary basis for making recommendations about future improvements to the East Maricopa Floodway.

Adopted public policy—the myriad of plans dealing with future land uses, open space, trails, transportation, and other public works—show community vision and public and elected official consensus. These regional plans are the blueprint for sustainable, planned growth in the East Valley and the foundation for the Conceptual Design Alternatives for the EMF.

Some of the highlights and preliminary conclusions of this chapter include:

- Projected population growth and employment trends will bring significant changes to the rural character and lifestyle of the East Valley.
- Land uses will change and transition from an agricultural base to diverse communities with core residential development.
- This growth will provide the “critical mass” of users for EMF open space and recreational amenities.
- Employment centers and regional destinations, such as Williams Gateway Airport/Campus, and surrounding employment and industrial areas will support future public transit and multi-modal improvements, including a commuter EMF bike path.
- Schools and parks, and their connections to a safe, alternative bike route along the EMF and to the cultural and educational opportunities in the EMF are opportunities for multi-use development.
- The adjacent Roosevelt Water Conservation District (RWCD) canal provides opportunities for alternate public trail use and partnering.
- On-going transportation planning and multi-modal opportunities provide opportunities for public support for improving infrastructure in advance of development.
- Archaeological sites provide the opportunity to preserve and interpret these resources.

Finally, the cultural environment includes visual resources—what we see as viewers in the landscape. In the case of the EMF and the adjacent RWCD canal, the manmade ribbon of channel and canal create a curvilinear counterpoint to the grid of section line roads that cover the valley floor. The close-up views of this flood control and irrigation infrastructure, and the distant vistas available because of the canal and EMF rights-of-way, offer opportunities for environmental enhancement, transformation, and preservation of existing views to distant mountain ranges.

4.0 Opportunities and Constraints

4.1 Summary of Opportunities

4.1.1 Multiple Benefits

The goal of the study is to identify opportunities for multiple benefits associated with the redesign of the EMF to increase its current capacity. Floodway expansion can be undertaken through a number of design options including channel reshaping and detention basin development. Channel reshaping provides an opportunity to create a Sonoran Desert landscape with native and non-native uplands and riparian plant species for wildlife habitat and educational interpretation. Detention basin development offers an opportunity for recreational amenities such as sports fields and green open space. Since floodway inadequacies

increase downstream, the majority of capacity mitigation techniques will be implemented in the transitional and rural reaches of the EMF, as illustrated in Figure 21. Opportunities associated with channel modifications, basins and other hydrology opportunities are clustered in the southern-most portion of the study area. These areas currently offer the largest amount of undeveloped open space to accommodate design changes.

4.1.2 Archaeological Interpretation

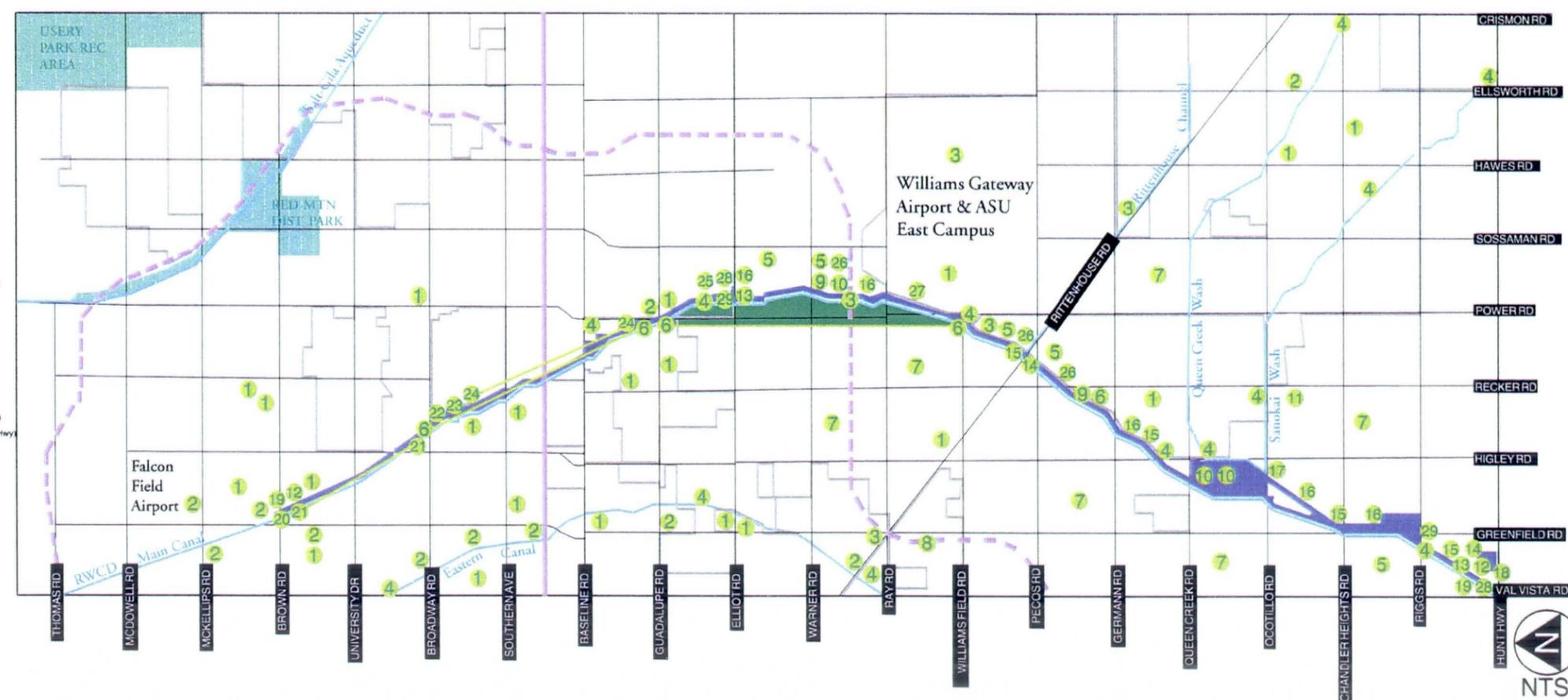
There are three known archaeological sites along the EMF that have been previously classified as significant cultural sites. These offer an opportunity for expansion of educational and interpretive linkages between schools, historical museums, and cultural learning centers. Archaeological site interpretation is most frequently designed as passive, non-invasive paths with appropriate educational signage or small reconstructed areas for viewing. Active use is discouraged through the placement and use of appropriate hardscape and plant materials.

4.1.3 Biotic Linkages

The Sanokai and Queen Creek Washes provide an opportunity for expansion of existing biotic and environmental linkages throughout the study corridor. These washes act as wildlife corridors from the surrounding mountains to the Gila River. Linkages may also be developed using two areas of existing undisturbed native vegetation as the host for future habitat development. Biotic linkages also provide an opportunity for education and interpretation.

- Legend**
- Socio-Economic Resources**
 - 1 Schools/Educational Facilities
 - 2 Parks
 - Multi-Modal Resources**
 - 3 Public Transit Improvement
 - 4 Bicycle & Trail Connection
 - Land Use**
 - 5 Planned Development/ Large Parcel in Single Ownership
 - 6 Connection to Residential (Commercial Opportunity to Incorporate Plazas & Linkages)
 - 7 Agricultural Land/ Transition to Residential
 - 8 Commercial Plaza
 - Physical & Natural Resources**
 - 9 Native Biotic Community
 - 10 Archaeological Site
 - Hydrology**
 - 11 Off-Channel Retention/ Detention Basin(Entire EMF)
 - 12 Undulating Channel
 - 13 Bank Erosion Control(Elliot Rd to Hunt Hwy)
 - 14 Wider/Deeper Channel(Pecos Rd to Hunt Hwy)
 - 15 Inline Cascade Basin
 - 16 Recharge Basin
 - 17 Natural Wash
 - 18 Improved Transition to Floodplain
 - 19 Low Flow Channel
 - Visual Resources**
 - 20 Princess Park Views
 - 21 Greenbelt & Trail(Brown Rd to Broadway Rd)
 - 22 Nature Trail to Fence
 - 23 Leisure World Golf Course
 - 24 Superstition Springs Golf Course
 - 25 First Panoramic View to Superstition Mountain
 - 26 Native Sonoran Desert Vegetation
 - 27 Williams Field Golf Course
 - 28 Panoramic View(Guadalupe Rd to Hunt Hwy)
 - 29 Orange Grove

Figure 21. Opportunities Map



4.1.4 Future Land Use and Development

The earlier discussion of population and growth trends in the East Valley portrays an area in transition from rural to suburban and urban land uses. As the Valley develops in response to its shared community vision and adopted plans, residential subdivisions along the EMF corridor will create a need for increased floodway capacity and a “market” for EMF amenities. Areas where there are adjacent commercial and planned or built-out residential subdivisions will create opportunities for integrating pedestrian, transit, and bicyclist amenities. As noted in Figure 21, these designated areas show possible locations for integrating commercial plazas, public transit stops, and pedestrian and bicyclist connection nodes at key points—or activity nodes—along the EMF.

The Opportunities Map also shows areas of agricultural land in transition to future residential development. Connections from these neighborhoods to the EMF would be important in implementing Maricopa County’s and the East Valley communities’ goal of integrating pedestrian trails and bicycle routes throughout the Phoenix Metropolitan area. As development occurs in the Queen Creek area, trail connections from SanTan Regional Park to the EMF could be provided.

The Opportunities Map shows location opportunities for public transit service centers based on Freeway intersections combined with future planned commercial centers surrounded by future residential, plus light-rail and transit facility opportunities.

4.1.5 Planned Development and Large Parcels in Single Ownership

Large parcels in private ownership located in proximity to the EMF corridor offer opportunities for planned communities or mixed-use developments that are sensitive to the multi-use functions of the EMF. Several of these large parcels are currently in agricultural use, but are planned for “Commerce Park” or “Mixed Use” on the composite Planned Land Uses map (see Figure 9). Since these parcels are near the Williams Gateway Airport/Campus, they will likely become major employment areas. Since these parcels are currently zoned for low-density residential (R-43) or Airport Development Areas (AD II or ADIII), they would need a future rezoning or subdivision review process to develop to their highest and best use. The rezoning/subdivision process will offer an opportunity to require site design standards that will ensure functional (access and linkage) and aesthetic sensitivity to recreational, habitat, or visual resources along the EMF. In some cases, land dedications and easements could be further opportunities for multi-use of the EMF corridor, recognizing that the District does not have authority on issues such as zoning requirements. The following land use planning policies suggest ways for local jurisdictions to partner with the District for implementation of open space and other amenities:

- Private developers in the rezoning process could dedicate land along the floodway.
- Percentage of gross receipts or a special tax mechanism for adjacent non-residential development in the area could support the East Maricopa Floodway Enhancement Fund.

- An assessment could be made on a per lot basis for residential development adjacent to the floodway.
- All jurisdictions could adopt the same general design guidelines for signage and trail construction materials and standards.
- All jurisdictions could adopt the same maintenance and management plan for open space and plant replacement requirements
- Jurisdictions could look at land acquisition possibilities along the floodway and could participate in continuous trail development.
- Jurisdictions could notify adjacent communities of their plans along the floodway.
- Jurisdictions could encourage trail linkages, linear park access points, educational opportunities, parks and recreation facilities, sports facilities, recharge areas, natural restoration areas and wildlife enhancement, and open space in their design planning adjacent to the floodway.
- Development could be coordinated with Maricopa County Flood Control for drainage improvements adjacent to the floodway.
- Functional open space could be designed to provide areas for active and passive recreation, including multi-purpose trails, nature trails, and linear park areas. These areas could be planned to provide visual relief, shade, screening and buffering, and protect viewsheds and environmental amenities.
- Open space and pedestrian linkages within new commercial and residential developments could be integrated with linear park open space nodes and trails.

4.1.6 Schools

As noted in the discussion of Educational and Recreational Facilities earlier in the report, schools and parks in proximity to the EMF offer a variety of opportunities for educational outreach and recreational linkages. Tapping existing educational and recreational resources will help to actualize an important multi-use goal of this study. Several of the goals listed in the Study Overview section of this report address creating “opportunities for recreational amenities to serve the demands of an increasing population. . . and creating connections with established and future municipal facilities.”

Schools noted in Figure 21 are generally located within one-mile of the EMF and include elementary, junior high and high schools, as well as the ASU Williams Gateway Campus. Because of the range and size of student body, specific educational and cultural outreach will vary. Several schools located just west of the Eastern Canal and between Queen Creek and Sanokai Washes are also shown on the Opportunities Map because of long-term opportunities for regional multi-modal linkages.

Educational and interpretive opportunities include uniform signage, interpretive kiosks, and exhibit areas and public gathering places. The latter venues, strategically located near area schools, could be designed as outdoor classrooms or environmental laboratories to interpret the corridor’s natural or cultural resources. In addition to providing outdoor lecture space, teachers could incorporate ecosystem restoration, revegetation, and plant identification into course curricula. School children could be involved in the installation of environmental or public art

features (e.g., designing of outdoor play space or site-specific art) or in tree planting and habitat restoration. The larger community could participate as docents and foster trail stewardship and maintenance.

Environmental content areas could include exhibits on riparian ecosystem restoration, water recharge, habitat value, flora and fauna, and geology. Interpretation of cultural features could focus on the area’s prehistory (e.g., archaeology, Hohokam canal building, relationship to present day Indian communities) and the evolution of the cultural landscape with historic farming and ranching, canal building, the Queen Creek stage stop, and the development of population centers. Local history exhibits or “mile-markers” could include the history of the East Maricopa Floodway itself, the Maricopa Flood Control District, and the settlement history of the towns and cities of the East Valley. These exhibit areas (possibly small kiosks located at one-mile intervals along the corridor) could celebrate the East Valley’s unique sense of place. In addition to fixed exhibits, the corridor could be the setting for a variety of public and performance art and temporary “hands-on” exhibits.

Educational opportunities in the form of Horticulture/Wildlife Habitat Interpretive Trails and Historical Markers meet the District’s and the communities’ goals of multi-use and educational opportunities. These educational elements can be developed in association with public schools. An interpretive trail could be developed in association with Highland Junior High School located near the EMF on Guadalupe Road. The horticultural aspect of the trail could be accomplished by placing plant identification signs in association with individual plants. The signs would indicate the botanical and common names and place of origin. A class or individuals would be able to walk the trail with a prepackaged list of detailed information concerning each signed plant. The historical markers could be developed in conjunction with masonry monuments marking one-mile intervals along the 19.3-mile Floodway. Historical vignettes placed on these markers could indicate the local Hohokam cultural heritage and the pioneering history of the East Valley.

4.1.7 Parks

Parks located in proximity to the EMF corridor offer a variety of recreational and multi-modal opportunities. Those parks adjacent to or in close proximity to the floodway can serve as trail staging and parking areas. Many of these parks already provide restrooms, parking, and other facilities, and are already linked via the arterial or collector roadway system to existing and future bike routes. In addition, parks offer sites for many of the educational and cultural outreach activities and exhibits described above in the schools section.

4.1.8 Multi-Modal

Multi-modal opportunities include improvements for public transit (e.g., bus services, Park and Ride lots, light rail or other transit facilities) in proximity to the floodway and bikeway trails.

Site-specific opportunities exist for Park and Ride lots and transit stations. Maricopa Association of Governments (MAG) coordinates the development of Park and Ride Lots within the County. District-owned properties may be appropriate for Park and Ride lots. The District's property on Baseline Road just west of Power Road has the area and proximity to the Superstition Freeway to be convenient for commuters. Population densities appear to make a Park and Ride Lot feasible at this location.

Gilbert's Crossroad Park Master Plan for the expansion of the existing park has identified a site north of the Southern Pacific Railroad, west of Greenfield Road for a commuter rail station. Once the Valley-wide mass transit system is developed, there will be need for additional commuter rail stations. There may be an opportunity to develop a station in association with the Rittenhouse Basin near Pecos Road and the EMF. This would be approximately three miles from Crossroads Park.

One of the goals listed in the Study Overview section of this report highlights "opportunities for alternative mode links between public transportation facilities and major transportation routes for equestrians, bicyclists and pedestrians." Another goal states: "create coordinated connections with established and future municipal facilities and regional trail systems in the East Valley."

In order to address multi-modal opportunities, and as part of the stakeholder and public process components of this study, the District is exploring ways to partner with East Valley municipalities and other stakeholders in developing multi-modal and trail amenities on District property. The locations shown on the Opportunities Map include key points along the floodway for bike and trail alignments and connections, as well as a conceptual route which would link EMF trail amenities with those along the Eastern Canal, the Western Canal, and Queen Creek and Sanokai Washes. These opportunities are in direct response to the trails and open space plans that have been adopted by Maricopa County and other jurisdictions in the East Valley. The types of trails and design standards would depend on site-specific considerations, and are not part of the current study. However, based on preliminary study area analysis, equestrian trails along the EMF and equestrian lateral linkages would be most appropriate south of Guadalupe Road. This existing agricultural and low-density residential area provides enough EMF right-of-way width and vertical clearance at bridges for safe equestrian trail use.

4.1.9 Visual Resources

With the stated need to mitigate capacity of the floodway, there is an opportunity to reshape EMF landforms to more natural and less engineered appearance. Reshaping could include several different landform opportunities – sidewalls, tops of channel, and channel bottom.

In the channel bottom, a small, narrow, meandering channel could be designed and graded with rocks and boulders placed as accents. This would create visual interest and a meandering focal point that would lead the viewer's attention to a detailed landscape feature. It would break up the strong axis line created by the engineered template of the existing channel. It would give an opportunity for water to be present for longer periods of time after rainstorms. Currently, with the broad, flat floodway bottom, any water that is present is spread out and evaporates quickly. A small meandering channel would also provide water for wildlife, as well as for visual relief. "Watchable Wildlife" would be an additional scenic attraction.

