

# Chapter 2

## Revised Project Description

The chapter discusses the characteristics of the currently proposed project, particularly as related to Alternative 3 - the Preferred Alternative, and describes how and why certain characteristics of the currently proposed project differ from those presented in the Draft EIS/EIR. As described in greater detail below, the Partner Agencies have revised the project description in response to comments on the Draft EIR, paying particular attention to concerns expressed by the local community. Additionally, technical data recently developed by the Partner Agencies regarding hydrologic analyses for the Folsom Facility suggest that the need for, and extent of, a raise greater than 3.5 ft is no longer necessary to provide dam safety and flood damage reduction benefits. The raise element of the project will undergo detailed design during the Corps' pre-construction, engineering and design phase and if needed, supplemental NEPA/CEQA documentation would be prepared.

While the basic nature, purpose, and fundamental elements of the project remain the same as described in the Draft EIS/EIR, the Partner Agencies have refined certain aspects of the project in response to concerns raised during the public comment period and the development of recent data indicating a reduced need for certain flood control improvements (such as a raise of more than 3.5 ft). The following sections 1) summarize the four basic action elements associated with the project, 2) describe how the project description has changed since publication of the Draft EIS/EIR, with particular attention to Alternative 3 and a brief discussion of the other alternatives, and 3) describe the implementation sequence (i.e., phasing) of the currently proposed project.

### 2.1 Description of the Folsom DS/FDR Preferred Alternative

The Folsom DS/FDR Preferred Alternative incorporates four action elements to be implemented by Reclamation and the Corps.

1. A new **Auxiliary Spillway** would be controlled by 6 submerged tainter gates (6STG). The Auxiliary Spillway, also referred to as the JFP, would be implemented jointly by Reclamation and the Corps to address hydrologic Dam Safety and Flood Damage Reduction concerns related to controlled release of water from Folsom Dam. Reclamation has also evaluated a Fuseplug Spillway alternative as a stand-alone dam safety alternative to be implemented only if the Corps is unable to receive timely construction funding or realize timely hydrologic risk reduction by

construction of the 6STG spillway. Reclamation and the Corps will jointly identify the final environmental mitigation and commitments for the new Auxiliary Spillway project element, inclusive of the Fuseplug option, under a joint JFP ROD.

2. Additional **Dam Safety** modifications will be undertaken by Reclamation to address seismic and static concerns related to the Main Concrete Dam and six of the eleven earthen structures. Seismic modifications would be made to MIAD by undertaking foundation jet grouting in conjunction with a downstream overlay and the reinforcement of Main Concrete Dam existing gates and piers. Static modifications would be undertaken to the Right and Left Wing Dams (RWD, LWD), Dikes 4, 5 and 6 and MIAD. Reclamation will independently identify the final environmental mitigations and commitments for this effort under a stand-alone ROD.
3. **Security** improvements will be undertaken by Reclamation to key Folsom facilities to address national security concerns. Reclamation will independently identify the final environmental mitigations and commitments for this effort under the dam safety ROD.
4. **Flood Damage Reduction** improvements in addition to the 6STG will be undertaken by the Corps including modification or replacement of existing emergency spillway gates and a 3.5-ft raise to all Folsom embankment facilities. The Corps will prepare a separate ROD for the 3.5-ft raise, emergency gate modifications or replacement, and other flood damage reduction features. As described more in this section, detailed design for these flood damage reduction features at the Folsom Facility would occur during the Corps' pre-construction, engineering and design phase. The issuance of a ROD by the Corps for such improvements at the Folsom Facility is not expected to occur in conjunction with the currently proposed DS/FDR actions, but rather would occur later as a separate action with supplemental environmental documentation if necessary.

The following sections describe the basic nature and characteristics of each of these four actions. Section 2.2.4 of the Draft EIS/EIR provides detailed descriptions of the various engineering measures (i.e., improvements) associated with these actions, which were included to varying degrees in the six alternatives (i.e., No Action/No Project Alternative and Alternatives 1 through 5).

