

**Black Mountain Boulevard  
Ramps to SR 51/101 TI –  
Cave Creek Road**

**Federal Aid No.: STP-PHX-0(266)A  
Tracs No.: SS979 03D**

**Section 4(f) Resources Technical Memorandum**

**Prepared by:**

AZTEC Engineering Group, Inc.

**for:**

City of Phoenix  
Arizona Department of Transportation  
Federal Highway Administration

August 15, 2012

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## Introduction

This memorandum documents the resources afforded protection under Section 4(f) of the US Department of Transportation Act of 1966 occurring within the Black Mountain Boulevard State Route 51 to Cave Creek Road (BMB) study area and describes any direct or constructive uses of those resources. The intent of this memorandum to provide documentation to the Federal Highway Administration (FHWA) to understand the resources afforded protection under Section 4(f) occurring within the study area and any impacts to those resources from alternatives being considered. In some cases, an alternative could be eliminated if impacts cannot be mitigated and other reasonable alternatives that avoid impacts to a Section 4(f) property exist.

The purpose of the overall study being completed for BMB is to evaluate alternatives for a north-south oriented major arterial street located in the north Phoenix metropolitan area. The purpose of a future project, if undertaken, would be to provide direct access to and from areas of existing and future development and State Route 51 (SR 51), address a gap that exists in north-south oriented streets between Cave Creek Road and Tatum Boulevard, increase efficiency of the transportation network by reducing congestion and travel times for motorists, and provide greater regional mobility and improved access to other subregions within the Phoenix metropolitan area.

The study area is located in the north Phoenix metropolitan area and is roughly bounded by the Central Arizona Project (CAP) Canal to the south, the 32<sup>nd</sup> Street alignment the west, the 40<sup>th</sup> Street alignment to the east, and Pinnacle Vista Drive to the north. The study area is located entirely within portions of the City of Phoenix and unincorporated portions of Maricopa County. BMB would connect SR 51 with east-west running arterial routes including Deer Valley, Pinnacle Peak, Happy Valley, and Jomax roads. Only those resources with the potential to be impacted as defined in the Act will be analyzed in detail in this memorandum.

Section 4(f) of the US Department of Transportation Act of 1966 (as amended) states that the Secretary of Transportation “may approve a transportation program or project . . . requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance, or land of an historic site of national, State, or local significance (as determined by the federal, state, or local officials having jurisdiction over the park, area, refuge, or site) only if 1) there is no prudent and feasible alternative to using that land; and 2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use” (49 U.S.C. Section 303).

A “use” of a Section 4(f) resource, as defined in Title 23 CFR §774.17, occurs when:

- Land is permanently incorporated into a transportation facility.
- There is a temporary occupancy of land that is adverse in terms of the statute’s preservation purpose.
- There is a constructive use of a Section 4(f) property.

A constructive use of a Section 4(f) resource occurs when the transportation project does not incorporate land from the Section 4(f) resource, but the project’s proximity impacts “are so severe that the protected activities, features, or attributes that qualify a resource for protection under section 4(f) are substantially impaired” [23 CFR §774.15(a)]. For example, a constructive use can occur when:

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- The projected noise level attributable to a project substantially interferes with the use and enjoyment of a noise-sensitive facility of a resource protected by Section 4(f). FHWA has defined this noise level as 67 decibels (dBA) or above.
  - The proximity of a proposed project substantially impairs aesthetic features or attributes of a resource protected by Section 4(f), where such features or attributes are considered important contributing elements to the value of the resource. Examples of such an adverse effect would be a transportation facility that obstructs or eliminates the primary views of an architecturally significant historical building, or a transportation facility that substantially detracts from the setting of a park or historic site that derives its value, in substantial part, from its setting.
  - A proposed project results in a restriction on access that substantially diminishes the utility of a significant publicly owned park, recreation area, or historic site.

## Existing Conditions and Environmental Consequences

The BMB study area contains a combination of trails (planned and existing), and two recreation areas (Figure 1). The Reach 11 Recreation Area and the Cave Buttes Recreation Area are both identified in the recreation element of the City of Phoenix General Plan (2002). However, after field review of the area depicted as the Cave Buttes Recreation Area within the BMB study area, which is the Cave Buttes dike itself between Cave Creek Road and 40<sup>th</sup> Street, it was noted that the area is fenced and signed “No Trespassing . . . . Property of Flood Control District of Maricopa County.” Therefore, because the portion of the Cave Buttes Recreation Area within the study area is not currently accessible to the public for recreation purposes, it is not afforded protection under Section 4(f). No public parks, wildlife or waterfowl refuges, or significant historic sites occur within the study area.