There is an opportunity to undulate the floodway bottom and perhaps to create basins of standing water within the floodway. This would create visual interest and new focal points of water – a distinctive scenic feature – in the desert. In addition to these new basins, it would be possible to widen the floodway and have a braided wash with small islands in the bottom. These islands would simply be mounds of earth that are higher than the surrounding channel bottom, but would be below the channel-tops. Therefore, the desired future landscape character for the channel bottom would be a stream channel that is sympathetic and relates to the natural landscape attributes of form, line, color and texture.

Channel sidewalls have a uniform slope that reinforces the "engineered-look" of the floodway, as well as the strong axis landscape composition. There is an opportunity to regrade and reshape channel sidewalls to emulate more natural landforms in the desert, or to create a stylized desert landform. Sidewalls could be laid back to flatter slopes in some areas, made steeper in some areas, and generally given more interesting landforms.

The channel-tops are flat on both sides of the EMF, and with the maintenance roads on one or both sides of the floodway, there is a strong sense of an industrial landscape that has no human scale to its features. If the channel-tops were reshaped with mounds and other undulations, it would create visual interest and could also provide numerous elevated viewer platforms.

A desired future landscape character for the channel would include native and drought tolerant plants to create mosaic patterns of trees, shrubs and ground covers throughout the 19.3-mile long corridor. This would provide foreground enframing for viewers, erosion stability, shaded relief for pedestrian, cyclists and equestrians, psychological and emotional relief, and visual variety and interest.

Various themes can be adopted for landscape planting within the EMF corridor and new basins. One theme is to study the native Sonoran Desert vegetative communities in the Gila River Indian Community lands, and to revegetate the entire EMF corridor with native desert upland and riparian vegetative communities. This would be an ecological restoration theme and is developed as Alternative 3. An alternative is to create a "stylized Sonoran Desert" landscape with a palette of native and non-native, drought-tolerant species. Grassy lawns and playfields could be provided in the basins for active and passive recreation facilities as shown in Alternative 2.

If mounds were constructed and if they were taller than surrounding landscape features (e.g., surrounding rooftops), then viewers on top of these mounds would have scenic viewing opportunities to the surrounding mountain ranges. Before urbanization, panoramic views were available from this landscape to these mountain ranges. With construction of mounds on the channel-tops, these panoramic landscape views would again be visible from the EMF.

In two locations, concrete structures have been placed in the floodway for energy dissipaters at grade changes. Additionally, there are 20-bridge/culvert overcrossings of the EMF. At each of these locations, there is an opportunity for public art to be placed on the concrete structures. Public art would increase visual interest, create new focal points in the landscape, involve members of the public and stakeholders, and mitigate the negative visual impacts of these concrete structures.

4.2 Summary of Constraints

4.2.1 Existing Structures

There are numerous utility and bridge crossings along the EMF. This infrastructure creates structural challenges for floodway expansion. Channel reshaping (widening or deepening) in areas with existing structures can cause undercutting of piers and foundations, effecting potential structural failure, and trigger reconstruction of these foundations. Utility exposure, such as sanitary sewer, can create potential environmental impacts that would also require mitigation. Relocation of existing utilities and/or bridge reconstruction, although costly, would be necessary to implement design changes.

4.2.2 Archaeological Site Invasion

Careful preservation of known archaeological sites is essential for preventing the loss or damage of significant material. The State Historic Preservation Office encourages thorough documentation of sites prior to development. Site avoidance negates the need for additional research and/or mitigation.

4.2.3 Environmental Impacts

Habitat development along an active recreational corridor often creates conflicts with environmental goals and users. Bird watchers, environmental researchers, and the public often want access in close proximity to wildlife nesting and foraging areas. As a result, wildlife may be repelled by human activity. Wildlife corridors adjacent to developed areas create opportunities for the introduction of feral predators into sensitive areas and/or wildlife species into the built environment.

4.2.4 Multi-Modal

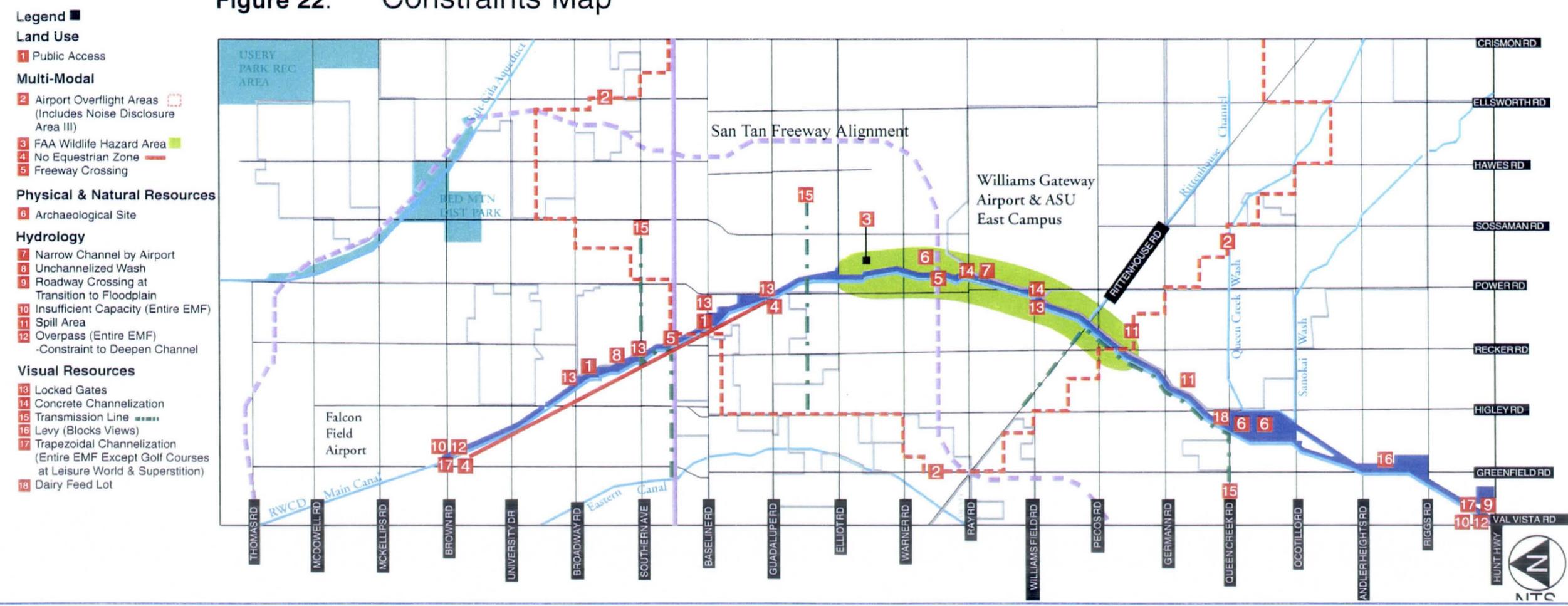
Within the EMF corridor there are more opportunities than constraints for implementation of multi-modal transportation. However, the Williams Gateway Airport Overflight Zone and the FAA Wildlife Hazard Area, as shown on the Figure 22, present limitations. The Overflight Zone is mainly an impediment to housing but may reduce recreational enjoyment of the area due to noise and air pollution. The

FAA Wildlife Hazard Area makes it prohibitive to create bird habitat areas. Floodway basin and recreational amenities in this area will need to be designed with more urban, hardscaped features rather than with a more naturalistic design and plant palette.

As referenced in the Multi-Modal Opportunities section, equestrian trails would be limited to areas south of Guadalupe Road. Equestrian travel north of Guadalupe Road along the EMF is restricted because road crossings in this area are box-culverts that do not accommodate the height of a horse and rider. Because areas in the northern portion of the study area are more urbanized, on-grade crossings would be dangerous to horses and riders.

Freeway crossings restrict the creation of natural areas in the EMF. These areas may also create traffic conflicts and unsafe conditions for bicycle and pedestrian connections to a future EMF linear trail system.

Figure 22. Constraints Map



4.2.5 Visual Resources

In two locations, the EMF channel is lined with concrete. Downstream of the intersection of Main Street and Higley Road there are vertical concrete walls and a flat concrete bottom in the floodway. Along Williams Gateway Golf Course, for 1-1/4 mile from Ray Road to Williams Field Road, there are sloping concrete walls and a flat concrete bottom. In both of these locations, the concrete creates a stark visual environment that is totally devoid of natural landscape elements. This is a constraint to visual restoration of the landscape because in both locations, the channel is very narrow and closely bounded by existing developments on both sides.

In several locations, there are electrical transmission lines or electrical distribution lines located adjacent to the EMF, between it and the RWCD main canal. The towers and lines create a rhythm and pattern in the landscape that leads the viewer's eye to the horizon along the strong axis created by the EMF. The presence of these towers and lines creates an industrial landscape character that is not conducive to scenic viewing or landscape appreciation. These lines and towers are disruptive to certain recreational activities as well, such as kite flying. Additionally, even though it is not strictly a visual resource concern, some people have health concerns about the electrical and magnetic fields that are present under and near these lines, and that concern may affect their ability to enjoy scenic quality along the EMF.

Utility companies have standards for landscaping beneath these utility lines that would be a constraint. For safety reasons, only certain trees can be planted under these electrical lines. Tree height and location is constrained by these regulations.

There are several locations where spillways entering the EMF are armored with concrete. These spillways are visually unattractive, yet these structures are necessary for energy dissipation. This presents a constraint for visual resources, because it is impractical to plant trees or shrubs or create mounded landforms in these areas. However, it also presents an opportunity to re-design and reconstruct these spillways with more attention to aesthetic beauty.

In two locations, concrete structures have been placed in the floodway for energy dissipaters at grade changes. These structures are visual focal points in the flat-bottomed channel, yet they are not scenically attractive. They are constraints to visual resources.

4.2.6 Public Access

Public Access to the East Maricopa Floodway is currently restricted by the District and by RWCD. The policy of both agencies is to post "NO TRESPASSING" signs and to prohibit public use of their respective lands. Public liability is a major issue. Especially for RWCD, there is a history of people falling into canals and being seriously injured or killed when they cannot escape the fast water and smooth concrete-lined canal. Public liability is a constraint of the EMF and RWCD as an open space and recreation corridor.

Leisure World and Superstition Springs Golf Course pose similar public access constraints. If the EMF is to become a major component of the Countywide Trail System of loop trails, cooperation with RWCD and the District would be imperative.

5.0 Alternatives

5.1 Alternative Development

This section describes three different alternatives that respond in varying ways to opportunities for capacity mitigation and multi-use of the East Maricopa Floodway.

Alternative 1: Flood Control without Amenities focuses on construction of new basins that would increase floodway capacity but would not address corridor multi-use goals. This is a straightforward engineering solution to mitigate the floodway capacity issue. The District, without participation of East Valley partners, could implement this alternative.

Alternative 2: Flood Control with Recreational Enhancement, as the name suggests, focuses on the variety of linked recreational amenities that would be built in phases to meet the recreational future demands of East Valley residents. Implementation of this alternative would necessitate participation with East Valley partners and the District.

Alternative 3: Flood Control with Environmental Enhancement highlights ecological values, with an emphasis on habitat restoration and environmental education. Implementation of this alternative would necessitate participation with East Valley partners and the District.

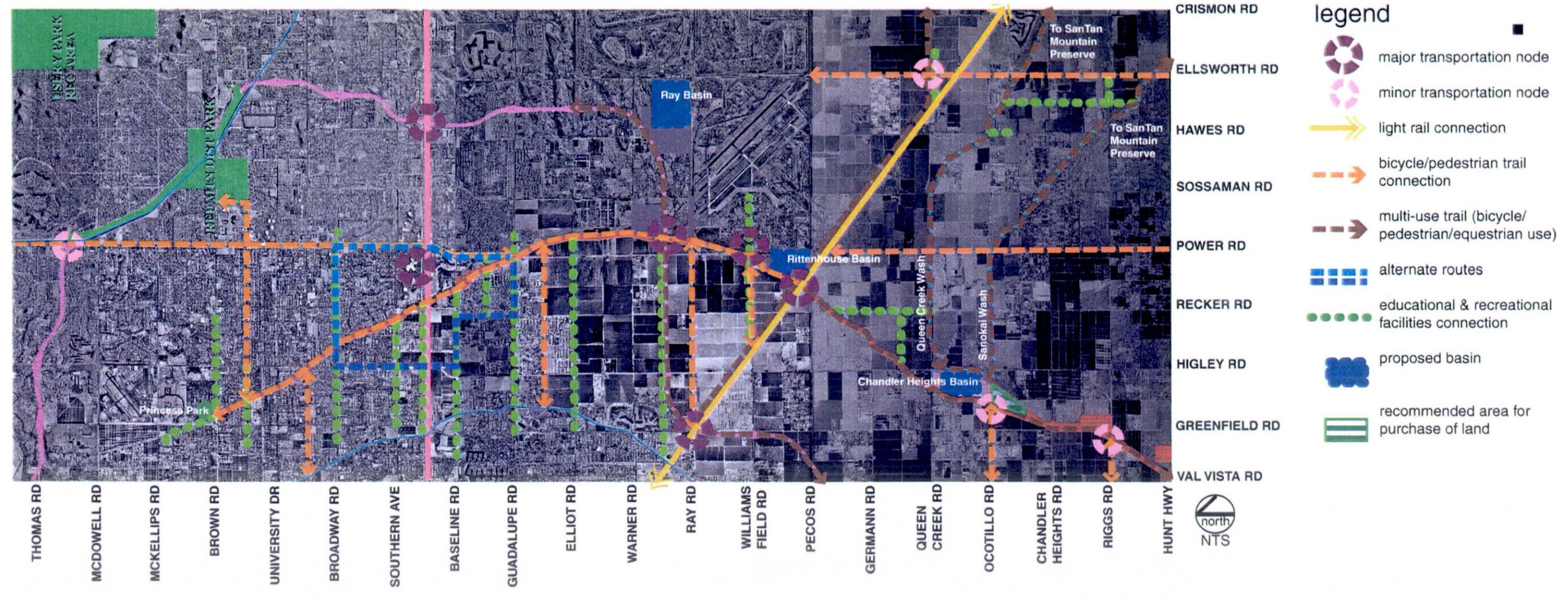
5.1.1 Features Common to All Alternatives

Although these three alternative approaches emphasize different themes, there are some features that they all share, as shown in Figure 23 – Features Common to All Alternatives.

5.1.1.1 Floodway Capacity

The East Maricopa Floodway under-capacity issue will be addressed in all alternatives, and floodway capacity needs will be met.

Figure 23. Features Common to All Alternatives



5.1.1.2 Open Space

The East Maricopa Floodway provides open space opportunities for residents of the East Valley of Maricopa County. Under all alternatives, important linkages would be made between the EMF and recreational facilities, educational facilities, freeways, surface streets, commercial centers and residential neighborhoods (both existing and planned). These linkages would contribute to the quality of life for East Valley residents, and fulfill opportunities for recreation and open space that are listed in city and town general plans. These linkages would provide important opportunities for people to experience and enjoy the open space characteristics of the EMF. These linkages are shown on Figure 21 – Opportunities Exhibit and on Figure 23 – Features Common to All Alternatives.

5.1.1.3 Superstition SanTan Corridor and Marathon Trail

During scoping, open house, and steering committee meetings, several alternative names were discussed for the East Maricopa Floodway. Because the EMF is an important link in the County Trails Committee plan to develop the Sun Circle Trail and the Legacy Trail, it is important that each alternative for EMF respond to the desire to complete the loop trail system in the County. Also, because of the length of the EMF, it is possible to create a marathon-length course for marathon races and training events. Therefore, public consensus from these meetings was to rename the EMF the “Superstition SanTan Corridor and Marathon Trail.” This new name is used for each of the three alternatives.



5.1.1.4 Air Safety

To comply with Federal Aviation Administration regulations and constraints regarding wildlife strikes in flight paths, it is recommended that the proposed Knox Basin near the end of the runway at Williams Gateway Airport be deleted from each alternative.

5.1.1.5 Multi-Modal

The EMF could link to major transportation nodes, including development of park and ride facilities, and trailheads for pedestrians, bicyclists and equestrians, at the following locations:

- Superstition Springs Center (Power Road at Superstition Freeway).
- Intersection of EMF and the new San Tan Freeway (SR 202).
- Intersection of new San Tan Freeway (SR 202) and Rittenhouse Road.
- Intersection of EMF and Williams Field Road.
- Intersection of Ray Road and Rittenhouse Road.
- Intersection of EMF and Rittenhouse Road.

The EMF could link to minor transportation nodes at the following locations, both of which are roads of regional significance and will have bicycle lanes, and could accommodate trailheads for hiking, bicycling, and equestrian uses:

- Intersection of EMF and Ocotillo Road.
- Intersection of EMF and Riggs Road.

Maricopa County DOT has designated Power, Ellsworth and Riggs Roads as “roads of regional significance,” and these will generally include bicycle paths. In all alternatives, these roads and bicycle lanes/paths will augment recreation opportunities for bicyclists using the Superstition SanTan Corridor and Marathon Trail.

Multi-modal opportunities exist at Rittenhouse Road for the existing railway to be used for light rail commuter use.

These multi-modal facilities would contribute to the quality of life for East Valley residents, and fulfill opportunities listed in city and town general plans.

5.1.1.6 Trail Program

On February 21, 2000 the Maricopa County Board of Supervisors announced the formation of the Maricopa County Trail Commission and their plans to form a Regional Trail System.