### **2.1.1 Auxiliary Spillway - JFP (Reclamation and the Corps)**

The JFP involves the construction of a new Auxiliary Spillway (6STG or Fuseplug control structure) downstream of the toe of the LWD to provide the operational capability for improved hydrologic control (controlled sustained discharge earlier

and for longer durations and/or prevention of overtopping) of storm induced floods in excess of reservoir storage capacity in advance of and during a major storm. The new Auxiliary Spillway Preferred Alternative (6STG) would be constructed jointly by Reclamation and the Corps. Reclamation would initiate excavation of the spillway channel and stilling basin and the Corps would complete excavation of the channel including the approach channel, and construct the control structure and concrete lining of the channel and stilling basin. The Draft EIS/EIR addressed the impacts of constructing either spillway option, including operating the new facility to existing operational parameters. The Corps has initiated further study, including the follow-up environmental documentation process, to address the future operational issues for the 6STG spillway.

Common (soil) rock material excavated from the spillway channel would be hauled eastward on government property for temporary stockpiling and/or permanent disposal of excess material at or near the downstream toe of the LWD, Observation Point area, Dike 7, and the D1/D2 area near MIAD (see Figure 2-1 for locations of site features and stockpile areas under the Preferred Alternative). Although not part of the JFP, the temporarily stockpiled material would be used for the proposed dam safety improvements (Section 2.1.2 below) including construction of a downstream overlay at MIAD and various staging platforms.

### **2.1.2 Dam Safety Improvements (Reclamation)**

To address seismic and static concerns for structures comprising the Folsom Facility, Reclamation has planned modifications for the Main Concrete Dam, the RWD and LWD, Dikes 4, 5, and 6, and MIAD. All of these modifications would be constructed independently by Reclamation.

To address seismic concerns for the Main Concrete Dam, three types of improvements are planned to provide reinforcement to the existing spillway gates and piers to withstand a major earthquake. Deformation of the gate piers and during earthquake loading could result in failure of several spillway gates. This failure could release significant quantities of water that could cause flooding and possible failure of the downstream levees. The three types of improvements proposed to enhance dam safety include:

- a) Bracing between existing piers - The project design is intended to inhibit pier bending during an earthquake. The braces consist of steel trusses that span the distance between piers. The braces (seven per spillway bay) are designed to carry the cross-canyon force during a seismic event. The braces would reduce bending stresses in the pier reinforcing steel and minimize deflections of the piers and potential loading of the spillway gates.
- b) Pier wrap - This improvement involves placement of a steel plate wrapped around the downstream portion of the pier and anchored with bolts on both

sides that extend completely through the pier, upstream of the area of concern. The steel plate would carry the load placed on it if the pier tends to shear and displace; the pier would hold in place.

- c) Spillway gate bracing - Spillway gates would be overstressed during large seismic events and could fail from buckling of the gate arms. Failure of several spillway gates could release significant quantities of water that could cause flooding and failure of the downstream levees. Designs for reinforcing and/or replacing the existing gate arm members were developed as part of the project to address this failure mode. These modifications would strengthen the gate arms and reduce the probability of gate failure. This strengthening could be performed with the gate in place. During construction, a bulkhead would be installed upstream of the gate to eliminate loading on the gate and the reinforcement installed.

To address seismic concerns for MIAD, two types of improvements are planned. The first improvement involves stabilization of the foundation of MIAD using a subsurface jet grouting process. A cement-grout mixture would be formed on-site using a cement material hauled to the MIAD project site and mixed with water. The cement water mixture would be injected into the subsurface by a drilling method and would solidify in situ. Following jet grouting, material temporarily stockpiled from the new Auxiliary Spillway site at the D1/D2 area, along with processed sand and gravel material, would be placed as an overlay on the downstream face of MIAD.

To address static concerns for LWD, RWD, Dikes 4, 5, and 6, and MIAD, Reclamation would install new seepage control filters within the downstream face of each earthen structure. The filter material would be processed sand and gravel material and would be delivered to each individual facility from offsite in highway legal haul trucks and/or processed from materials excavated from the Auxiliary Spillway on-site at or near the LWD. The construction improvements involve stripping a layer of shell material from the downstream face of the wing dams and dikes, placing the filter material, and replacing the shell. Additional material needed to rebuild the shell would either be excavated from the Auxiliary Spillway site or from supplemental borrow sites.

### **2.1.3 Dam Security Improvements (Reclamation)**

Reclamation would install security cameras at access points to the Main Concrete Dam, Dikes 4 through 7, and at MIAD. The cameras would be placed on 30-ft steel poles with electrical and cable connections buried. To improve the night visibility of the Main Concrete Dam and control gates, Reclamation would install lighting to focus on the critical aspects of this structure. To the extent practicable, lighting would be installed in a manner that meets security mission requirements and

minimizes glare or reflection impacts to homes and other private property surrounding the reservoir.