John Teets Park occurs outside but adjacent to the study area. The closest BMB alignment being considered to this property is approximately 0.25 mile west and would not result in direct or constructive uses. Pinnacle High School although identified on Figure 1, does not fall under the criteria for protection as a Section 4(f) Resource. The Paradise Valley Unified School District and Pinnacle High School have a specific trespassing policy that limits the use of its facilities, while preventing other uses during non-school hours, and is therefore not protected under Section 4(f).

Only two planned trails within the BMB Study Area are identified in the General Plan. The first trail is planned along the future alignment of Happy Valley Road while the other planned trail would cross the existing 40<sup>th</sup> Street alignment providing access to the Cave Buttes Dike from the southwest corner of the Tatum Highlands neighborhood. The planned trail along the Dike would connect to the Cave Buttes Recreation Area, however, as stated earlier, the dike is signed to restrict public access and therefore, not protected by Section 4(f) at this time.

The alignments being considered are compatible with both planned trails as the future road network was jointly planned and identified within the recreation element of the General Plan. Therefore, no direct or constructive uses of these trails would occur. Other trails identified from the General Plan are located within the Reach 11 Recreation Area. Because BMB alignments being considered in the south half of the study could directly impact the Reach 11 Recreation Area, the remainder of this document focuses on those alignments between SR 51 and Deer Valley Road. No other properties are further analyzed.

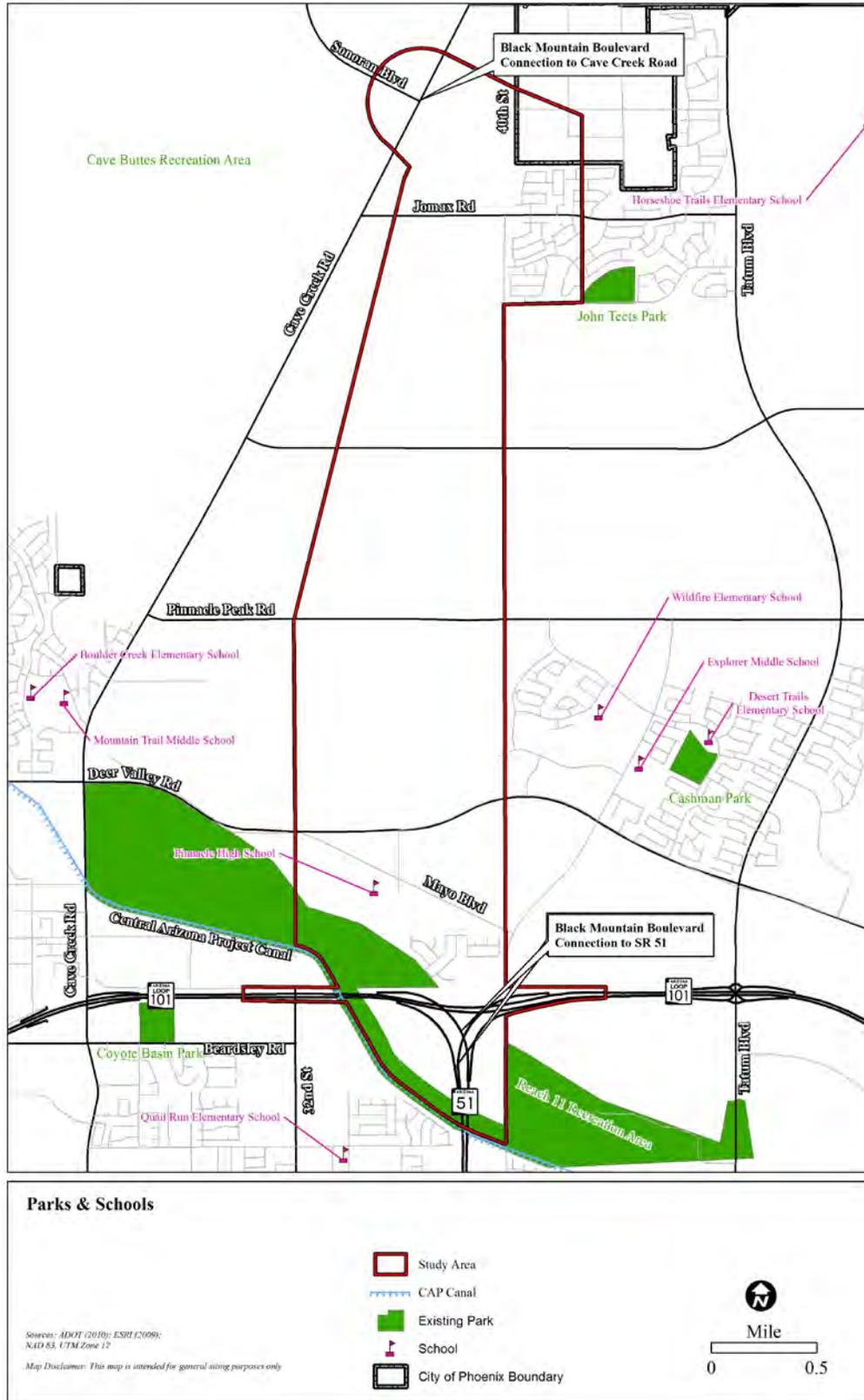


Figure 1. Parks, Schools, and Recreation Areas.