The goal of the program is to connect the County park system, link recreational corridors around the Valley and help preserve open space in the community. The project will capitalize on existing right-of-ways such as canals, parks, utility corridors and flood control projects.

5.2 Rationale for Development of Alternatives

In studying the existing conditions of the floodway, including property owned by the District and the narrowness of the EMF, it was determined that there are only three areas where dramatically different uses likely would occur.

- Golf Courses Bypass
- Rittenhouse Basin
- Chandler Heights Basin

5.2.1. Golf Courses Bypass

The County Trails Committee is interested in utilizing the EMF corridor as an important link and component of the Legacy Trail, which is a planned loop trail that will encircle Maricopa County. One obstacle to using the EMF as a component of this countywide trail is the lack of District ownership of the floodway through Leisure World and Superstition Springs Golf Course. To bypass these areas, there are three distinct routes for the proposed recreation corridor. First is a public trail along the RWCD main canal (which would require public access and liability issues, which are currently constraints, to be resolved). Second is use of sidewalks along surface streets to the east (Broadway and Power), and third is use of sidewalks along surface streets to the west (Broadway to Higley to Guadalupe).

5.2.2 Rittenhouse Basin

Because of its proximity to the railway and the possibility of future light-rail commuter service, the proposed Rittenhouse Basin could function as a park and ride facility, or a recreation complex, or an environmental restoration site, or a combination of all these uses. At the proposed Rittenhouse Road Basin, the possibility exists for development of a park and ride facility that could serve on weekends as parking for recreation facilities, ballfields, trailheads and passive recreation uses.

5.2.3 Chandler Heights Basin

Because of its proximity to Sanokai Wash and Queen Creek Wash, which both lead to the San Tan Mountain Preserve, the proposed Chandler Heights Basin could function as an ecosystem restoration area, an active or passive recreation complex, or perhaps both. At the proposed Chandler Heights Basin, the possibility exists for development of recreation facilities – ballfields, trailheads and passive recreation uses – plus development of community gardens for nearby residential areas.

5.3 Differing Features in Alternatives

Alternative 1 would respond only to the EMF capacity issue, while Alternatives 2 and 3 would respond more comprehensively to the multiple use opportunities discussed in the EMF report and to the larger, long-range vision of East Valley communities for sustainable development that enhances quality of life.

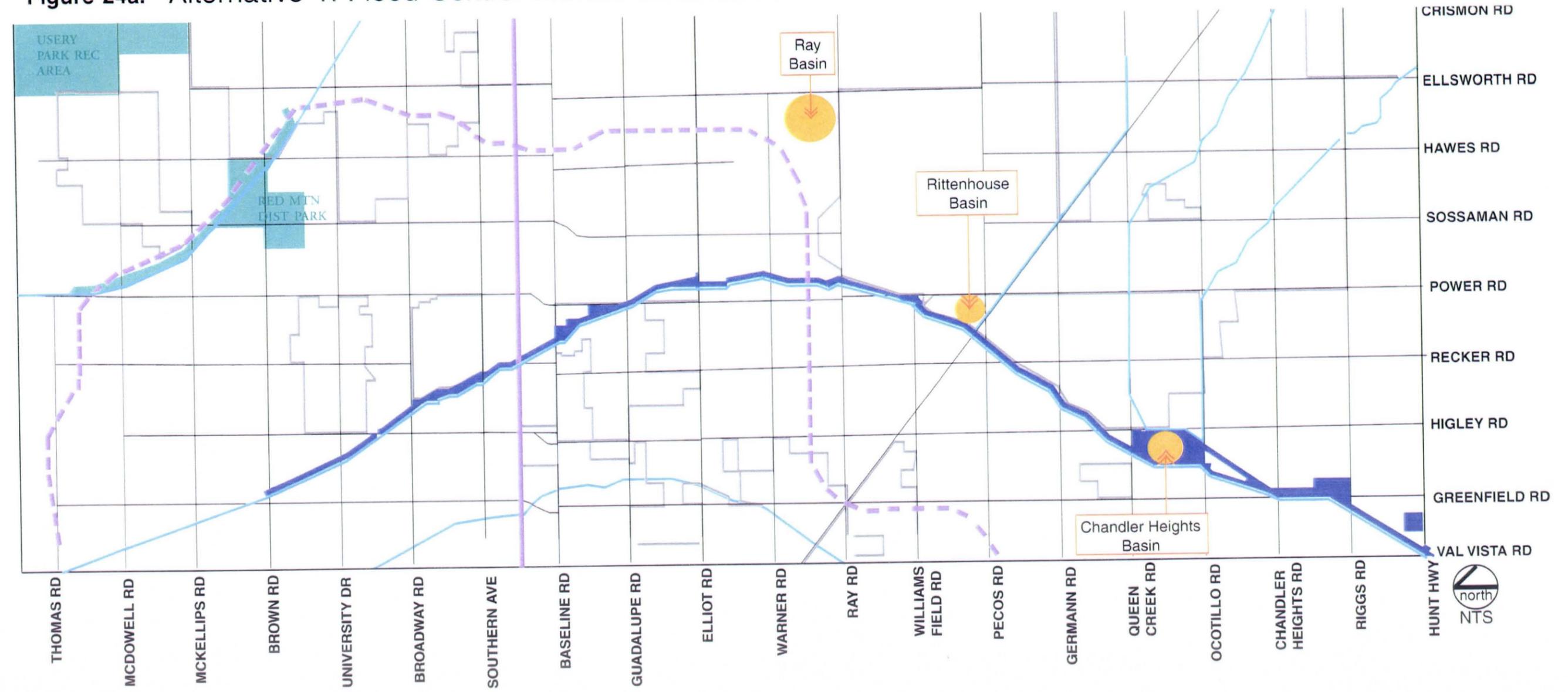
Based upon input to the District from the Steering Committee, stakeholders, and the general public, it is obvious that there is strong support for amenity features that are portrayed in Alternatives 2 & 3.

5.3.1 Alternative 1: Flood Control without Amenities

- Sidewalk bypasses of Leisure World and Superstition Springs Golf Courses using surface streets: Broadway to Power plus Broadway-Higley-Guadalupe to Power.
- No public access along EMF or RWCD from Broadway to Guadalupe.
- Off-line detention/retention basins at Ray and Ellsworth (called the Ray Basin), Rittenhouse Basin and Chandler Heights Basin, with dirt surfaces and 4-to-1 side slopes and 8-1/2-foot deep basins with flat bottoms.
- No change in the concrete lined channel between Ray Road and Power Road, along Williams Gateway Airport.

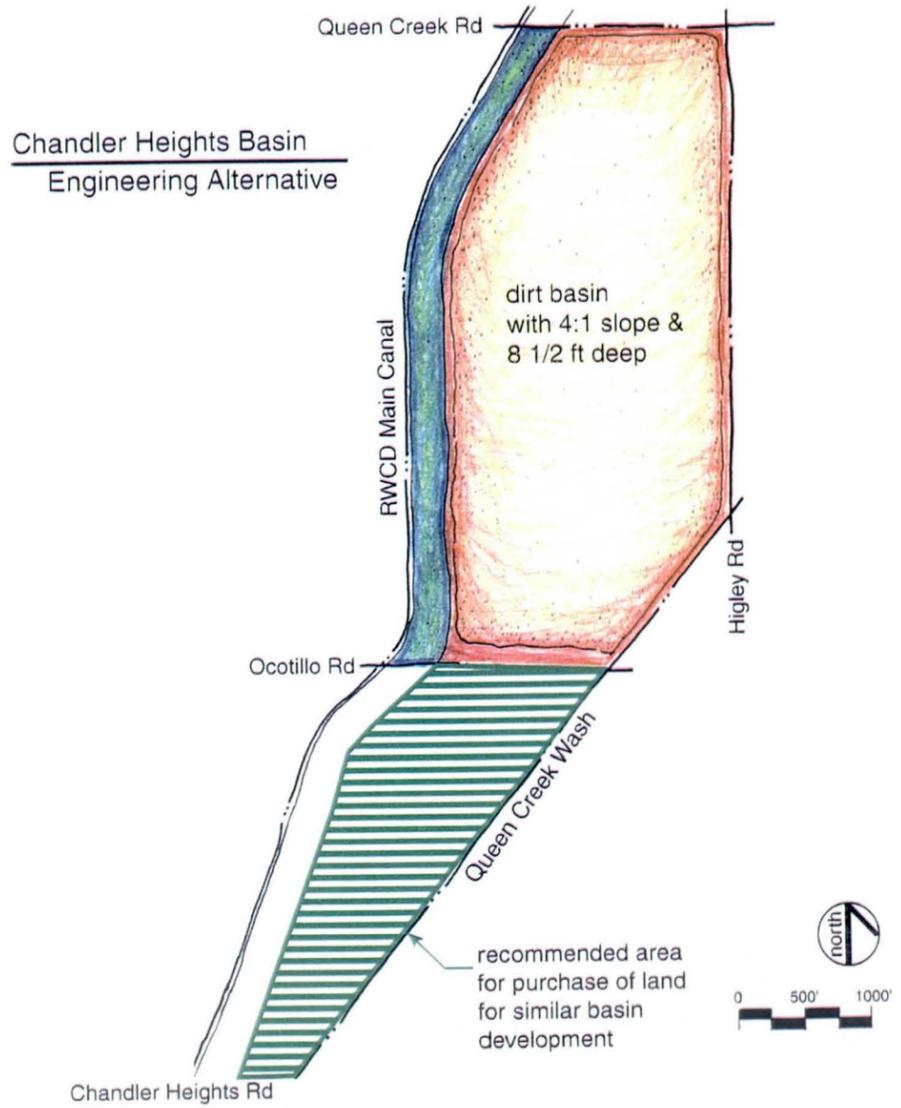
The development of Alternative 1 – Flood Control without Amenities – would be a straightforward engineering solution to the problem of inadequate capacity in the East Maricopa Floodway. From data collected in the hydrological analysis, the capacities of the lower portions of the EMF need to be increased, specifically in areas south of Ray Road. For increasing the volume of the floodway, the design remedy selected for Alternative 1 would have retention/detention basins. (An option that was not selected for Alternative 1 would increase the width/depth of the channel itself).

Figure 24a. Alternative 1: Flood Control without Enhancements



From analysis of land ownership data, there are three areas that are most feasible for future basins. These would be at Ray Road near Ellsworth Road (the Ray Basin, which is outside the EMF corridor), at Rittenhouse Road along the EMF, and at Chandler Heights along the EMF near the confluence of Sanokai and Queen Creek Washes. Design of these basins would be practical, straightforward engineering shapes, in areas justified by land size and relative position to the EMF.

Figure 24b.



The improvements proposed in Alternative 1 are basic and necessary for flood control within the EMF and augment the simple engineered solution that currently exists.

Under Alternative 1, the floodway would retain its predominant geometric shape, and it would remain off-limits for public use. Existing fences, gates and no tres-

Figure 24c.

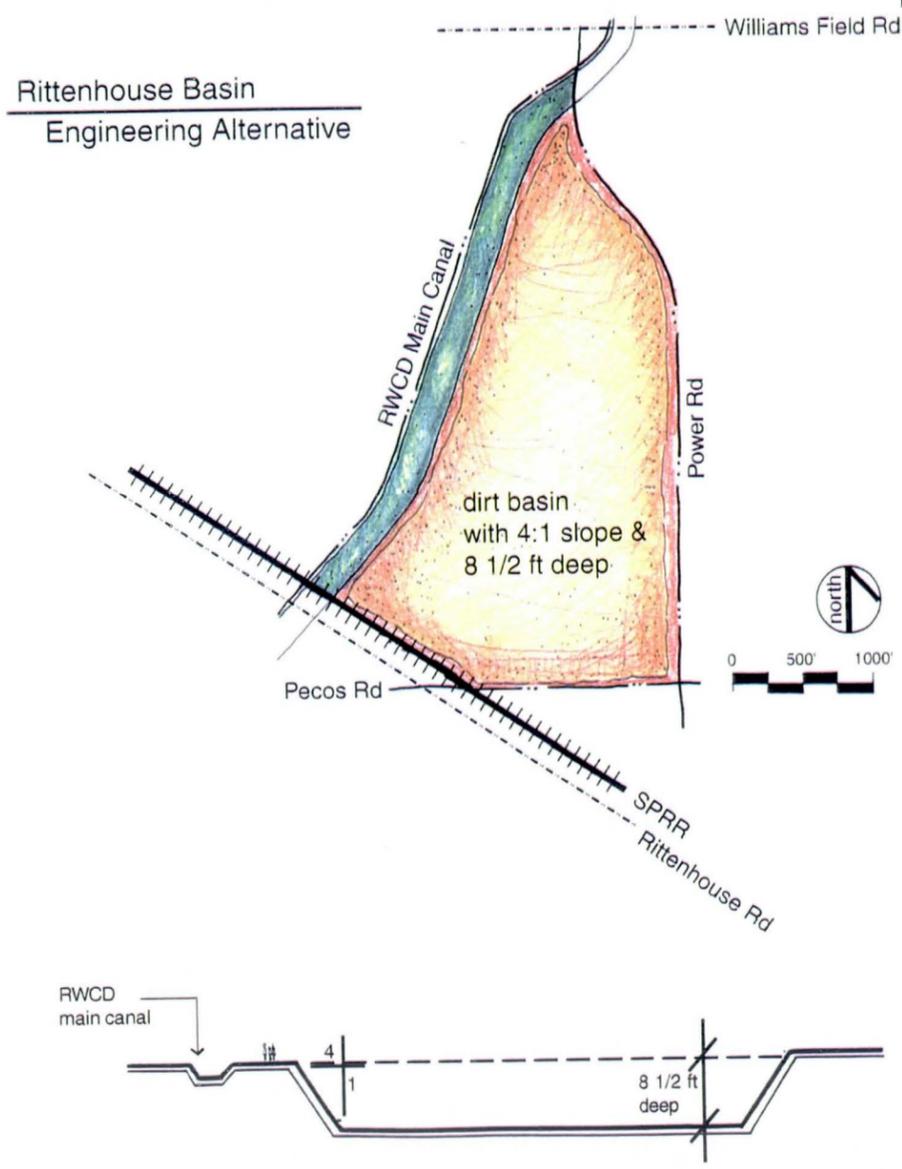


Figure 24c. Typical Basin Cross Section

passing signs would remain. Implementation of Alternative 1 would not respond to the desires, as expressed in general and community plans for open space corridors providing recreation amenities. This solution would respond to those who favor minimum expenditures of taxpayers' moneys for floodway improvements and those who do not want to have recreational users on District-administered or RWCD-administered lands.

The estimated cost of construction for Alternative 1, Flood Control with No Recreational or Multi-Use Enhancements, is \$80,951,000. Based on current budget information, the District estimates the annual cost of operation and maintenance (O&M) is \$13,000 per mile, or \$250,900 for the 19.3-mile corridor.

Alternative 1 Construction and Engineering Costs	
Item	Total
Park & Ride Facilities & Corridor Signage	\$838,000.
Channel & Corridor Improvements	\$0.
Ray Detention Basin	\$20,652,000.
Rittenhouse Detention Basin	\$11,878,000.
Chandler Heights Detention Basin	\$31,900,000.
A/E Design Fees & Contingencies	\$15,683,000.
Total Construction & Engineering Costs	\$80,951,000.

5.3.2 Alternative 2: Flood Control with Recreational Enhancement

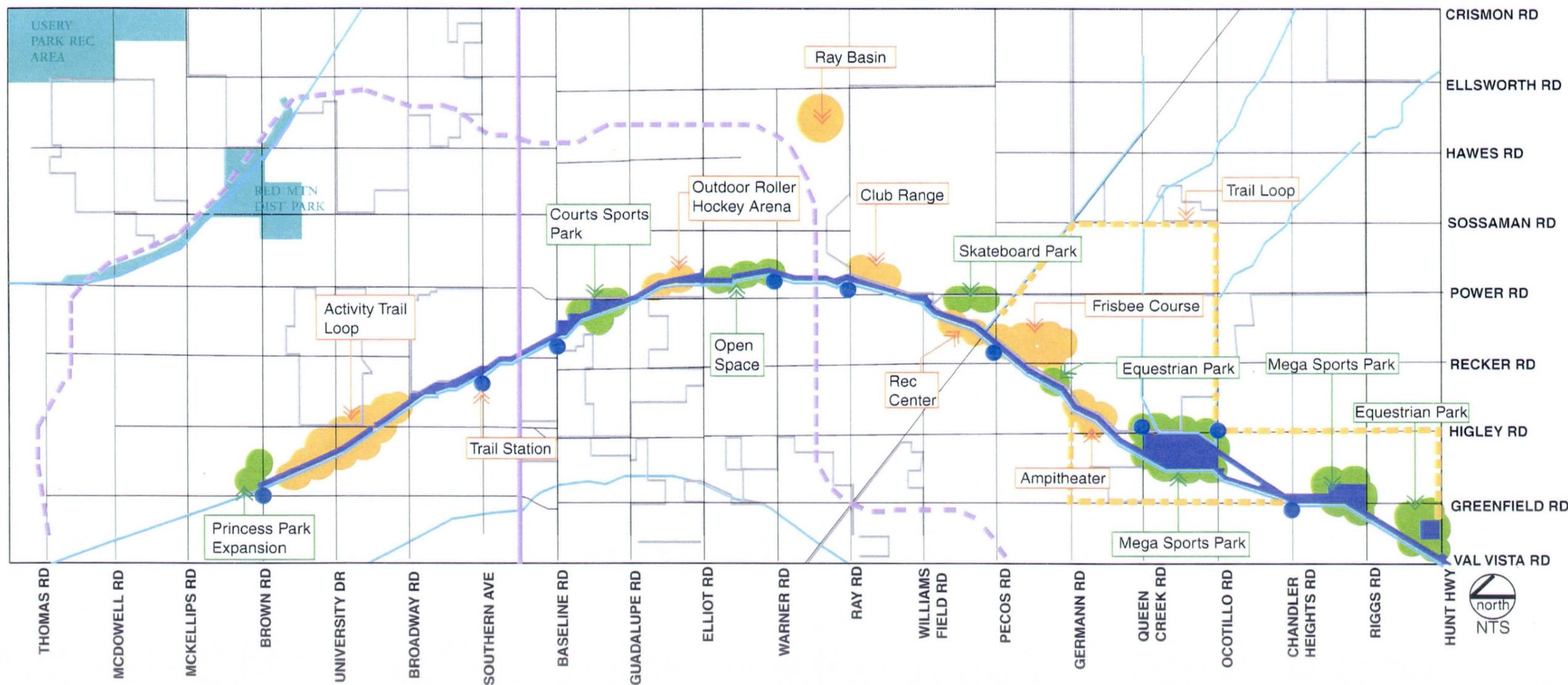
- Princess Park expansion with Trail Station and parking.
- Pedestrian and bicycle trail along RWCD main canal from Broadway to Guadalupe.
- In addition, sidewalk bypasses of Leisure World and Superstition Springs Golf Courses using Broadway to Power or Broadway-Higley-Guadalupe to Power.
- Trail Stations at Southern, Baseline, Pecos, Higley, Ocotillo and Chandler Heights Roads.
- Trail linkages to parks/schools along Brown, Baseline, Warner, Ray, Pecos and Ocotillo Roads.