#### **2.1.4 Flood Damage Reduction Actions (Corps)**

To provide for improved flood damage reduction benefits in addition to the 6STG spillway, the Corps plans two separate actions as their Selected Plan. Construction of the JFP Auxiliary Spillway would increase project discharge capacity at lower pool elevations with no net increase in pool elevation. This allows lowering of the maximum pool and a decrease in the need for surcharge storage space in the reservoir. The additional modifications include the modification and/or replacement of existing emergency spillway gates and a 3.5-ft parapet wall or earthen raise to all embankment structures. The spillway gate replacement is to account for differing gate sizes and/or improve flow capacity; the raise is intended to provide additional freeboard. The 3.5-ft raise and emergency gate replacement portion of the Corps' Selected Plan would undergo further design during the Corps' pre-construction, engineering, and design phase.

## **2.2 Changes to the Project Since the Release of the Draft EIS/EIR**

Based upon additional engineering analysis and responding to public comments on the Draft EIS/EIR, the following section introduces the changes to the project description as revised since the release of the Draft EIS/EIR.

### **2.2.1 Sequencing and Length of the Folsom DS/FDR Actions**

The Partner Agencies have modified the proposed sequencing of construction at each of the Folsom facilities. The proposed completion date for certain dam safety actions have been extended several years and there is less overlap of construction work for the dikes and wing dams. The new Auxiliary Spillway would now be constructed as part of three phases. Table 2-1 provides the proposed sequencing of the Folsom DS/FDR actions. It is important to note that the schedule proposed in Table 2-1 is tentative and subject to change based on engineering design considerations and availability of funding for each activity.

### **2.2.2 Inundation Due to Raises**

The Draft EIS/EIR introduced the possibility of constructing a Folsom Facility raise greater than 4 ft which could result in constructing new embankments to contain reservoir water resulting from an increased reservoir surface elevation beyond existing conditions. Since publishing the Draft EIS/EIR, Reclamation has determined that a Fuseplug Spillway alternative could pass the PMF without the need for embankment raises above the current crest elevation. As a result,

<b>Table 2-1</b>		
<b>Folsom DS/FDR Project Phase Sequencing</b>		
<b>Activity ID</b>	<b>Folsom Facility</b>	<b>Construction Period</b>
1	Auxiliary Spillway Excavation Phase 1	September 2007 to March 2009
2	Right and Left Wing Dam Static Modifications	October 2007 to November 2008
3	MIAD Jet Grouting	July 2008 to November 2009
4	Auxiliary Spillway Excavation Phase 2	September 2010 to January 2014
5	Dike 5 Static Modifications	September 2009 to May 2010
6	MIAD Seismic Overlay	June 2015 to April 2017
7	Dikes 4 and 6 Static Modifications	September 2017 to April 2018
8a	Pier Tendon Installation at Main Concrete Dam	January 2014 to March 2015
8b	Spillway Pier Wraps & Braces	August 2016 to April 2018
8c	Spillway Gate Repairs	January 2018 to August 2020
9	Auxiliary Spillway Approach Channel Excavation Phase 3 and Gate Structure Construction	September 2011 to November 2014
10	Raise of all Folsom Facilities	May 2010 to September 2014

Reclamation has determined that no property takes, flowage easements, or additional small scale impoundment features such as dikes or berms are planned as part of its role in the Folsom DS/FDR actions.

Based upon additional engineering analysis since the Draft EIS/EIR was published, the Corps has concluded that with optimization of all elements of the Selected Plan (6STG, emergency spillway gate modification and 3.5-ft raise) an increase to maximum reservoir water surface elevation beyond current dam crest elevation is not anticipated to provide for flood damage reduction benefits.

Under the Selected Plan, the future maximum reservoir water surface elevation would not exceed the existing take line for a 200-year design event and there would be a lower maximum water surface elevation than the without-project condition for all flood events inclusive of a PMF event. This would eliminate the risk that surrounding properties would be flooded. Consequently, no property takes, flowage easements or additional small scale impoundment features such as dikes or berms beyond the existing take line are planned in the Final EIS/EIR. The 3.5-ft raise portion of the Selected Plan will undergo further design during the Corps' pre-construction, engineering, and design phase and if needed, supplemental NEPA/CEQA documentation would be prepared.