## Reach 11 Recreation Area

In 1986, the City of Phoenix (City) and the US Bureau of Reclamation (Reclamation) entered into a Recreation Land Use Agreement (RLUA) for approximately 1,500 acres of land now known as the Reach 11 Recreation Area located within the Paradise Valley Flood Retention Basin. The RLUA provided the parameters to allow the City Parks and Recreation Department (City Parks and Recreation) to operate and maintain recreational facilities within the basin. Reclamation still retains the underlying ownership of the basin itself, and the primary function of the basin to provide flood control is maintained. Although its primary purpose is flood control, FHWA, ADOT, City, and Reclamation have previously determined that it is a significant resource for recreation.

In January 2003, a Record of Decision was signed by Reclamation approving the Environmental Impact Statement (EIS) completed for the Reach 11 Recreation Area Master Plan (RAMP). The EIS and RAMP provided analysis of the various recreational needs and an assessment of how these needs would coincide with the underlying purpose of the basin to capture flood waters. The EIS described the variety of planned uses within Reach 11 by splitting areas into zones. Zones were identified numerically 1-6 (Figure 2). Each zone had a specific mix of recreational uses ranging from fields, courts, and maintenance yard areas in Zone 1 to equestrian oriented uses in Zone 3. Zone 2 was identified for future transportation needs which is the existing State Route (SR) 51 and SR Loop 101 Traffic Interchange. This zone also includes a future ramp connection from the SR 51 north to Black Mountain Boulevard (a City major arterial street). Many elements of the RAMP have been constructed including softball/baseball fields, soccer fields, the equestrian center, many trails and trailheads, etc.

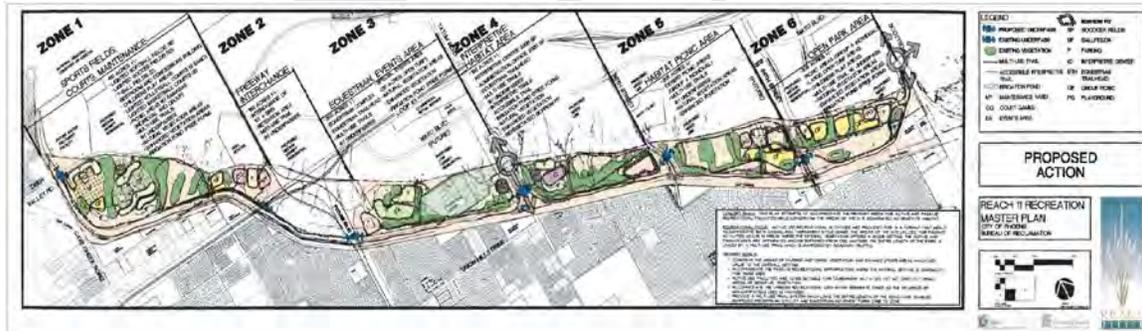


Figure 2. Reach 11 Zones (2002 EIS)

Although generalized boundaries were developed between each zone for purposes of the EIS, and have been used to further develop amenities within Reach 11 by City Parks and Recreation based on the RAMP, no detailed legal descriptions of these boundaries are known to exist. Some flexibility in the edges of these boundaries is assumed to be reasonable providing City Parks and Recreation and Reclamation are in agreement with any minor changes. For purposes of this memorandum, it is assumed that the western edge of Zone 2 as described in the EIS and RAMP correlates to the preliminary BMB/SR 51 connection design plans developed in 1996 and the remaining boundaries are as illustrated in the EIS.

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## *Environmental Consequences*

Any alternatives considered for BMB will require consideration of “teacup balancing” or preventing the loss of flood pool capacity within Reach 11 in accordance with the *Bureau of Reclamation Guidelines For Road Crossings And Development Within Dike Drainage Basins, Hayden/Rhodes Aqueduct - Reach 11* dated June, 2009. As stated earlier, the primary purpose of this area still remains flood control. Any excavations necessary in areas outside of where the BMB ramps would be constructed in Zone 2 to balance the flood pool capacity would be completed in locations consistent with planned recreation facilities. Any proposed excavation areas would be coordinated with Reclamation and City Parks and Recreation to ensure that they would be consistent with their future facility needs and would not preclude the development of planned recreation facilities.

Graphic illustrations for each build alternative are included in the appendix. Other differences are briefly described below along with each alternative analysis.