- Courts Sports Parks along EMF between Baseline and Guadalupe.
- Open space along EMF between Elliot and Warner.
- Mega Sports Parks along EMF at Chandler Heights Basin and between Chandler Heights and Riggs Roads.
- Outdoor roller hockey, club range, amphitheater, frisbee course scattered along EMF.
- Equestrian loop trails from Rittenhouse Road to Hunt Highway.
- Equestrian loop trails from EMF to San Tan Mountain Preserve utilizing Sanokai and Queen Creek Washes.
- Equestrian Park at Hunt Highway.

Recreational enhancements to the EMF are a strong theme for a multi-use alternative. As part of Alternative 2, improvements with recreation in mind are the solution for the next level of development of the floodway. A variety of data collected and analyzed from this study, including general plans, open space plans, transportation plans and resource inventories, have led to the recommended uses, needs and placement within the floodway and adjacent to its corridor.

Lesser areas of development exist south of the Guadalupe Road and are therefore, prime locations to master plan for future use. The surrounding communities of this region are mostly rural and provide a greater opportunity to develop adjacent to the floodway. Combining flood control with recreational improvements would

Figure 25a. Alternative 2: Flood Control with Recreational Enhancements



create the multi-use potential of mega sports parks and flood control detention basins north of Riggs Road and north of Octotillo Road. Support from the Town of Gilbert for a major park of athletic fields in these areas motivates the placement of these particular enhancements. Special interest clubs and groups have suggested other recreational uses that are in demand yet are lacking in the East Valley. Directly adjacent to the EMF near Hunt Highway is a large horse ranch. In conjunction with this existing site, the proposed equestrian park would be logical for this area of the floodway. Equestrian trails and facilities would support the demand for equestrian trails and linkages throughout the East Valley, as well as the demand for pedestrian and bicyclist trails.

An opportunity arises for the mixed uses of the floodway as a trail network and links to the natural washes of Queen Creek and Sanoki. Linkages from the EMF,

through Queen Creek and Sanokai Washes to the San Tan Mountain Preserve, would expand connections to these nearby areas of interest. Because of the great distance of such a trail system or loop, a secondary equestrian station (Pecos/Germann area) would be logical. Overpass height restrictions at box culverts and higher population density areas in the northern portion of the EMF limit and prohibit most equestrian uses north of this secondary equestrian station.

With a wider channel area in the south portion of the EMF, activities that require land area for their recreational purposes are best suited here. A possible "frisbee golf" course or similar sports complex in the area just south of the Rittenhouse Railroad would be developed in Alternative 2. Construction of special event areas that are not already widespread throughout the valley, such as a frisbee course, a skate park, roller blading area, or club range, would be an excellent opportunity to

draw new uses to the floodway. In addition to being underdeveloped, the land areas adjacent to the Rittenhouse Railroad are at a crossroads of transportation. A proposed light-rail commuter system hub in this area would provide multi-use travel access and make this area a strong center of activity. This also is a compelling reason for a recreation center somewhere north of Pecos Road, combined with the influx of community development in the surrounding towns of Gilbert, Chandler, Queen Creek and Higley and the need for a central community center. As development of the southeast part of the valley expands, there are currently no passive recreation areas for this community.

The estimated cost of construction for Alternative 2, Flood Control with Recreational Enhancements, is \$210,133,000. At build-out, the estimated annual cost of operation and maintenance (O&M) is \$2,000,000 to \$3,000,000.

Alternative 2 Construction and Engineering Costs	
Item	Total
Park & Ride Facilities & Corridor Signage	\$838,000.
Channel & Corridor & Basins Improvements	\$72,736,000.
Ray Detention Basin	\$20,578,000.
Rittenhouse Detention Basin	\$23,183,000.
Chandler Heights Detention Basin	\$53,566,000.
A/E Design Fees & Contingencies	\$39,239,000.
Total Construction & Engineering Costs	\$210,133,000.

Figure 25b

**Chandler Heights Basin
Recreational Alternative**

- ① baseball/softball field
- ② soccer/football field
- ③ basketball/volleyball field
- ④ community garden
- ⑤ open space with pond
- ⑥ sports complex
- ⑦ picnic area with ramada
- ⑧ parking

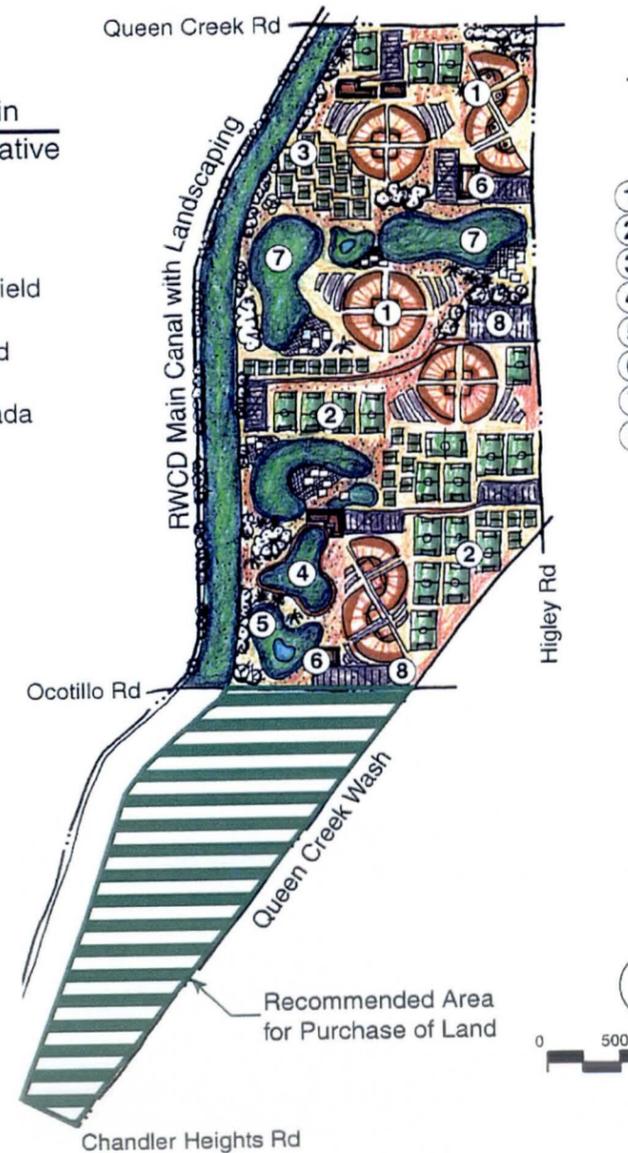
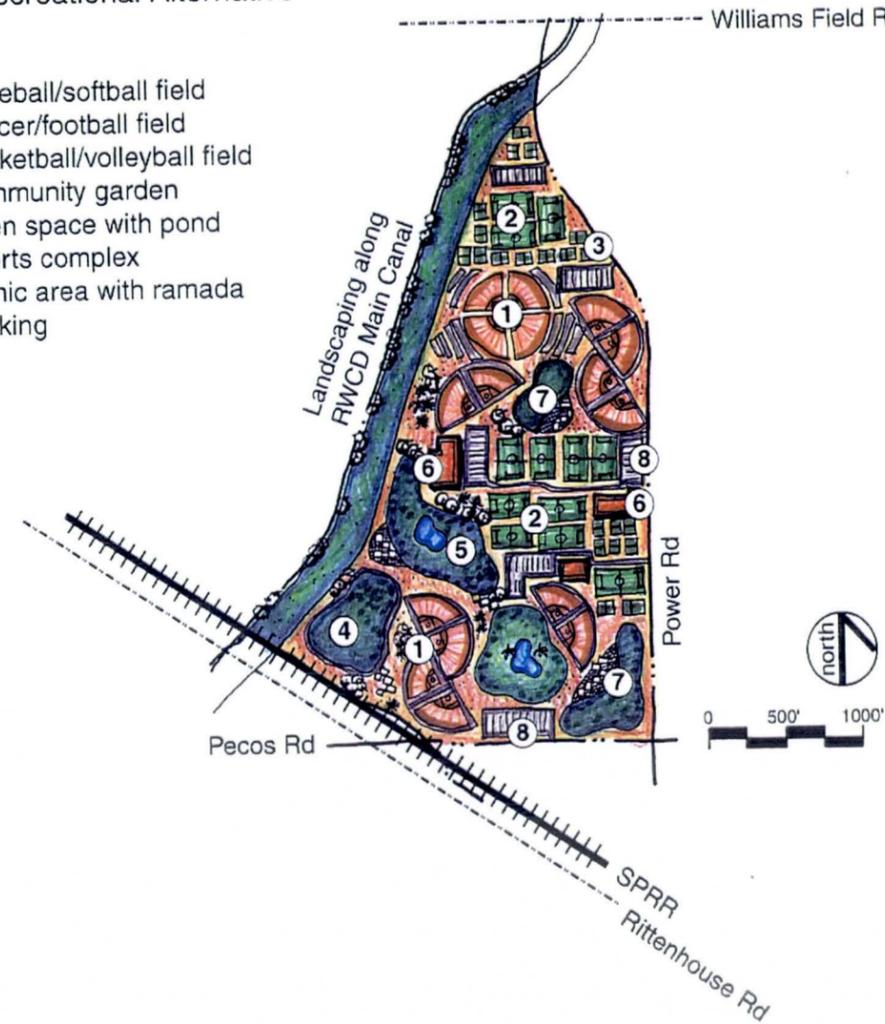


Figure 25c

**Rittenhouse Basin
Recreational Alternative**

- ① baseball/softball field
- ② soccer/football field
- ③ basketball/volleyball field
- ④ community garden
- ⑤ open space with pond
- ⑥ sports complex
- ⑦ picnic area with ramada
- ⑧ parking



An outdoor amphitheater proposed in the area near Germann Road would be an excellent choice to fill this void. Even utilizing the banks of the channel as a natural terracing for an amphitheater is a spatially economical solution. Skateboarding is ever increasing in popularity, as is roller blading. The need for these non-traditional sport sites grows as users clog the few existing facilities in the valley. The potential to develop a popular site like this adjacent to the EMF is strong in this ever expanding southeast valley area that the floodway traverses. In proximity to the transportation crossroads at recreation center, a site developed for a skate park north of Pecos road and adjacent to the many uses associated with Williams Gateway Airport is recommended. Improvements to the areas along the Airport and golf course are restricted by the narrow stretch of land associated with the floodway.

Recreation theme activities in this area would be uses that require long and narrow land-areas. Sites allocated for this area could be dedicated to activity/sport clubs to best utilize this shape, such as ball fields, target ranges, or other similar linear sports. The need for such places is apparent in the data gathered from surrounding communities showing the lack of space for these activities in the East Valley, as is the case for an outdoor roller hockey arena. Not only is hockey one of the most popular sports in the valley, but it is one that has the least amount of user sites available. And a low maintenance, outdoor roller hockey rink is far less expensive to build and operate than an indoor ice hockey rink. With other sites dedicated for recreational uses along the south part of the EMF, the in-fill along the north with its narrower spatial constraints limits the number and type of enhancements.

General large open space is a missing quality in urban areas, and it best situated in the vicinity of the floodway between Ray and Elliot Roads. Other areas also lack this type of space and are alternative locations, but a central transition site at Ray-Elliott is the logical first choice for planning. In the heavily populated areas in Mesa, recreational activity trails best fit in the high user/low development space available in or adjacent the floodway. Obstacle courses, multi-use trails, and playgrounds best describe the events for this character area. At the start, end, and major hubs along the EMF, trail stations will introduce users to the many opportunities of recreation available, creating a clear threshold or point of entry to the EMF from the surrounding communities. Under Alternative 2, recreational enhancements would supply the entire East Valley with facilities that would satisfy the needs and interests of active recreational users.



Figure 25d. Detail Meandering Streambed (Low Flow Channel)