### 2.2.3 Folsom DS/FDR Optimized Project Area

The project footprint evaluated in the Draft EIS/EIR included areas required to construct raises of all structures up to 17 ft in height (Alternative 5).<sup>1</sup> Based upon further engineering analysis and considering public comments on the Draft EIS/EIR, the Partner Agencies have concluded that raises above 3.5 ft are not required and have eliminated them as project alternatives. As a result, the project footprint has been reduced to the minimum area necessary to support the new Auxiliary Spillway; work on the main concrete dam; the seismic and static modifications to Dikes 4, 5, 6, LWD and RWD and MIAD; and any 3.5-ft raise. Reducing the project footprint has reduced impacts to those presented in the Draft EIS/EIR, primarily pertaining to recreation, vegetation and wildlife, and other elements of vital concern to the surrounding communities. Upon completion of construction, project staging areas, haul roads, stockpiles, temporary access roads, detours, trails and paths or similar features would either be reclaimed/restored as close to practical to the pre-existing condition and/or similar to the surrounding terrain and/or be graded to provide unimproved platforms as elected by Reclamation.

The following text summarizes specific individual changes to the project footprint as a result of eliminating raises above 3.5 ft, along with the commensurate reduction in impacts. Figures 2-1 and 2-2 illustrate the reduction in project footprints under the Draft EIS/EIR and the revised Preferred Alternative. These figures should be reviewed in relation to the text below.

#### ***Dike Crest and Toe Construction Zones***

In the Draft EIS/EIR, the maximum area of impact for the dike construction zones was assumed to encompass a 150-ft vegetation clearing buffer from the downstream toe of all earthen embankments except at Dike 7, the LWD and MIAD and embankment crest widths to accommodate up to a 17-ft raise. In the revised project description, areas below Dikes 1, 2, and 8 have been removed from consideration. Areas at Dike 7, the RWD, LWD, and MIAD remain largely the same. Minor adjustments include extending areas to the federal property boundary limits below Dike 7 to accommodate material stockpiles; at the site of the new Auxiliary Spillway below the LWD to the newly granted easement limit provided for the Folsom Bridge Project; and at MIAD to the federal property boundary bordering Green Valley Road to accommodate jet grouting and the seismic overlay modifications. All other toe buffers have been eliminated from Dikes 1, 2, 3, and 8 and reduced to 80 ft or less at Dikes 4, 5, and 6.

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<sup>1</sup> While several of the alternatives considered in the Draft EIS/EIR propose a dam/facility raise less than the 17 ft anticipated under Alternative 5, a single most-conservative impact footprint was used in the programmatic-level analysis of all alternatives that proposed any raise (i.e., Alternatives 2 through 5).

Crest widths on all earthen embankments have been reduced to the limit of the existing crest width, typically 20 ft, to accommodate the 3.5-ft raise. No additional toe area is required to accomplish the raise element for Dikes 4, 5, 6, and 7. For Dikes 1 to 3 and Dike 8, a 50-ft temporary construction easement is assumed. Chapter 3 of this Final EIS/EIR discusses how these changes would reduce impacts to the natural, physical, and social environments. Figures 2-1 and 2-2 of this document provide a comparison of the reduced footprints for construction zones near the facilities proposed for modifications.