### **Alternative 1A –Direct Ramp Connections**

Alternative 1A (refer to Appendix for Figure) was modified based on the original Alternative 1 concept presented to the public in April 2012. Alternative 1A reduces speeds on the northbound ramp that connects SR 51 to BMB from 50 miles per hour (mph) as used for the original Alternative 1 concept to 30-40 mph. Traffic calming features such as a roundabout could also be considered near the property line between Pinnacle High School and Reach 11. Access to the future Reach 11 Recreation Area facilities and future Pinnacle High School parking could also be provided at this location with the traffic calming feature.

Common to all alternatives except for *Alternative 4 No Ramp Connections*, all northbound ramp configurations would be designed to include 2 travel lanes from the SR 51 to the north edge of the Reach 11 Recreation Area where the service ramps end and the actual BMB arterial begins. Each build alternative would also have 2 southbound lanes on the ramp connection merging into one single lane before it ties into the SR 51 southbound mainline.

### **Direct Use**

Alternative 1A would only impact 0.04 acre of the Reach 11 Zone 1 designated area. This minimal area of disturbance would be for embankment to support the transportation facility. It is possible when detailed engineering is completed to reduce the slopes or include design features such as walls to minimize or potentially eliminate this encroachment, respectively. However, the portion of Zone 1 potentially impacted does not contain any current or future planned recreation uses nor change the original intent of the planning completed. This portion of Zone 1 that would be encroached upon in the RAMP only identifies landscaping elements as the land use. Landscaping elements could be included along these slopes to be consistent with RAMP and future plans for this separation of uses between Zones 1 and 2. Adjacent uses within Zone 1 would still provide the opportunity for construction of the planned maintenance yard. No portion of Zone 1 that was intended for recreation amenities would be directly impacted. Trail crossings linking activities within the Reach 11 were also planned with the understanding of a future transportation corridor to be constructed in Zone 2. Connectivity of all existing and planned trails within the Reach 11 Recreation Area would be maintained.

### **Constructive Use**

Because the Reach 11 Recreation Area was planned jointly with the future transportation corridor, features adjacent to the corridor included only support-type facilities such as a maintenance yard

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and a parking lot. All other active or passive uses, except for trail crossings were planned at a distance where no constructive type uses would likely occur. Because the Reach 11 facilities nearest the BMB ramps are not noise sensitive, sensitive to changes in the aesthetic qualities of their setting, or intended to be publically accessible, this alternative would not cause constructive use impacts to Reach 11.

### Alternative 2 –Half-Diamond Interchange Configuration

Alternative 2 (refer to Appendix for Figure) would be constructed as a half-diamond interchange with ramp connections to and from the SR 51 mainline diverging into or from a free-flowing but low-speed (20 mph) curve at the portion of the ramp where the continuation to the BMB alignment turns north to the school. Similar to Alternative 1A, northbound ramps would be designed to include 2 travel lanes from the SR 51 to the north edge of the Reach 11 Recreation Area. Two southbound lanes would continue from BMB onto the ramp but would merge into one single lane before the SR 51 mainline. Traffic calming features such as a round-about could also be considered near the boundary between the Pinnacle High School and Reach 11 property lines. Access to the future Reach 11 Recreation Area facilities and future Pinnacle High School parking could also be provided at this location with the traffic calming feature.

#### Direct Use

Alternative 2 would be mostly confined to the existing transportation corridor within Reach 11 known as Zone 2. Based on the best available Zone 1 and 2 boundary information as described previously, 0.37 acre of Zone 1 could be incorporated into the transportation facility. The 0.37 acre disturbed would be for embankment to support the transportation facility.

Similar to Alternative 1A, it is possible when further detailed engineering is completed to reduce or eliminate encroachment. Landscaping elements could also be included along slopes that would be consistent with future plans outlined in the RAMP. As described for Alternative 1A, no portion of Zone 1 that was intended for recreation amenities would be impacted and all trails would be maintained.

#### Constructive Use

Similar to Alternative 1A, no constructive uses would likely occur.

### Alternative 3 –West Alignment

Alternative 3 (refer to Appendix for Figure) would be constructed with ramp connections between the SR 51 and Deer Valley Road crossing through Reach 11 south and west of Pinnacle High School. Ramps would directly connect to Deer Valley Road on approximately the 32<sup>nd</sup> Street alignment. Instead of the ramps occupying the portions of Reach 11 set aside for transportation in the RAMP as Zone 2, the ramp alignments would be constructed through both Zones 2 and 1. Access to the future Reach 11 Recreation Area facilities and future Pinnacle High School parking would not be provided with this alternative.

#### Direct Use

Alternative 3 would require that 6.54 acres of the Reach 11 Recreation Area, all outside of Zone 2, be permanently converted from recreation to transportation use. Different from the minor impacts described in Alternative's 1A and 2, direct impacts resulting from Alternative 3 would occur to planned recreation facilities including areas set aside for sport courts and picnic areas as approved in the RAMP. Portions of Zone 1 located further west of the Alternative 3 alignment have already been constructed including soccer fields, parking lots, and baseball fields. Under

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Alternative 3, an update to the RAMP would be required to determine if planned recreation facilities could be relocated or co-located to maintain their intended function and use based on their given space requirements and/or if impacts would result in a total loss of those uses in these areas due to the bifurcation or displacement created by the Alternative 3 alignment.