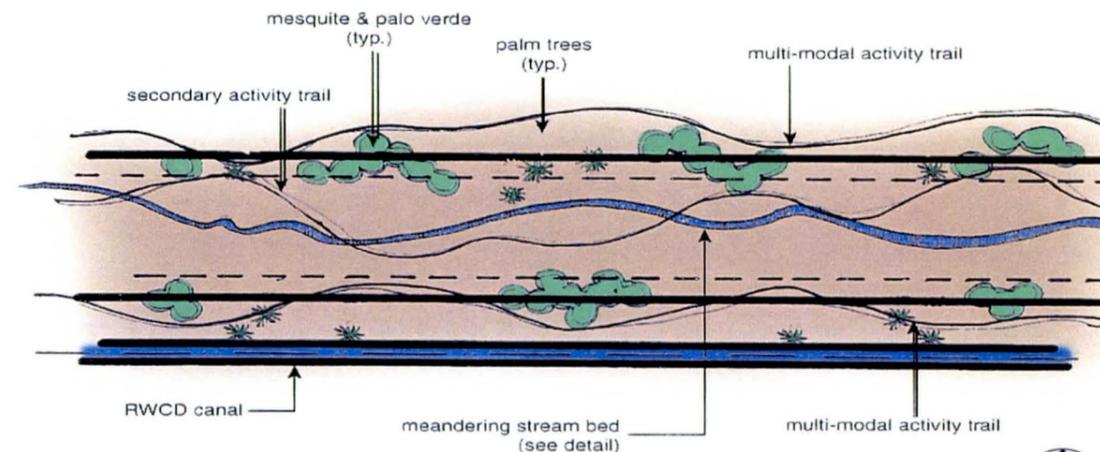


Figure 25e. Urban Area Plan Alternative

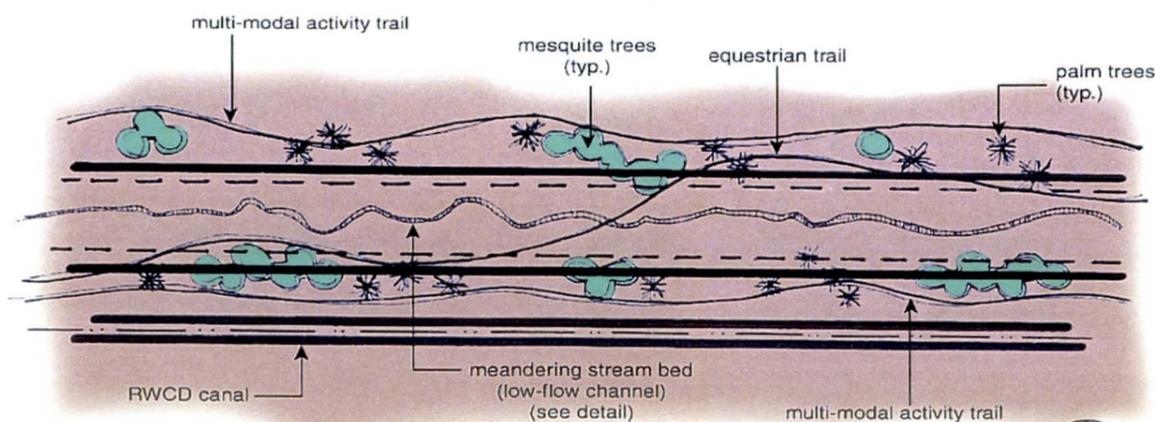


Figure 25f. Transition Area Plan Alternative

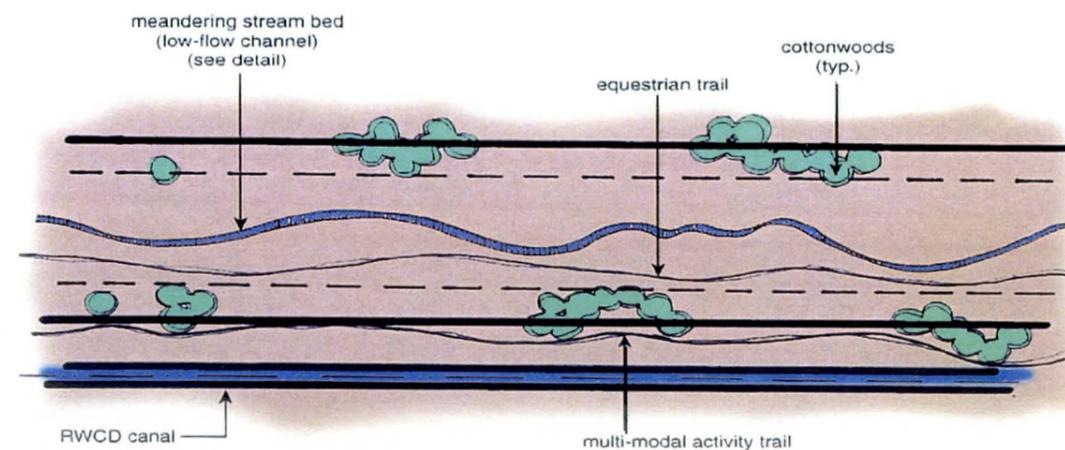


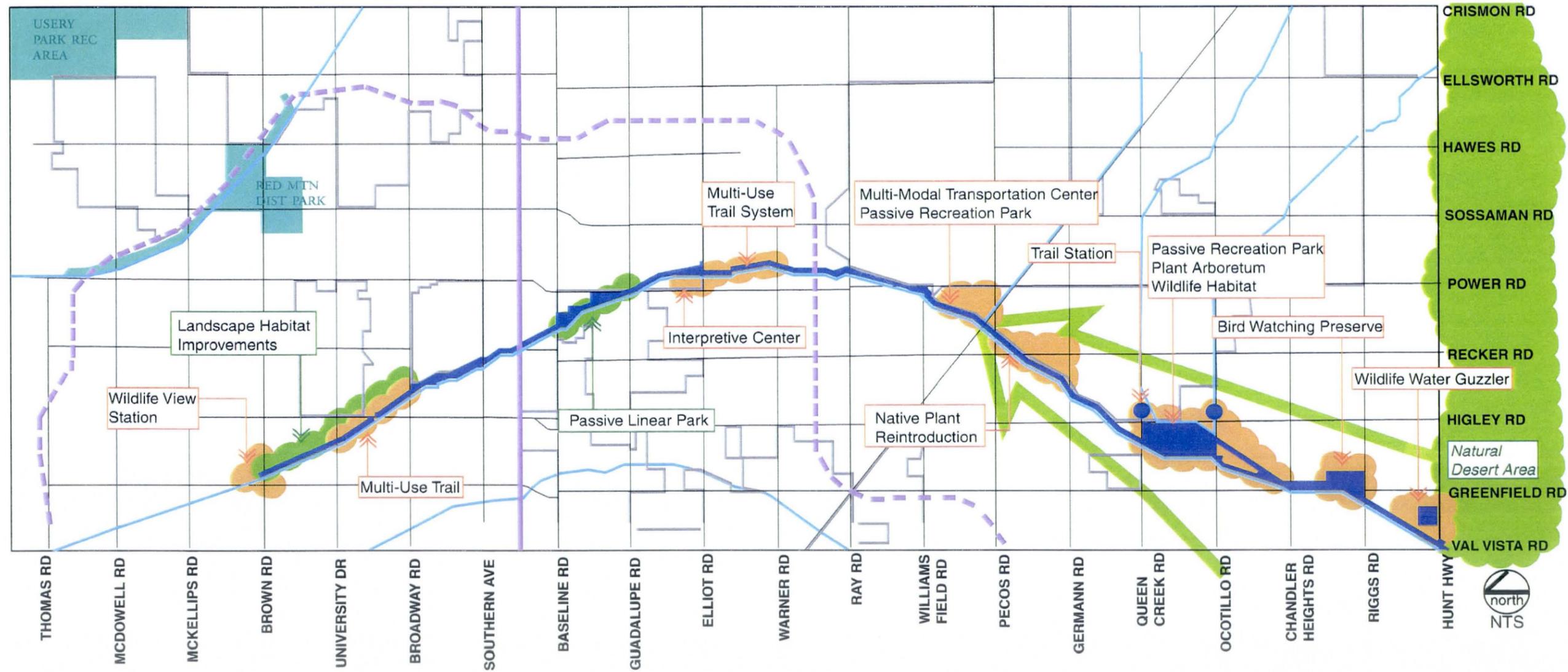
Figure 25g. Rural Area Plan Alternative



5.3.3 Alternative 3: Flood Control with Environmental Enhancement

- Wildlife viewing station at Princess Park.
- Landscape habitat improvement for wildlife between Brown and Broadway.
- Multi-use trail system between University and Broadway.
- Sidewalk bypasses of Leisure World and Superstition Springs Golf Courses, using Broadway and Power or Broadway-Higley-Guadalupe to Power.
- Trail linkages to parks/schools along Brown, Baseline, Warner, Ray, Pecos and Ocotillo Roads.
- Passive linear park between Baseline and Guadalupe.
- Interpretive Center at Elliot Road and the EMF.
- Multi-use trail system between Elliot and Ray Roads.
- Multi-modal transportation center and passive recreation park at Rittenhouse Basin.
- Native plant reintroduction between Rittenhouse Road and Hunt Highway, with passive recreation park, plant arboretum, community gardens for nearby residential areas, and wildlife habitat at Chandler Heights Basin.
- Native plant reintroduction from EMF to San Tan Mountain Preserve utilizing Sanokai and Queen Creek Washes.
- Trail Stations and wildlife habitat restoration at Higley and Queen Creek Roads.
- Bird watching-preserve at Riggs Road Basin.
- Wildlife water guzzler at Hunt Highway Basin.
- Groundwater recharge facilities at selected locations along EMF, either constructed or managed facilities.

Figure 26a. Alternative 3: Flood Control with Environmental Enhancements

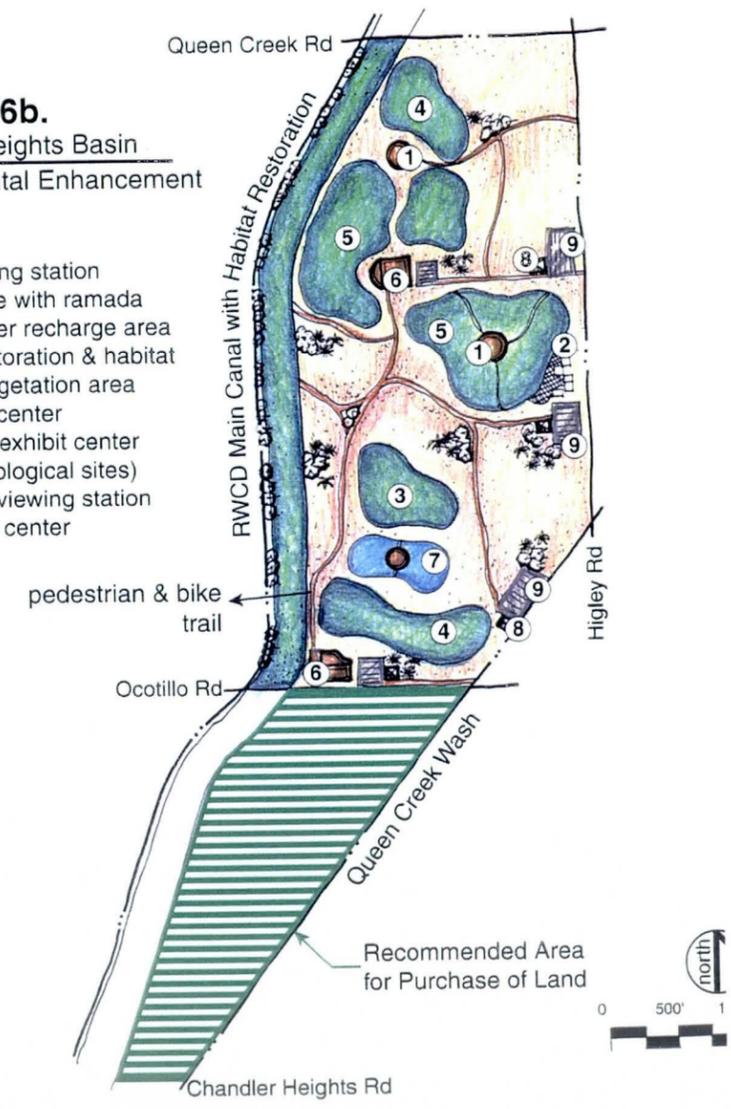


A theme of environmental enhancement to accompany flood control is the definition of Alternative 3. In areas of retention/detention basins, a mixed use of flood control with wildlife habitat, educational opportunities, or passive recreation is proposed. Situated at large land areas available for water storage, such as the potential basin north of Riggs Road, a dual use as a bird watching preserve would mesh in conjunction with the size of the land parcel. Its location would be appealing to migratory and residential bird species as an out of the way habitat.

The larger potential basin north of Ocotillo Road allows for many uses within that area because of its size. A wildlife habitat in lowland areas with an informational trail to include a plant arboretum and open spaces for passive recreation use is a more environmentally sensitive alternative to an exclusive engineered-basin. A linked corridor to a potential basin site north of Hunt Highway would end in a mixed use of that site for a wildlife water guzzler, or permanent watering hole for wildlife. This would increase watchable wildlife for recreationists.

Figure 26b.
Chandler Heights Basin
Environmental Enhancement
Alternative

- ① bird watching station
- ② open space with ramada
- ③ groundwater recharge area
- ④ wildlife restoration & habitat
- ⑤ riparian vegetation area
- ⑥ education center (museum/ exhibit center for archaeological sites)
- ⑦ pond with viewing station
- ⑧ bike rental center
- ⑨ parking



The existing natural desert ecosystem at the Gila River Indian Community also would be reintroduced into the floodway. Native plant revegetation would meld from approximately Pecos Road in a smooth transition to the naturalized habitat south of Hunt Highway.

At the confluence of the re-naturalized washes of Queen Creek and Sanoki, wildlife trail stations would provide nodes for interest and rest areas for nature trails linking the EMF to the San Tan Mountain Preserve and beyond.

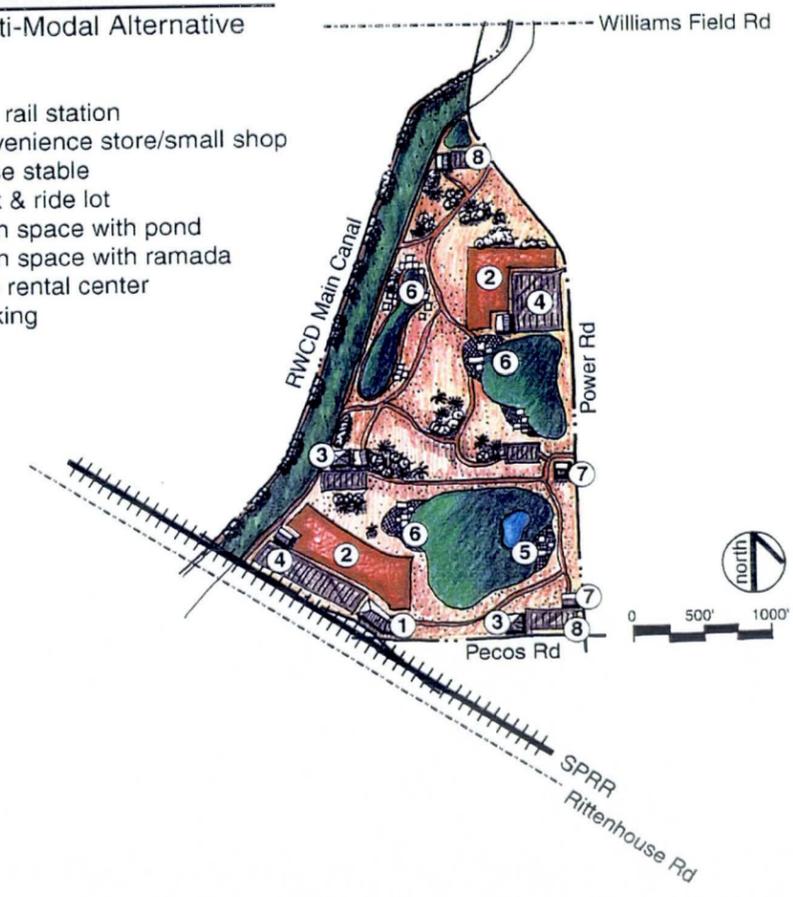
Adjacent to the Rittenhouse Railroad would be area available for a passive recreation park and multi-modal transportation center. This area also has a man-made wash (Rittenhouse Wash) flowing at this point into the EMF.

North of the crossing of the proposed San Tan freeway is an opportunity to provide an alternative to an engineered geometric floodway. As a current transitional area from urban development to the rural landscape, a site amenity that is more urban in character would be most practical.

An interpretive center around Elliot Road will draw interest to the floodway from neighboring residential communities. Linking to this area would be a multi-use trail

Figure 26c.
Rittenhouse Basin
Multi-Modal Alternative

- ① light rail station
- ② convenience store/small shop
- ③ horse stable
- ④ park & ride lot
- ⑤ open space with pond
- ⑥ open space with ramada
- ⑦ bike rental center
- ⑧ parking



system to create interactivity from the center to the naturalized landscaping along the floodway. With the EMF becoming more urban in the northern portion, urban development projects would be more conducive with the surrounding environment.

Because of floodway width and land ownership constraints, a passive linear park adjacent to RWCD is appropriate in the area from Guadalupe Road to Baseline Road. This greenbelt would provide tranquil areas within the floodway for open space. The constraints of the Superstion Golf Course and Leisure World residential community do not allow connection to floodway development until Broadway Road. A multi-use trail for events such as biking, jogging, roller-blading, skate boarding, walking, and floodway hiking could link the sites or make connections along alternate routes and blossom into improved habitat areas similar to the existing site conditions, but with more extensive plantings.

The origin point at Princess Park would include redevelopment of the park and expansion as a wildlife/environmental station center. All of these improvements maintain the environmental enhancement theme that provides passive recreation, educational opportunities, and naturalized habitat areas throughout the entire floodway as Alternative 3.

The estimated cost of construction for Alternative 3, Flood Control with Environmental and Multi-Modal Enhancements, is \$200,263,000. At build-out, the estimated annual cost of operation and maintenance (O&M) is \$2,000,000 to \$2,750,000.

Alternative 3 Construction and Engineering Costs	
Item	Total
Park & Ride Facilities & Corridor Signage	\$838,000.
Channel & Corridor & Basins Improvements	\$53,878,000.
Ray Detention Basin	\$20,578,000.
Rittenhouse Detention Basin	\$30,365,000.
Chandler Heights Detention Basin	\$58,056,000.
A/E Design Fees & Contingencies	\$37,386,000.
Total Construction & Engineering Costs	\$200,263,000.

6.0 Recommended Plan

6.1 Purpose of Preferred Alternative

The purpose of the Preferred Alternative is to maximize multi-use opportunities and minimize constraints along the length of the East Maricopa Floodway corridor. Further, the Preferred Alternative is to provide a multi-jurisdictional concept for development of possible recreational, educational, environmental and quality of life enhancements to an existing flood control facility corridor. The vision for these enhancements is to promote public use of public lands utilized for flood control when the flood control facility is not needed to convey storm flows.

Opportunities within the corridor that were identified included:

- Potential for new linear trails and linkages to other existing trails.
- Potential for fixed recreational facilities.
- Potential for managed and/or basin groundwater recharge facilities
- Potential for educational enhancements.
- Potential for environmental and/or habitat enhancements.
- Potential for multi-modal centers and park and ride sites.
- Opportunity to promote the corridor as an enhancement to the surrounding community, providing increased quality of life and open space.

Limitations within the corridor that were identified included:

- Limitations for trail access through developed areas, particularly the master planned Leisure World retirement community and the commercial operations at Superstition Golf Course.
- Limitations for connection of the Superstition-Santan Corridor trail north to the Salt River Project Canals and Salt River Recreation Area via the Roosevelt Water Conservation District Canal system.
- Limitations to development of environmental and habitat enhancements in the vicinity of Williams Gateway Airport and Falcon Field due to FAA bird strike issues.
- Competition for local, and regional funds for construction of multi-use facilities.

The preferred alternative sought to combine the opportunities noted to provide an enhanced multi-use corridor while recognizing the limitations within the corridor for a change in use by the public.

6.1.1 Development of Preferred Alternative

Figure 27 (on following page) depicts the preferred alternative as recommended by the Project Steering Committee and as reviewed by the public during a July 5, 2000 Open House.