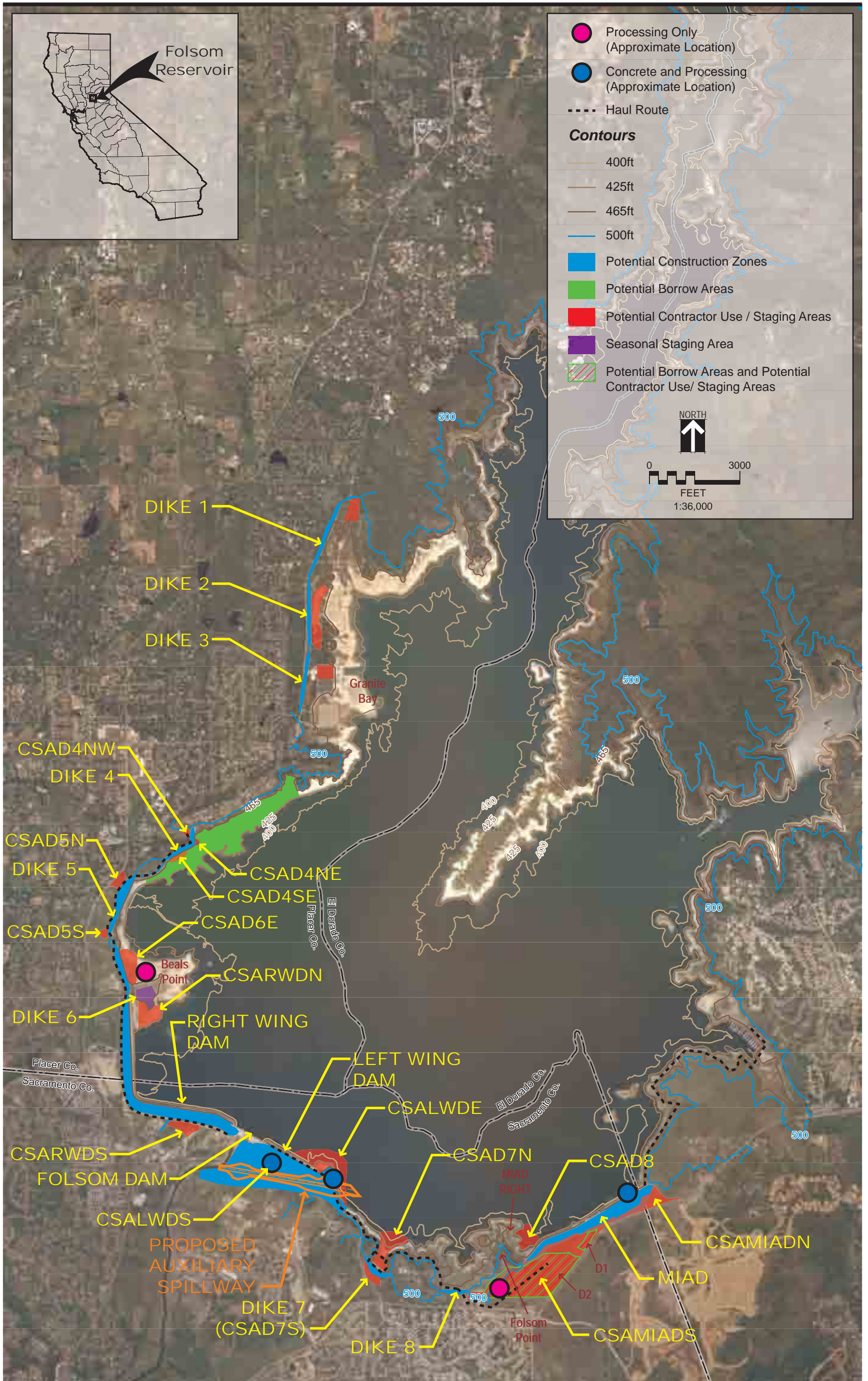
### ***Haul Routes***

In response to public comments on the Draft EIS/EIR, the Partner Agencies have further clarified the proposed haul routes identified in the Draft EIS/EIR. The haul routes are predominantly within the Federal property boundary and use existing service routes along the immediate toes of existing embankments and/or in-reservoir (i.e. at or below elevation 480.5 ft and typically above normal operational reservoir water surface elevation of 466.0 ft). The identified routes avoid surveyed cultural resources sites, incorporate public safety protection measures, such as fencing and with traffic control measures and/or grade separated crossings, and/or provide for temporary alternate public access detours at major recreation area access points. To the extent practicable, the Partner Agencies would use natural topography and stockpiled materials to reduce noise along haul routes and control fugitive dust emissions with combinations of water, dust control surfactants, and gravel. The use of haul routes, along with other impact reduction measures would reduce recreational impacts. A summary explanation is provided below and detailed explanation of this change to relevant specific impacts, such as recreation, is addressed in Chapters 3 and 4.

As outlined in Section 2.5 and Chapter 4 of this document, there would be nearly continuous public access to recreation areas throughout the construction period. Access would be facilitated through the use of traffic control measures and/or grade separated vehicular and/or pedestrian crossings and/or temporary alternate public access detours. Temporary closures could occur during construction of the grade separation or other access measures or to meet unforeseen project circumstances. In such cases, temporary closures would be accomplished during off-peak days or the off-season to minimize impacts on recreation activities.

Reclamation's Central California Area Office will notify local agencies and the general public and accept input in advance of any possible extended closure(s) that may be necessary due to unforeseen project circumstances.





**Figure 2-1**  
The Preferred Alternative  
Construction Zones