#### Constructive Use

Although future noise level increases under this alternative have not been modeled, it is reasonable to assume that levels would increase near areas described in the RAMP such as picnic areas or areas set-aside for court games in Zone 1. Additional mitigation features to protect these areas by reducing noise levels so that a new facility would not impair the use of these recreation facilities would be required. A detailed Section 4(f) evaluation would be required to fully analyze the intensity of any constructive uses and to determine if recreation facilities would be substantially impaired. Details of the magnitude of the increases would depend on an exact alignment. Alternative 3 could also diminish the setting and scenic value from within the Reach 11 Recreation Area because the elements of the RAMP did not include an elevated transportation facility traversing from east to west through Zone 1.

#### Alternative 4 – No Ramp Connections

BMB would be constructed along the alignment designated in the City of Phoenix General Plan. No direct connection between the BMB and SR 51 would be constructed.

#### Direct Use

As a result of no connection to the SR 51, no portion of the Reach 11 Recreation Area would be impacted. No direct use of any Section 4(f) properties would occur as a result of selection of this alternative. However, as a part of the RAMP, access was envisioned from BMB to Zone 1 of the Reach 11 to access the planned parking facilities in the future. With no connection to SR 51, BMB would need to be extended south to the boundary between the Pinnacle High School property and Reach 11 in order for this access to future Reach 11 parking to be constructed.

#### Constructive Use

No proximity impacts such as noise would occur because Alternative 4 does not include a connection from BMB to the SR 51. The opportunity for improved public access would be diminished unless BMB was to be extended to the south for the future access point described in the RAMP. No other constructive uses would occur.

### *Summary*

The City Parks and Recreation Department have jointly planned recreation uses and the future transportation corridor identified as Zone 2 in the RAMP and EIS completed in 2003 and approved by Reclamation. All alternatives except Alternative 4, No Ramp Connections, would result in some disturbance to what is depicted as Zone 1 from the EIS and RAMP. However, based on coordination with City Parks and Recreation and Reclamation, Alternatives 1A and 2 are consistent with what was originally envisioned for the Zone 2 transportation corridor. As stated earlier, no precise legal descriptions of the boundary between Zone 1 and 2 are known to exist. The assumptions used in this document were based on preliminary design plans developed in 1996 to illustrate what right-of-way would be required for a transportation facility connecting BMB to SR 51 in the future. A boundary between Zone 1 and 2 was developed based on these early, preliminary design plans. With that, it is reasonable to assume that minor impacts to locations where no recreation-oriented features are described in the RAMP that would result from

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Alternatives 1A and 2 is consistent with the original intent of the EIS. Similar to both no recreation uses within Zone 1 would be impacted and measures to further minimize harm could be developed during final design.

Conversely, Alternative 3 is not consistent with the intent of the EIS and RAMP. Alternative 3 would connect SR 51 to BMB by traversing Zone 1 of the Reach 11 Recreation Area and connecting to Deer Valley Road near the 32<sup>nd</sup> alignment. City Parks and Recreation and Reclamation have expressed opposition to this alignment based on these impacts (Refer to Appendix), therefore it is our recommendation to eliminate Alternative 3 from further consideration. It is demonstrated by the development of Alternatives 1A and 2 that reasonable and prudent alternatives are available to avoid impacts to the Reach 11 Recreation Area outside of Zone 2 and any impacts from selection and eventual construction of either of these alternatives would be considered *de minimis*.