6.1.2 Description of Preferred Alternative

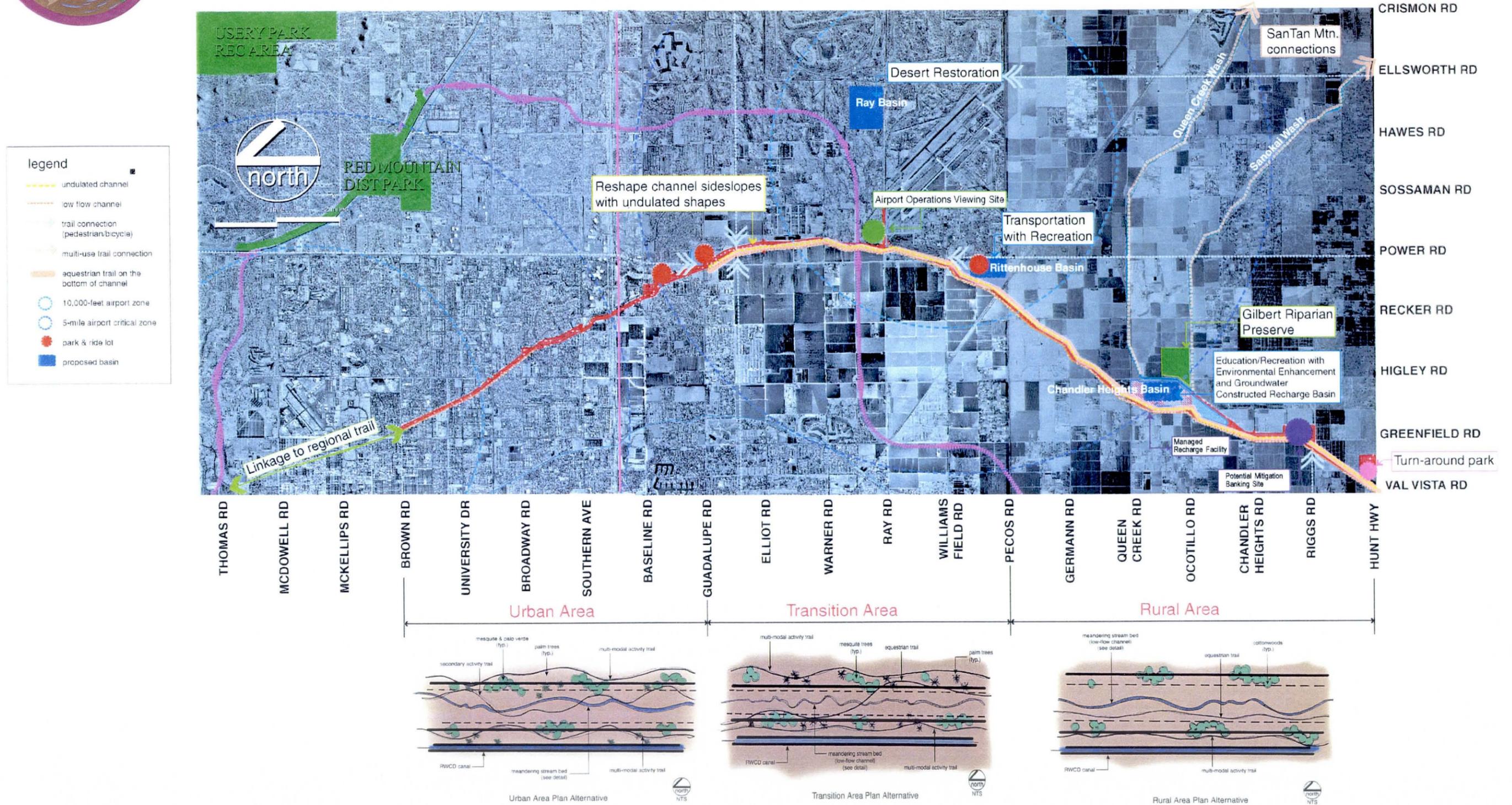
Listed below are the major elements of the preferred alternative. Descriptions of recommended plan elements start at the northern terminus of the Floodway and proceed south.

- The Superstition-SanTan Corridor and Marathon Trail would be extended north from Princess Park to the County Trail at the Salt River in order to provide a regional trail connection.
- From Brown to Guadalupe Road, crosswalks would be painted at each surface street as it intersects the SanTan Corridor trails where existing box culverts are not sufficiently tall enough for pedestrians, bicyclists or equestrians. As needed, traffic signals would be installed at these crosswalks to ease conflicts with vehicular traffic.
- A low flow meandering channel would be created in the flat bottom of the floodway to contain small storm flows, provide an opportunity for water-based recreation and for possible use as a groundwater recharge facility.
- An equestrian trail would be provided within the channel bottom, parallel to the meandering low flow channel. The equestrian trail would begin at Guadalupe Road and terminate at the Maricopa/Pinal County Boundary at Hunt Highway. The equestrian trail would utilize Queen Creek and Sanokai Washes as linkages to the SanTan Mountain Regional Park.
- Three new basins would be constructed: Ray, Rittenhouse and Chandler Heights.
- There would be bicycle rest stops, water fountains, horse stables, water troughs and possible concessions at two new basins along the floodway at Rittenhouse and Chandler Heights.
- Floodway side slopes would be undulated to break up the engineered look of the trapezoidal cross-section where possible.
- Earth mounds would be constructed sufficient for scenic viewing, over rooftops of yet-to-be-built subdivisions, from the floodway to background mountains.
- A hard surface trail for hiking and biking would be provided on the west bank of the floodway.
- A soft surface trail would be provided for hiking and mountain biking along the east bank of the floodway. The soft-surface trail would allow surface flows, from the east flowing west into the floodway, to cross the trail and enter the floodway with minimal disruption and minimal cost to repair after flooding.
- Park and Ride facilities would be located at Baseline Road and at Guadalupe Road to allow pedestrians and bicyclists to use the SanTan Corridor and meet with car pools or mass transit facilities connecting to the existing Superstition Freeway and the proposed Santan Freeway.
- The SanTan Corridor pedestrian/bicycle trail would be connected to the proposed trail along the existing power line corridor between Guadalupe and Elliot Road.
- The Ray Basin would be constructed to capture floodwaters from the SanTan Freeway and Powerline Floodway. The basin would be utilized as a desert restoration site without standing water to minimize any adverse affect on Williams Gateway Airport activities.
- An aircraft-viewing site would be located on the northeast corner of Ray Road to encourage public involvement and enjoyment in Williams Gateway Airport operations and special events.
- The Rittenhouse Basin would be constructed for flood water detention, with a strong recreational use theme, including multi-modal transportation and recreational enhancements, a Park and Ride lot, a bike rest stop, a possible light rail station, equestrian center, horse stables, soccer and ballfields.
- The Chandler Heights Basin would be constructed for flood water detention, enhanced with a strong recreational theme as a multi-use facility with active recreational enhancements, including a Regional Park, and wildlife habitat restoration and riparian preserve. Active recreational facilities would include soccer and baseball fields and open spaces. An environmental and education enhancement theme would be incorporated with Gilbert Riparian Preserve Plan, which proposes 8 groundwater recharge ponds, and a recreational lake that allows fishing and boating.
- Bicycle trails associated with Maricopa County Department of Transportation Roads of Regional Significance specifically Riggs Road, Ellsworth Road, and Power Road would be connected to the Superstition-SanTan Corridor and Marathon Trail, creating a regional trails system for the east valley.
- A mitigation-banking site/environmental habitat site would be located on the northeast side of Riggs Road to provide for potentially necessary replacement of habitat disturbed by flood control facilities within the area.
- Ground water recharge facilities could be provided both within the meandering low flow channel of the floodway as well as in the Rittenhouse Basin and the Chandler Heights Basin to provide east valley cities and agencies sites for possible recharge of groundwater.
- A Turn-Around Park at Hunt Highway would provide a final destination and scenic view of the Santan Mountains for corridor users.



SUPERSTITION-SANTAN CORRIDOR and Marathon Trail

Figure 27a. Preferred Alternative: Flood Control with Multi-Use Enhancements



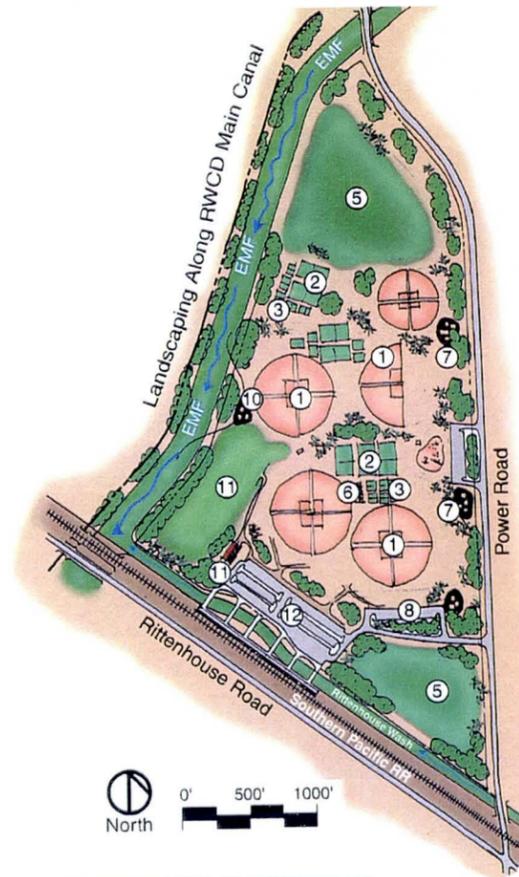
6.2 Implementation Plan

From a national perspective, States, Counties and Municipalities are implementing plans for recreational and multi-use trails. There are many Federal and State programs (ISTEA, TEA-21, Rails-to-Trails, etc.) designed to increase open space in urban areas, preserve the natural character of landscapes and improve or restore natural environments. Historically, Maricopa County has been a leader in designating areas within urban areas for preservation of open space and for enhancement of recreation and multi-uses. This recommended plan continues the tradition of Maricopa County as a leader in open space planning.

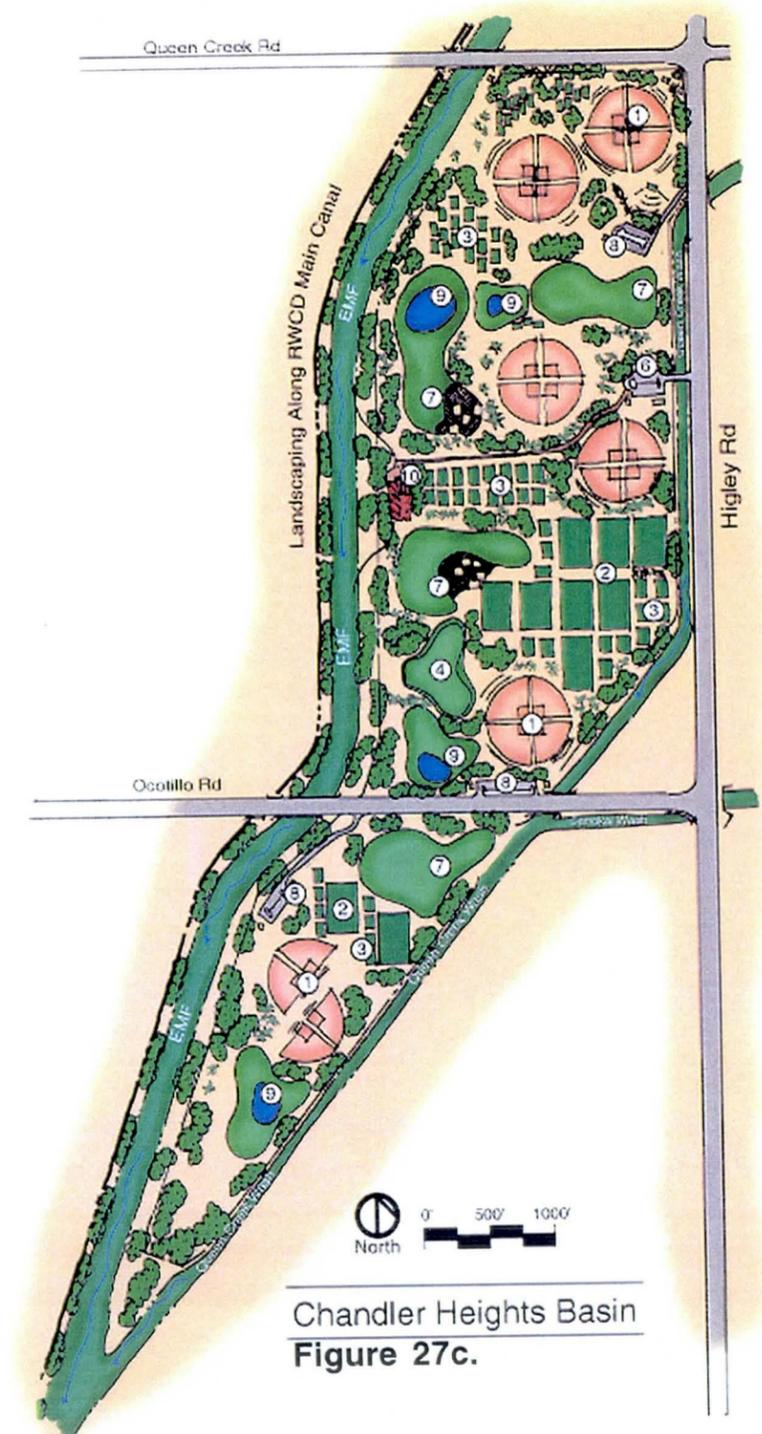
Maricopa County Trail Commission

County policy already supports implementation of the Recommended Plan for the Superstition-SanTan Corridor and Marathon Trail. On February 21, 2000 the Board of Supervisors announced the formation of the Maricopa County Trail Commission and their plans to form a Regional Trail System. The goal of the program is to connect the County park system, link recreational corridors around the Valley and help preserve open space in the community. The project will capitalize on existing right-of-ways such as canals, parks, utility corridors and flood control projects.

The County Trail Commission has visited the project site and has indicated that the East Maricopa Floodway is a high priority first element for construction of a Countywide Trail System. The Trail Commission is expected to endorse the Recommended Plan. The District will continue to coordinate with the County Trail Commission for further implementation of the preferred alternative.



Rittenhouse Basin
Figure 27b.



Chandler Heights Basin
Figure 27c.

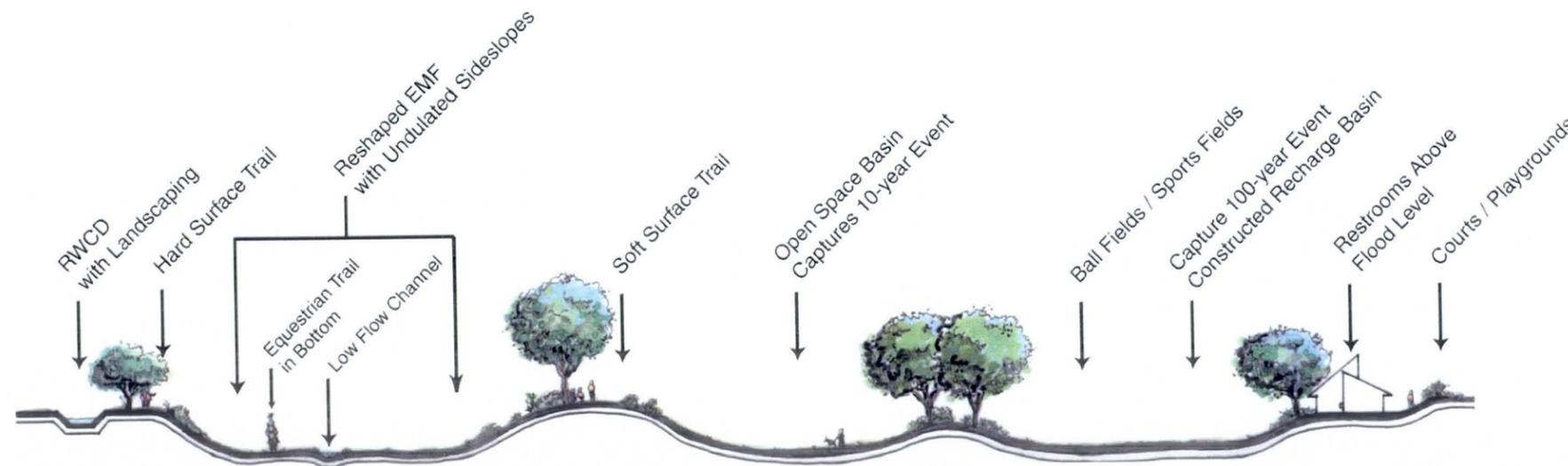


Figure 27d. Typical Section Through EMF and Basin

6.2.1 Marketing Plan

Flood Control District

The District is the lead agency for the inception of the vision for this project. With this plan, the District recognizes the opportunity to look beyond engineered design solutions for flood control and to include recreation, redevelopment and environmental restoration outside the floodway and in adjacent communities and neighborhoods.

Although lands of the East Maricopa Floodway are publicly owned and the District has jurisdiction and responsibility for the EMF, the plan for the multi-use Superstition-SanTan Corridor and Marathon Trail depends on the District developing a regional vision, in concert with East Valley communities and stakeholders, for the recreational and multi-use potential of the EMF. Implementation of the Recommended Plan requires marketing the District's regional vision for the Superstition-SanTan Corridor and Marathon Trail.

Partnerships

The underlying assumption of marketing is that people who live, work and play within the East Valley need to be involved in the development of plans for corridor land uses, environmental restoration and recreational amenities. Their participation and recommendations will be the foundation for lasting relationships and partnerships for the cities and towns along the corridor.

Target Market

The Target Market for implementation of this master plan are those who need to be brought into the concept to influence development of the multi-use aspects. The key question will be how to keep potentially interested parties involved in development of the corridor over the long term. Interested parties (stakeholders) might include:

- Outdoorsman Organizations
- Runner/Hiker Organizations
- Biking Organizations
- Schools/Educational Institutions
- Local and Regional Development Entities
- Civic Groups
- Environmental Agencies
- County Agencies
- Corporate Entities
- Local, State and Federal Governments to include specifically Parks, Public Works, Public Involvement functional area.

Key Success Factors

Project development, in this case implementation of the features of the Superstition-Santan Corridor Preferred Alternative, requires recognition of those factors that are critical to the success of the project. For the preferred alternative the key success factors include:

- A start small, build momentum philosophy

- Corporate sponsorships
- Municipal sponsorships
- Investment and acknowledgement by the community of the need to support open space and recreational enhancements and access to public facilities
- Involvement of schools, and civic groups
- Strong leadership through a civic leader supportive of the concept
- Ability to maintain and sustain features after they are built
- Strong endorsements from the local and regional political structure
- Strong initial pursuit of funding
- Widespread usage by the public
- Recognition of security and maintenance needs and issues
- Acceptance of potentially increased liability to the landholder
- Dialogue between environmental and development-interests to foster and build community consensus
- Identification and modification, as necessary, of a phasing plan in order to take advantage of unique, unplanned opportunities for implementation
- Public participation in the development of the concepts
- Maximized media focus to spread the concept to the largest audience possible focusing on the human-interest aspects of the plan

6.2.1.1 Marketing Alternatives

In the short-term, work on this corridor study will be marketed most extensively in the East Valley. Promotion of the recommended plan concepts will be the impetus for long-term marketing and eventual phased construction of the preferred alternative. The first phase of development will include reconstruction of the floodway, construction of basins, construction of recreation areas such as ballfields and playgrounds, construction of water recharge projects, and development of the trails systems and their amenities. Short-term alternatives applicable to the first year may include:

- Placement of corporate sponsored mile markers
- Sponsored equestrian rides
- School Environmental Education Opportunities
- Adopt-A-Trail
- Adopt-A-Tree
- Adopt-A-Brick
- Sponsored events such as 5K, 10K and Marathons
- Sponsored Walk-A-Thons

As the Superstition SanTan Corridor begins to take shape, long-term marketing will be needed to maintain and increase interest and involvement of different people, agencies, municipalities and sponsors. This long-term effort beyond the five-year time frame should include:

- Sports League Play

- Corporate Adopt-A-Trail
- County/State/Federal Improvements

Conclusion

An effective marketing and public information plan for the Superstition SanTan Corridor must be both a record of the shared regional vision and a blueprint for future action. The marketing and public involvement techniques and activities described herein offer a "menu" of ideas. However, because any good public planning process must be creative and responsive to new ideas from community members, the Recommended Plan should be a flexible guide, not a prescribed plan of action.

6.2.2 Funding Sources

A variety of funding sources may be available to implement the different phases of this project. The funding sources listed include resources for waterway corridor enhancement, as well as for environmental education, recycling, alternative modes of transportation and sustainable development. There is the potential to incorporate many facets into any project; for example, a trailhead may include an educational/interpretive center and recycling bins. The following list may foster concepts and elements to include in projects. The list provides contacts so that communities may follow-up on those resources that best fit their needs.

After each funding description there is a note describing the potential opportunities provided by the funding source for various types of projects. This is not an exhaustive listing of types of projects that may qualify for funding but this can provide direction for agencies as they begin developing strategies for finding mechanisms to finance their projects.

Suggested funding sources may include the following:

Conservation and Reinvestment Act (CARA)

The act, funded by Congress on yearly basis, allocates money to States under seven funding categories: Land and Water Conservation Fund projects; Wildlife Conservation; Urban Parks and Recreation Program; Historic Preservation; Indian and Federal Lands Restoration; Farmland Protection Program and Endangered and Threatened Species Recovery. The states make the funds available as grants to local governments.

Contact: Dawn Coomer, Maricopa Association of Governments (MAG)
Address: 302 North 1st Avenue Saguardo Room, 2nd Floor, Phoenix, AZ 85003
Phone: (602) 264-6300

*Opportunity for Flood Control District (District) and municipalities to develop multi-use and multi-modal trails throughout corridor.

Arizona Game and Fish Teaming with Wildlife Program

Funding received through the Federal Conservation and Reinvestment Act (CARA) can be distributed to projects throughout the State for Wildlife Conservation, Outdoor Education and Recreation.

Contact: Tim Wade, Habitat Evaluation Specialist, Arizona Game and Fish Department
Address: 7200 E. University, Mesa, AZ 85207
Phone: (480) 981-9400

*Opportunity for the District and municipalities to work with state agencies to develop environmental educational and multi-use facilities.

Arizona Growing Smarter Grant Program

Supports the acquisition of State Trust Lands for conservation of open spaces in or near urban areas and other areas of experiencing high growth pressures. Funds are available to state agencies, counties, municipalities, and non-profit organizations.

Contact: Jason Hall, Arizona State Parks
Address: 1300 W. Washington, Phoenix, AZ 85007
Phone: (602) 542-7126; Fax: (602) 542-4180

Arizona Heritage Fund (AHF) Trails

Supports non-motorized trail acquisition, construction, and improvement throughout Arizona. Qualified applicants include municipalities, counties, state agencies, and federal agencies.

Contact: Steve Laurent, Arizona State Parks
Address: 1300 W. Washington, Phoenix, AZ 85007
<http://www.pr.state.az.us/partnerships/grants/grantdesc.html>

The Design Arts Program

The Design Arts Program of the National Endowment for the Arts funds projects that promote excellence in urban design, historic preservation, planning, architecture, and landscape planning.

Contact: Room 625, Nancy Hanks Center

American Greenways Eastman Kodak Grant Program

The program encourages action-oriented greenway projects. Keys to determining which projects will receive grants are the importance of the project to local greenway development efforts, how likely the project is to produce tangible results, and the extent to which the grant results in matching funds from other sources. The program's grant amounts range between \$500 to \$2,500.

Contact: The Conservation Fund
Address: 1800 N. Kent Street, Suite 1120 Arlington, VA 22209
Phone: (703) 525-6300; Fax: (703) 525-4610

*Opportunity for a small grant program for municipalities for the development of multi-use trails and associated amenities.

Arizona Department of Environmental Quality (ADEQ) Recycling Unit

The Waste Reduction Initiative Through Education (WRITE) grants are for recycling education and Waste Reduction Assistance (WRA) grants are for recycling projects.

Contact: ADEQ, Recycling Unit
Address: 3003 N. Central Ave., Phoenix, AZ 85012
Phone: (602) 207-4171

*Opportunity for the District and municipalities to include a recycling educational component, recycled products and recycling equipment in their trails facilities development.

Arizona Game and Fish Department Heritage Fund Grants

The Urban Wildlife Habitat component of the fund supports the establishment of wildlife habitat/populations in harmony with urban environments and promotes public awareness of Arizona's native wildlife.

Contact: Tim Wade, Habitat Evaluation Specialist, Arizona Game and Fish Department
Address: 7200 E. University, Mesa, AZ 85207
Phone: (480) 981-9400

*Opportunity for the Flood Control District and municipalities for wildlife habitat restoration and enhancement in the urban portions of the study area, and for a public awareness program.

Arizona Heritage Fund (AHF) Historic Preservation

Supports historic preservation efforts, including rehabilitation of historic properties and preservation education. Qualified applicants may be incorporated municipalities, counties, state agencies, and non-profit institutions.

Contact: Steve Laurent, Arizona State Parks
Address: 1300 W. Washington, Phoenix, AZ 85007
Phone: (602) 542-7127
Website: <http://www.pr.state.az.us/partnerships/grants/grantdesc.html>

*Opportunity for the Flood Control District and municipalities to team with non-profit organizations for historic preservation efforts along the river corridors.

Arizona Water Protection Fund

Provides moneys for the development and implementation of measures to protect water of sufficient quality and quantity to maintain, enhance, and restore rivers and streams and associated riparian resources.

Contact: Steve Laurent, Arizona State Parks
Address: 1300 W. Washington, Phoenix, AZ 85007
Phone: (602) 542-7127

*Opportunity for municipalities for river and riparian area enhancement and restoration projects.

The Body Shop USA Foundation, Inc.

This foundation makes grants to organizations that serve and preserve the environment through education or direct service. Applicants may be educational institutions and non-profit organizations.

Contact: Wendy Alachendro, The Body Shop USA Foundation, Inc.
Address: 5036 One World Way, Wake Forest, North Carolina 27587
Phone: (919) 554-4900

*Opportunity for municipalities to partner with non-profit organizations to develop an environmental education component in their river trails development.

Community Facility Districts

Community Facility Districts, CFDs, which may only be formed within municipal boundaries by a sponsoring municipality, may be used to provide for the acquisition, construction, operation and maintenance of a wide variety of public infrastructure, including open space areas for recreational purposes. There are two ways to form a CFD: by majority vote of landowners at a special election or by a petition signed by all landowners in the proposed District.

Contact: Individual Municipalities

*Opportunity for municipalities for the development of recreational open spaces along the river corridors.

Development Fees

Counties and cities may impose development fees on landowners in a "benefit area" to pay for a proportionate share of the public facilities required to serve a development. The county development fee statute defines public facilities to include only neighborhood parks intended to serve development within a one – half mile radius, but excludes regional parks; the statute applicable to municipalities allows development fees to be assessed for "necessary public services," which has been interpreted to include parks and open areas. There must be a reasonable relationship between the cost of the public facilities for which the development fee is assessed and the service demands of the benefit area. The development fees assessed must not exceed a proportionate share of the costs incurred or to be incurred in providing a public facility. Also, development fees must be used and expended for the benefit area that pays the development fee.

Contact: Individual Municipalities or Maricopa County
 *Isabel McDougall, Community Development, Maricopa County
 Address: 3003 N. Central, #1040, Phoenix, AZ 85012
 Phone: (602) 240-2210

*Opportunities for the county and municipalities to develop parks as development occurs along the river corridors.

The Educational Foundation of America

The foundation supports smaller, more grass roots organization and projects with sustainability, replicability, and potential for long-term environment impact. Interests include: energy efficiency and conservation, environmental education, alternatives to nuclear energy, sustainable agriculture, water quality issues, and public land resources conservation. The foundation encourages educational institutions, non-profit organizations, public agencies, and research institutions to apply. Grant amounts will range between \$10,000 to \$200,000.

Contact: Diane Allison, Executive Director, Educational Foundation of America
 Address: 35 Church Lane, Westport, Connecticut 06880-3515
 Phone: (203) 236-6498

*Opportunity for public agencies to partner with non-profit organizations to develop environmental education components as part of their trails, riparian enhancement and recharge projects.

The Energy Foundation

The Energy Foundation will support regional transportation reform through analysis, policy research, regulatory work, and advocacy. The foundation will explore policy options that promote alternatives to increase single occupancy vehicle use and to new highway construction. The foundation will also support analysis and advocacy to promote increased vehicle fuel efficiency.

Contact: The Energy Foundation
 Address: Presidio Building 1012, 2nd Floor, Torney Ave., P.O Box 29905
 San Francisco, CA 94129-0905
 Phone: (415) 561-6700; Fax: (415) 561-6709
 Website: <http://www.ef.org/grants/transport/index.html>

*Opportunity for the county and municipalities for multi-modal, alternative transportation planning.

Environmental Protection Agency (EPA) Clean Water Revolving Fund

Low-interest loan program established by the federal Clean Water Act to make money available to local agencies for a wide range of water quality improvement projects. Applicants may be public entities, special for construction of treatment facilities. Public and private entities are eligible for implementation of non-point source control projects, and for estuary protection plans.

Contact: Juanita Licata, Water Division, EPA
 Phone: (415) 744-1948

*Opportunity for the District and municipalities for the development of non-profit source control projects within the river corridors for the treatment of water that enters the river systems.

EPA Climate Change Action Plan

This grant program funds proposals focusing on source reduction, recycling and composting. Emphasis is placed on measurability of projects, in terms of volumes of waste reduced to be translated into greenhouse gas reductions. Eligible applicants may be states, tribes, incorporated non-profits, and universities. Past award amounts range from \$50,000 to \$250,000.

Contact: Jessica Gaylord, Waste Management Division, EPA
 Phone: (415) 744-2122

*Opportunity for municipalities to partner with non-profit organizations to develop recycling programs as part of their river corridor planning.

EPA State Environmental Education Fund

The EPA supports projects which, design, demonstrate or disseminate environmental education practices, methods, or techniques. Applicants may be educational institutions, public agencies, and nonprofit organizations. Most awards are for \$5,000 and at times up to \$25,000.

Contact: Stacey Benfer, Office of External Affairs, EPA
 Phone: (415) 744-1161

*Opportunity for public agencies to develop an environmental education component as part of their multi-use trails and recharge basin development.

EPA State Wetlands Protection Grants

Assists state and tribal wetlands protection efforts. Funds can be used to develop new wetlands protection programs or refine existing protection programs. Eligible applicants may be state and tribal agencies, but this has been expanded for local projects to include local governments, conservation Districts, non-profits and others.

Contact: Mary Butterwick, EPA
 Phone: (415) 744-1985

*Opportunity for municipalities to partner with other eligible groups to develop programs for riparian preservation and enhancement along The Corridor.

EPA Sustainable Development Challenge Grants

Encourages community groups, businesses, and government agencies to work together on sustainable development efforts that protect the local environment and conserve natural resources while supporting a healthy economy and an improved quality of life. Eligible applicants may be incorporated non-profits, local governments, tribes, educational institutions, states, territories, and possessions * the program awards \$50,000 or less, or \$50,001 to \$250,000 with a 20% matching share required.

Contact: Debbie Schechter, Cross Media Division, EPA
 Phone: (415) 744-1624
 Website: <http://www.epa.gov/ecocommunity>

*Opportunity for the District and municipalities to partner with other eligible groups to develop innovative and sustainable approaches to natural resource conservation within the river corridor systems.

Federal Highway Administration, Department of Transportation (DOT)

Provides funds to the States to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational; trail uses. Qualified applicants may be state and local governments and nonprofit organizations.

Contact: George E. Schoener, Office of Environment and Planning, DOT
Address: 400 Seventh St. SW., Washington DC 20509
Phone: (202) 366-0150

*Opportunity the county and municipalities for developing their multi-use trails.

General Obligation Bonds

A county or municipality may issue general obligation bonds, which are backed by the full faith and credit of the county or municipality, for any lawful or necessary purpose. Each county and municipality has a constitutionally set debt cap, which limits the bond issuance capacity. Prior to issuing general obligation bonds, the county or municipality must receive authorization by a majority vote of qualified electors at an election. The primary advantage associated with general obligation bonds is the ability to use the bond proceeds for most any purpose and, if county general obligation bonds are used, the benefits and burdens of the funds and tax can be spread more uniformly county-wide.

Contact: Individual Municipalities or Maricopa County

*Opportunity for the county and municipalities to develop their multi-use trails and associated amenities.

Geraldine R. Foundation, Inc.

The foundation's special interests include: ecosystems and habitat preservation, pollution prevention and reduction, biodiversity/species conservation, energy conservation, and enlightened environmental policy through education and communication. Aquariums, botanical gardens, educational institutions, and zoos are encouraged to apply. Available grant amounts are between \$7,000 to \$100,000.

Contact: Scott McVay, Executive Director, Geraldine R. Dodge Foundation, Inc.
Address: 163 Madison Avenue, PO Box 1239, Morristown, New Jersey 07962-1239
Phone: (973) 540-8442

*Opportunity for municipalities to team with other eligible groups to preserve and enhance riparian and wildlife habitat area, along with developing an environmental education component.

Improvement District

Counties may form an improvement District to establish and maintain a park or recreational area for the benefit of the property within the District. The improvement District funds improvements by making assessments against the property

within the District, with each property owner receiving an assessment on the property in proportion to the benefits to be received by each lot. The improvement District may also fund the improvements with assessment bonds, which are repaid over a period of years by the assessments made on the property within the District. The primary disadvantages associated with the use of county improvement Districts are that approval by the majority of the landowners is required and an improvement District would need to be established for each benefit area of an open space improvement. It would be difficult to establish an improvement District on a countywide basis due to the stringency of the landowner approval and benefit area requirements.

Contact: Bill Scalzo, Maricopa County Parks and Recreation Services
Address: 3475 W. Durango, Phoenix, AZ 85009
Phone: (602) 506-4864

*Opportunity for the county to develop parks and recreational areas.

Lindbergh Grants

The Lindbergh Grants program functions as a provider of seed money and credibility for pilot projects that subsequently receive larger sums from other sources to continue and expand the work. Lindbergh Grants are made in the following categories: agricultural; aviation/aerospace; conservation of natural resources-including animals, plants, water, and general conservation (land, air, energy, etc.); education-including humanities/education, health and population sciences, and adaptive technology; and waste minimization and management. The Lindbergh Foundation encourages men and women, whose individual initiative and work in a wide spectrum of disciplines furthers the Lindbergh's vision of a balance between the advance of technology and the preservation of the natural/human environment to apply.

Contact: Lindbergh Foundation
Website: <http://www.mtn.org/lindfdtn/grantssummary.html>

*Opportunity for municipalities to work with non-profit organizations to develop pilot natural resource conservation and environmental education programs.

LRSP-Local, Regional and State Parks

Supports land acquisition and development of facilities for outdoor recreation improvements throughout Arizona. Applicants may be incorporated municipalities, counties, state agencies, and Indian Tribes.

Contact: Steve Laurent, Arizona State Parks Heritage Fund
Address: 1300 W. Washington, Phoenix, AZ 85007
Phone: (602) 542-7127

*Opportunity for the county and municipalities to develop recreational areas along The Corridor.

Marshall Fund of Arizona

The Marshall fund seeks projects that address and explore new ideas to improve the quality of life in Arizona. It also provides funds to meet critical budget problems for important ongoing projects. Grants can be made to tax exempt organizations, which qualify under Section (c)(3) of the Internal Revenue Code. Grant amounts range between \$1,500 to \$40,000.

Contact: Jan Laurant, Administrative Assistant, Marshall Fund of Arizona
Address: 3295 North Civic Center Blvd. Suite 15, Scottsdale, AZ 85251
Phone: (480) 941-5249

*Opportunity for municipalities to partner with non-profit organizations for creative approaches to improving the quality of life through the development of multi-use trails, open spaces and riparian preservation and enhancement.

Mitigation Fees

Mitigation for impacts to the "Waters of the US" as defined under the provisions of the Clean Water Act, which is administered by the Army Corps of Engineers and the EPA jointly, takes the form of restoration or enhancement of water related areas. Mitigation occurs in many steps, if the area is unavoidable. First, there is on-site mitigation, then in-kind one for one replacement of lost habitat, third off-site replacement or enhancement, lastly if previous options do not exist, in lieu fees can be assessed by the Corps as compensation. These fees are usually directed to a non-profit habitat related group such as the Nature Conservancy, or other land trusts in the valley.