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## References

City of Phoenix General Plan, 2002

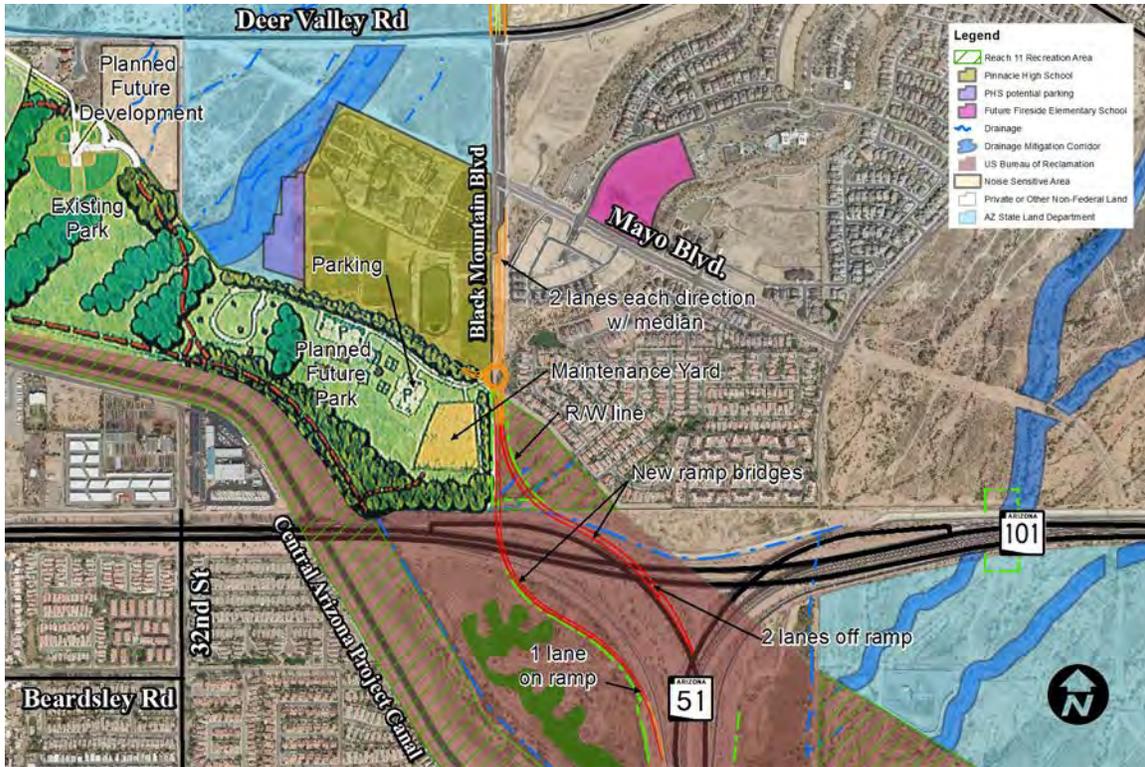
Record of Decision, Central Arizona Project Reach 11 Recreation Area Master Plan Final  
Environmental Impact Statement, December 2002

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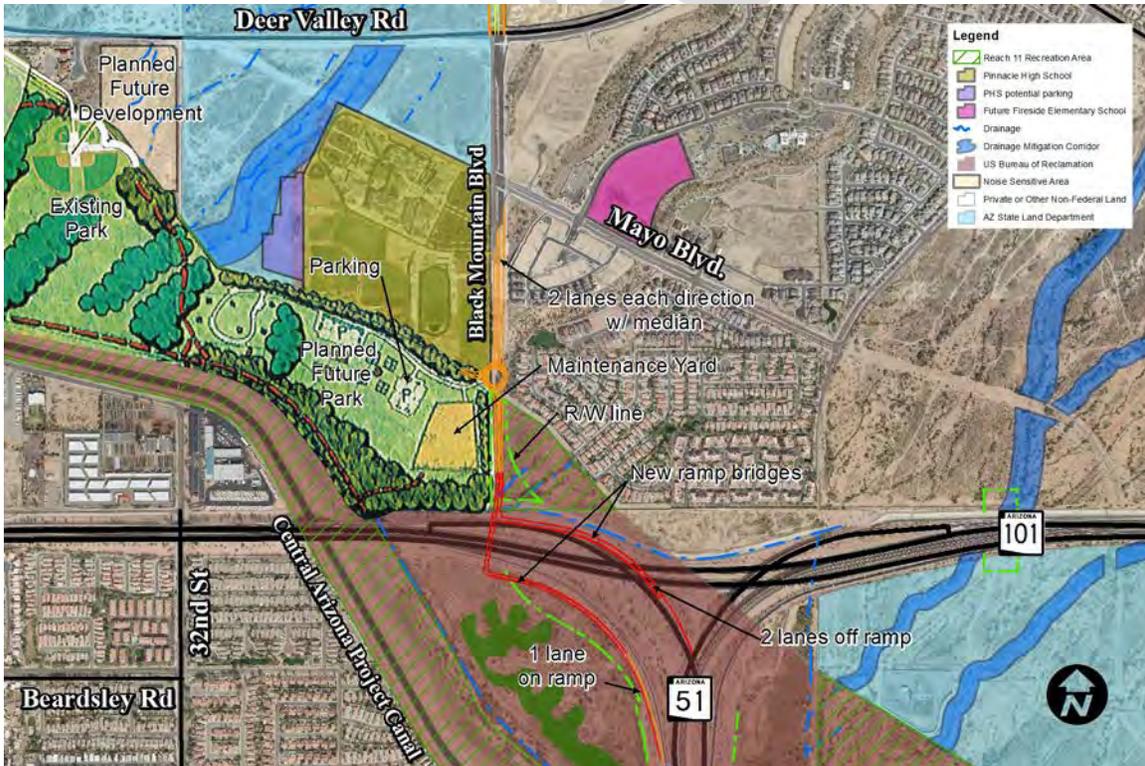
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## Appendix

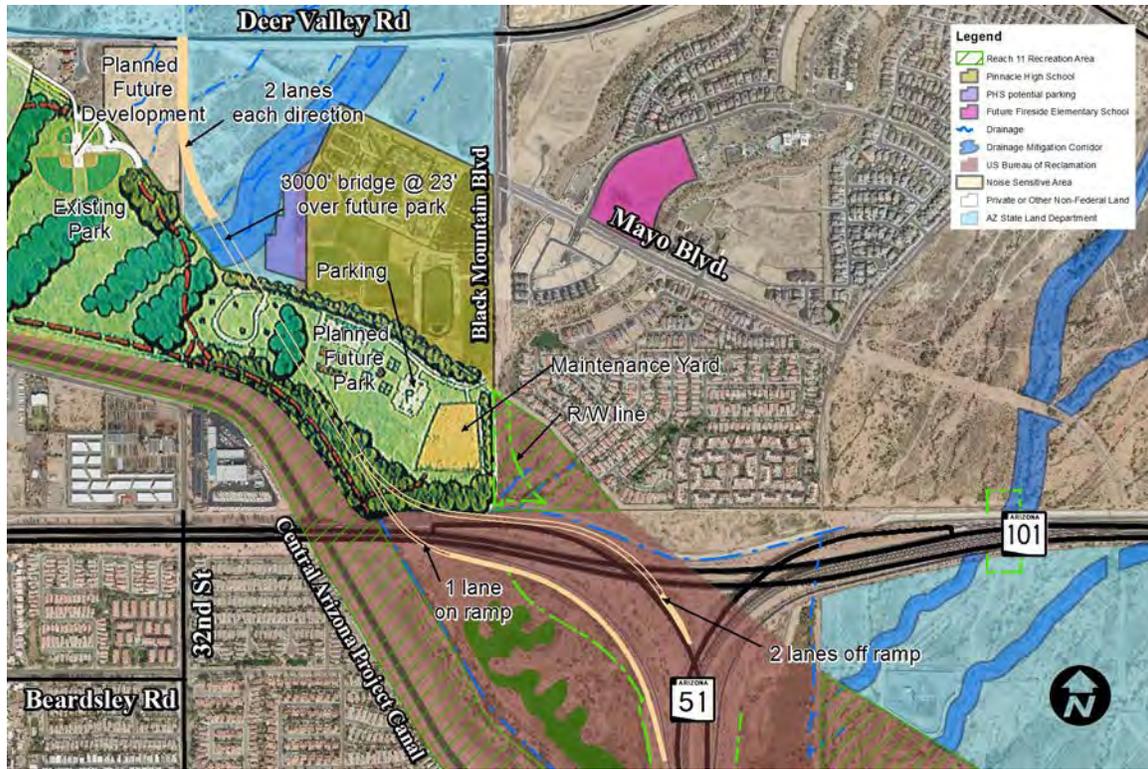
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Alternative 1A –Direct Ramp Connections



Alternative 2 –Half Diamond Interchange Configuration



Alternative 3 – West Alignment

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**City of Phoenix**  
PARKS AND RECREATION DEPARTMENT

June 12, 2012

Ron McCally  
Arizona Department of Transportation  
Valley Project Management  
1611 W. Jackson Street, MD EM01  
Phoenix, Arizona 85007

Re: Black Mountain Boulevard, SR 51/Loop 101 Interchange to Cave Creek Road  
PHX-0(266)A  
0000 MA PHX SS979 03D

Dear Mr. McCally:

On behalf of the City of Phoenix Parks and Recreation Department, I would like to take this opportunity to provide input regarding the proposed alignments for the Black Mountain Boulevard project, specifically concerning the alignment alternatives under consideration through the Reach 11 Recreation Area.

The U.S. Department of the Interior through the Bureau of Reclamation, in coordination with the City of Phoenix Parks and Recreation Department, prepared the Reach 11 Recreation Master Plan and Final Environmental Impact Statement. The Record of Decision for the environmental document was signed on January 14, 2003. The approved Reach 11 Recreation Master Plan depicts an area (identified as Zone 2) that provides for the Loop 101/SR 51 Freeway Interchange and the Black Mountain Boulevard ramp connections to SR 51.

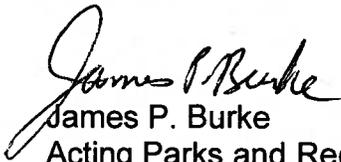
We understand that in response to requests from the public, the project study team was asked to consider an alignment alternative that would take Black Mountain Boulevard west of Pinnacle High School. In order to accomplish this, the proposed alignment (Alternative 3) would significantly deviate from what is approved in the Reach 11 Recreation Master Plan. We believe this would create a major detriment to the Reach 11 Recreation Area because it would not only bisect the approved master planned recreational facility but also would limit other park uses. Because of this, the City of Phoenix Parks and Recreation Department would not support further consideration of the proposed western alignment identified as Alternative 3.