Contact: Theresa Hoff, Ecologist, Flood Control District of Maricopa County
Phone: (602) 506-1501
Contact: Tim Wade, Habitat Evaluation Specialist, Arizona Game and Fish Dept.
Phone: (602) 981-9400 ext. 219
Contact: Anne Palaruan, Army Corps of Engineers, Regulatory Branch
Phone: (602) 640-5385

*Opportunity for the District and municipalities for riparian and wildlife area preservation and enhancement, and landscaping and other treatment of recharge areas.

The National Environmental Education and Training Foundation Inc.

The program supports environmental education and training projects related to health and drinking water projects. Yet, it retains a focus on youth, particularly environmental education projects that focus on higher grade levels and go beyond the classroom supporting environmental education projects that leverage resources, bring focus to the field, and empower citizens to make informed decisions on environmental issues. Past grants supported water resources, toxins and environmental health, and education on all levels. Qualified applicants may be aquariums, botanical gardens, educational institutions, museums, nonprofit organizations, research institutions, and zoos. The program awards between \$4,950 to \$15,000.

Contact: Michelle Harvey, Vice President, Programs, National Environment Education and Training Foundation Inc.
Address: 734 Fifteenth Street, NW, Suite 420, Washington DC, 2005
Phone: (202) 628-8200

*Opportunity for municipalities to develop environmental education projects and programs in conjunction with their trails, riparian area and recharge basin projects.

National Fish and Wildlife Foundation (NFWF) Challenge Grants

The National Fish and Wildlife Foundation (NFWF) has five initiatives through which challenge grants awarded: 1) Conservation Education; 2) Fisheries Conservation and Management; 3) Neo-tropical Migratory Bird Conservation; 4) Wetlands and Private Lands; and 5) Wildlife and Habitat Management. Eligible applicants are aquariums, botanical gardens, educational institutions, museums, nonprofit organizations, public agencies, research institutions, and zoos. The NFWF seeks a minimum two-to-one match (non-federal to federal) for all grants it awards.

Contact: Krishna K. Roy, Director, Development and Marketing, NFWF
Address: Bender Building, Suite 900, 1120 Connecticut Ave., NW, Washington DC 20036
Phone: (202) 857-0166

*Opportunity for municipalities for riparian and wildlife preservation and enhancement, and for conservation education projects.

National Park Service, Department of the Interior

Provides staff assistance to support partnerships between government and citizens to increase the number of rivers and landscapes protected and trails established nationwide. Applicants may be private nonprofit organizations and federal, state, and local government agencies.

Contact: Assistant Director for Recreation and Conservation, National Park Service
Address: 1849 C Street, NW, Washington, DC 20240
Phone: (202) 565-1200

*Opportunity for the county and municipalities to develop multi-use trails.

National Rivers Coalition REI Seed Grant Program

Supports grass roots river conservation. The funds are administered by the National Rivers Coalition, which consists of: American Canoe Association, American Rivers, American Whitewater Affiliation, National Wildlife Federation, River Management Society, River Network, Sierra Club, and the Wilderness Society. The program awards between \$200 to \$1,000.

Contact: Chad Smith, American Rivers
Address: 1025 Vermont Ave., NW, Suite 720, Washington, DC 20005
Phone: (202) 547-6900

*Opportunity for municipalities to work with local groups for riparian preservation and enhancement.

National Trails Endowment

The American Hiking Society (AHS) manages a fund of money created by contributions to an annual endowment fund for trails. Money from the endowment will be made available to organizations for which foot trails are a primary focus; for projects to establish, protect, and maintain foot trails.

Contact: Terry Cummings, AHS Affiliate Programs Manager
Address: 1422 Fenwick Lane, Silver Spring, MD 20910
Phone: (301) 565-6704 ext. 121

*Opportunity for municipalities to work with eligible organizations to develop low impact trails.

PowerBar Direct Impact on Rivers and Trails (DIRT)

Projects should: 1) endeavor to increase or maintain access to the outdoors or the size of an outdoor recreational resource, 2) have a regional or local focus, 3) identify a specific land area or waterway that will benefit, 4) have real potential for success or significant measurable progress over a short term, and 5) be quantifiable and include a measure for evaluating success. Grant amounts range between \$2,000 to \$5,000.

Contact: Dirt Program
Address: 2448 Sixth St. Berkeley, CA 94710
Website: www.sctrails.net/Trails.funding.html

*Opportunity for municipalities to partner to develop multi-use trails along The Corridor.

Project WET

Phillips is co-sponsor of this new environmental program, which focuses on the importance of water resources. Phillips' funds are being used to help the program expand into all 50 states.

Contact: Project Wet
Website: <http://www.phillips66.com/citiib2.html>

*Opportunity for municipalities to develop an environmental education component as part of their overall project.

Recreational Equipment, Inc. (REI) Environmental Grants

REI awards these grants to organizations for protection and enhancement of natural resources for use in outdoor recreation. Grants of up to \$5,000 are offered to accomplish any of the following: preservation of wildlands and open space; advocacy-oriented education for the general public about conservation issues; building a membership base of a conservation organization; direct citizen action (lobbying) campaign on public land and water recreation issues; and projects working to organize trails constituency or to enhance the effectiveness of a trails organization's work as a trails advocate at the state or local level.

Contact: Public Affairs Director, REI
Address: 6750 South 228th St., Kent, WA 98032
Phone: (206) 395-5955

*Opportunity for municipalities to work with local organizations for riparian and wildlife preservation and enhancement.

Recreational Improvement Fund (RIF) Grants

The program funds the maintenance, operation, and development of recreation trails and restoration of lands damaged by off-road vehicles and inland lake cleanup. Recreation Improvement Fund (RIF) dollars are available for operation, maintenance and development of recreation trails, restoration of lands damaged by off-road vehicles, and inland lake cleanup. This program funds the maintenance and development of recreational trails and related facilities. State and local partnership projects may apply for available grants.

Contact: Hector Chiunti, Forest Management Division, RIF
Phone: (517) 373-9483
Website: http://www.dnr.state.mi.us/Dept/Grants/recreational_trails_program-gran.htm

*Opportunity for municipalities for the development of multi-use trails and related facilities.

Recreational Trails Program Grants

Funds the maintenance and development of recreational trails and related facilities.

Contact: Hector Chiunti, Forest Management Division, RIF
Phone: (517) 373-9483
Website: http://www.dnr.state.mi.us/Dept/Grants/recreational_trails_program_gran.htm

*Opportunity for municipalities for the development of multi-use trails and associated amenities.

Revenue Bonds

Revenue Bonds are bonds issued by the municipality and backed by a dedicated revenue stream. Municipalities with a population of 75,000 or less may issue revenue bonds for utilities and "recreational facilities," which include swimming pools, parks, playgrounds, municipal golf courses, and ballparks. However, municipalities with a population of greater than 75,000 are limited by state statutes to the issuance of revenue bonds only for utilities. The advantage to utilizing revenue bonds is that the people who use the facilities pay for the facilities via park entrance fees or other charges. The disadvantages are that only municipalities with a population of 75,000 or less have express authority to utilize revenue bonds to finance recreational facilities, and it may be difficult practically to assess a user fee for open space areas in order to back revenue bonds.

Contact: Individual Municipalities

*Opportunity for municipalities with a population of less than 75,000 to develop recreational facilities.

The Surdna Foundation

The foundation's goal is to prevent irreversible damage to the environment, support government, private, and voluntary actions that will produce a sustainable environment, and foster a population of environmentally informed citizens. Their interests include biological and cultural diversity, energy and transportation, and restoring the environment in urban and suburban areas. Grants between \$20,000 to \$300,000 are available for nonprofit organizations.

Contact: Edward Skloot, Executive Director, The Surdna Foundation
Address: 330 Madison Avenue, 30th floor, New York, NY 10017-5001
Phone: (212) 557-0010

*Opportunity for municipalities to restore riparian and wildlife habitat in the urban and suburban areas of The Corridor.

State Lake Improvement Fund

The State Lake Improvement Fund Provides funding for the improvements on Arizona's lakes and rivers where boating is allowed. The Fund consists of a portion of motor vehicle fuel taxes, a portion of moneys from watercraft license fees, and interest. Approximately \$4,300,000 in grants are available annually to support the construction of lakes and development of boating-related facilities, purchase of boating safety equipment, and to acquire access to waters where boating is permitted. Eligible applicants may include municipalities, counties, and Arizona Game and Fish Department.

Contact: Steve Laurent, Arizona State Parks
Address: 1300 W. Washington, Phoenix, AZ 85007
Phone: (602) 542-7127

*Opportunity for the county and municipalities to develop boat usage projects within The Corridor.

Toyota USA Foundation

Grants were awarded to start the French Creek Project in Pennsylvania. This project is an environmental program for high school students and their teachers involving the preservation of a historic waterway. In addition, support was given to the Brooklyn Botanical Gardens to produce mobile active learning centers on different topics in botany and ecology. Grant amounts between \$25,000 to \$75,000 for aquariums, botanical gardens, educational institutions, museums, nonprofit organizations, and zoos.

Contact: Patricia Hull, Foundation Administrator, Toyota USA Foundation
Address: 19001 South Western Avenue, Torrance, CA 90509
Phone: (310) 618-6766

*Opportunity for municipalities to work with nonprofit organizations to develop environmental education programs that can be integrated into their projects.

Trail Heritage Funds

Sponsored by Arizona State Parks, Trail Heritage Funds provide a 50/50 match for project programs including: the acquisition or lease of future trail alignments; design and engineering when included with trail developments and directly related to the project; trail development and reconstruction activities including but not limited to; Subgrade preparation, base course, soil sterilization, earthwork, erosion control, re-vegetation, natural and hardening surfaces, culverts, low water crossings, bank improvements, gabions, retaining walls, guard rails, hand rails, and bridges, and trail support facilities including but not limited to signage, parking areas, hitching trails, bike racks fencing, motorized access barriers, underpass, rest rooms, and water facilities.

Contact: Steve Laurent, Arizona State Parks
Address: 1300 W. Washington, Phoenix, AZ 85007
Phone: (602) 542-7127

*Opportunity for municipalities for multi-use trail, signage, parking and restroom development.

Transaction Privilege/Sales Tax

A municipality may impose a transaction privilege or sales tax within its jurisdiction to fund the costs of open space recreation areas. However, unless all of the municipalities within the county adopt the tax, the open space plan would be carried out in only certain jurisdictions and the open space areas would be subject to different jurisdictions' control. Counties may not impose a countywide transaction privilege without legislative authorization. It is likely that the legislature would require voter authorization if it approved a transaction privilege tax for open space recreation areas.

Contact: Individual Municipalities

*Opportunity for municipalities to develop open space recreation nodes.

Transportation Equity Act TEA-21 Transportation Enhancement Funding

Transportation Enhancement funds are now available statewide for the design and implementation of pedestrian, bicycle, landscaping, scenic, historic preservation, archaeological, and other projects that are near, impacted by, or a functional part of a transportation system. Enhancement funds may also be used for acquisition of property and easements associated with transportation enhancement projects. Projects may be funded for an amount up to \$500,000 in federal funds; a 5.7% match is required for local projects. Flexibility in the use of funds, emphasis on measures to improve the environment, focus on a strong planning process as the foundation of a good transportation decisions- all ISTEA hallmarks-are continued and enhanced by TEA-21.

Contact: Dawn Coomer, Maricopa Association of Governments (MAG)
Address: 302 North 1st Ave. Saguaro Room, 2nd Floor, Phoenix, AZ 85003
Phone: (602) 254-6300

*Opportunity for the county and municipalities to develop multi-use and multi-modal, alternative transportation systems throughout The Corridor.

Wilburforce Foundation

Funding is focused on organizations that work to protect habitats, which are critically important to sustaining abundant ecological communities in Western Canada and Western United States. All applicant organizations must be classified as 501(c)(3) by the U.S Internal Revenue Service or 149(1)(f) by Revenue Canada. The foundation awards between \$20,000 to \$30,000.

Contact: Jen Clanahan, Program Associate, Wilburforce Foundation
Phone: (970) 245-5811
Website: <http://www.wilburforce.org/htguide1.htm>

*Opportunity for municipalities to work with non-profit organizations to develop riparian and wildlife preservation and enhancement projects.

World Wildlife Foundation (WWF) Innovation Grants

The WWF awards small grants to local, regional, and statewide non-profits to help implement strategies for the conservation of natural resources. Grants are offered to support projects that: conserve wetlands, protect endangered species, preserve migratory birds, conserve coastal resources, and establish and sustain protected natural areas, such as greenways. Available grant amounts are up to \$10,000.

Contact: Executive Director, WWF
Address: 6842 East Tanque Verde Road, Suite D, Tucson, AZ 85715
Phone: (520) 290-0828

*Opportunity for municipalities to work with non-profit organizations to develop riparian and wildlife preservation and enhancement projects.

6.2.3 Maintenance Plan

Basic services needed to support the proposed improvements include flood control maintenance, police, fire, emergency medical, hazardous materials response, water and sewer services, janitorial services at restrooms, landscape and irrigation maintenance, recreational and educational programming, reservations and fee collection. Natural habitat areas should receive no maintenance other than removal of noxious weeds. Following is a list of different maintenance areas.

- Flood control channel, basins and embankments.
- RWCD- irrigation canals and ditches.
- Recreation and multi-modal transportation corridor site amenities such as ramadas, trail surfaces, landscaping and irrigation, janitorial service and refuse collection.

6.3 Estimate of Costs

6.3.1 Capital

The capital construction cost estimate for the Superstition-SanTan Corridor and Marathon Trail, including the flood control structures, basins, recreational facilities and multi-use amenities, is \$207,950,811 plus \$5,130,000 in land acquisition, as expressed in Year 2000-dollars, for a total of \$213,080,811. Estimated cost for the multi-use amenities is \$74,803,060. This estimate is based upon average construction and land acquisition costs for similar flood control and multi-use facilities in Maricopa County within the last few years.

6.3.2 Operation and Maintenance

Currently the District contracts maintenance for the East Maricopa Floodway. Contract mowing of the floodway occurs three or four times per year, depending on precipitation. Regular patrol of District maintenance roads includes District personnel checking for vandalism, gopher damage, erosion, etc. Currently the District budgets approximately \$32,000 per annum for contract maintenance of the EMF, and after adding in District costs, including salaries, supplies and overhead, it is estimated that operation and maintenance currently costs \$13,000 per mile per annum.

It is assumed that future operation and maintenance costs of the multi-use amenities will be approximately 3% to 5% of construction-cost per-year. Based on this assumption, estimates for O&M for the Preferred Alternative, as expressed in Year 2000-dollars, is \$2,244,000 to \$3,740,000 per year.

6.3.3 Timing

The Flood Control District of Maricopa County will continue to budget for construction, operation and maintenance of the Floodway. Stakeholders will need to come forward to partner with the District for construction, operation and maintenance of the recreational, environmental and multi-use facilities shown in the Recommended Plan.

The following Gantt Chart shows the possible timing and costs for implementation of the Recommended Plan for the Superstition-SanTan Corridor and Marathon Trail, estimated to take approximately 15 years.

FEATURE and YEAR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	Land Acquisition	Estimated Construction Cost	Design & Construction Management (8%)	Construction Contingency Cost (15%)	Estimated Total Cost
General Mobilization & Security Fencing																	0	\$654,000	\$52,320	\$98,100	\$804,420
Trail Mile Markers / Signage																	0	\$100,000	\$8,000	\$15,000	\$123,000
Hard-Trail																	0	\$1,267,200	\$101,376	\$190,080	\$1,558,656
Soft Trail																	0	\$211,200	\$16,896	\$31,680	\$259,776
Multi-Use Bypass Trail																	0	\$150,000	\$12,000	\$22,500	\$184,500
Low Flow Channel																	0	\$421,400	\$33,712	\$63,210	\$518,322
Equestrian Trail																	0	\$288,900	\$23,112	\$43,335	\$355,347
Rittenhouse Basin Construction																	0	\$29,934,000	\$2,394,720	\$4,490,100	\$36,818,820
Rittenhouse Basin Recreational Improvements																	0	\$20,000,000	\$1,600,000	\$3,000,000	\$24,600,000
Chandler Heights Basin Construction																	0	\$53,566,000	\$4,285,280	\$8,034,900	\$65,886,180
Chandler Heights Basin Recreational Improvements																	0	\$30,000,000	\$2,400,000	\$4,500,000	\$36,900,000
Ray Basin Construction																	\$5,130,000	\$20,578,000	\$1,646,240	\$3,086,700	\$30,440,940
Ray Basin Desert Restoration																	0	\$475,000	\$38,000	\$71,250	\$584,250
Park and Ride Facilities																	0	\$600,000	\$48,000	\$90,000	\$738,000
Park Linkage Portals																	0	\$240,000	\$19,200	\$36,000	\$295,200
Trail Connections at Power Road																	0	\$480,000	\$38,400	\$72,000	\$590,400
Channel Reconstruction																	0	\$5,000,000	\$400,000	\$750,000	\$6,150,000
Riparian Preserve Construction																	0	(T.B.D.)	(T.B.D.)	(T.B.D.)	To Be Determined by the Town of Gilbert
Town of Gilbert responsibility																	0	\$400,000	\$32,000	\$60,000	\$492,000
Airport Operations Viewing Park																	0	0	0	0	Included in Low Flow Channel
Managed Recharge Facility																	0	0	0	0	Included in Rittenhouse /Chandler Heights Basins
Basin Recharge Facility																	0	0	0	0	
Turn-Around / Equestrian Park																	0	\$4,000,000	\$320,000	\$600,000	\$4,920,000
Mitigation Banking Habitat																	0	\$700,000	\$56,000	\$105,000	\$861,000
Grand Totals																	\$5,130,000	\$169,065,700	13,525,256	25,359,855	\$213,080,811