The ramp connections from SR 51 will provide an additional opportunity for access to the park which will also be a benefit to the public. For this reason, the City of Phoenix Parks and Recreation is opposed to the proposed Alignment 4 or no connection

alternative. The future planned connection from SR 51 is a vital access point to the Reach 11 Recreation Area.

The City of Phoenix Parks and Recreation Department supports the implementation of the Black Mountain Boulevard extension and ramp connections to SR 51 consistent with the Reach 11 Recreation Master Plan and Final Environmental Impact Statement which is accomplished through the proposed Alternatives 1 or 2. Therefore, we support moving forward with this project under the premise that Alternatives 1 or 2 are selected. Thank you for the opportunity to provide our input and please contact us, by calling Cynthia Peters, Parks and Preserve Administrator at 602-262-4997 or email [cynthia.peters@phoenix.gov](mailto:cynthia.peters@phoenix.gov) should you have any questions or require clarification regarding this letter.

Sincerely,

A handwritten signature in black ink that reads "James P. Burke". The signature is written in a cursive style with a large initial "J".

James P. Burke  
Acting Parks and Recreation Director

cc: Shane L. Silsby, P.E.  
Scott McKenzie, P.E.



# United States Department of the Interior

BUREAU OF RECLAMATION

Lower Colorado Region

Phoenix Area Office

6150 West Thunderbird Road

Glendale, AZ 85306-4001

AUG 10 2012

IN REPLY REFER TO:  
PXAO-4000  
LND-8.00

Mr. Ron McCally  
Valley Project Management  
Arizona Department of Transportation  
1611 West Jackson Street - MD EM01  
Phoenix, AZ 85007

Subject: Black Mountain Boulevard (BMB) Routing Alternatives, SR 51/Loop 101 Freeway Interchange (Interchange) to Cave Creek Road

Dear Mr. McCally:

The Bureau of Reclamation has reviewed multiple routing alternatives for your proposed BMB feature that traverses Federal lands and supports two of the three alternatives as discussed below. As background, Reclamation is responsible for the portion of the study area abutting the Central Arizona Project (CAP) canal defined as the Reach 11 Recreation Area (Reach 11). Reclamation's primary responsibility in managing this land is to ensure that the function of this area is maintained as a flood-control basin, and that the integrity of our facilities remains intact. The secondary purpose of Reach 11 is described in the 1986 Recreation Land-Use Agreement (Agreement) between Reclamation and the city of Phoenix (City) that allows the City Parks and Recreation Department to operate and maintain recreational facilities within Reach 11. Subsequent to that Agreement, Reclamation signed a Record of Decision in January 2003 for the Final Environmental Impact Statement (FEIS) and supporting the Reach 11 Recreation Master Plan (Master Plan) that further defined the types of uses and location of those uses that would occur within Reach 11. Included in the adopted Master Plan is an area defined for transportation facilities (identified as Zone 2) for the subject Interchange and the BMB ramp connections to and from SR 51.

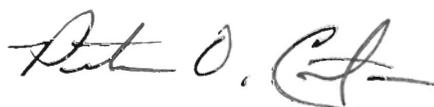
Alternatives 1 and 2 developed by the BMB study team appear to be consistent with the implementation of the Master Plan. We understand the public had requested the study team to consider an alignment alternative that would route the BMB through Reach 11 outside of Zone 2 and west of Pinnacle High School (Alternative 3). Reclamation has significant concerns with Alternative 3 because it would deviate from what was previously approved in our Record of Decision as the set-aside for transportation facilities, and would impact areas designated for the future development of recreational uses. We understand that the City Parks and Recreation Department has also expressed its concerns with Alternative 3 as they are the entity currently responsible for implementing, operating, and maintaining recreation facilities per our Agreement and in accordance with the FEIS and the Master Plan. Additionally, in our discussion with the project's operating entity, the Central Arizona Water Conservation District, we have also jointly

expressed concerns for any alignments that would constitute a lateral encroachment, which we believe this would as it parallels the CAP canal.

In summary, Reclamation is opposed to the implementation of Alternative 3. We believe implementation of either Alternatives 1 or 2 would satisfy the intent of our original recreation planning and environmental review.

Thank you for the opportunity to provide input, and please contact me at 623-773-6240 should you have any questions or require clarification regarding this letter.

Sincerely,

A handwritten signature in black ink, appearing to read "Peter O. Castaneda". The signature is fluid and cursive, with a large, stylized initial "P" and "C".

Peter O. Castaneda  
Chief, Water and Lands Division

cc: Mr. David V. Modeer  
General Manager  
Central Arizona Water  
Conservation District  
Attention: Mr. Tom Fitzgerald  
P.O. Box 43020  
Phoenix, AZ 85080-3020