

American River Watershed Project

# Post Authorization Decision Document

## American River Watershed Project

### Folsom Dam Raise, Folsom Bridge



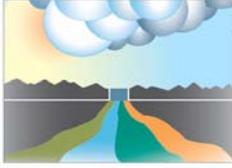
**DRAFT**



US Army Corps  
of Engineers

Sacramento District  
South Pacific Region

May 2006



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# **American River Watershed Project, California**

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**American River Watershed Project, California**  
**Folsom Dam Raise,**  
**Folsom Bridge**  
**Post Authorization Decision Document**

**EXECUTIVE SUMMARY**

**Introduction**

This report constitutes a post authorization decision document for an element—a permanent bridge—of the congressionally authorized Folsom Dam Raise Project, California. The Folsom Dam Raise Project is a key component to the American River Watershed Project, which is intended to significantly reduce the risk of flooding to the Sacramento area. In addition to the Folsom Dam Raise Project, the other components of the American River Watershed Project are: (1) the Folsom Dam Modifications Project; (2) Common Features levee work; (3) reoperation of Folsom Dam, (4) and an update of the Flood Management Plan to reflect the operational capabilities created by the Folsom Dam Modifications project and improved weather forecasting (advance release). The Folsom Dam Modifications Project is undergoing additional investigation by the U.S. Army Corps of Engineers (Corps), the U.S. Bureau of Reclamation (Reclamation), the State of California Reclamation Board, and the Sacramento Area Flood Control Agency (SAFCA).

This report (1) describes in detail both the tentatively recommended permanent bridge project and the process to identify it, and (2) presents an update of the total project cost and cost-sharing responsibilities of the overall Folsom Dam Raise Project, including the bridge project. A draft environmental impact statement/environmental impact report (EIS/EIR) has been prepared to supplement the 1996 American River Watershed Project, Supplemental Information Report and Supplemental EIS/EIR. This draft post authorization decision document and supplemental EIS/EIR are being circulated for public and agency review. Public and agency comments will be considered, as appropriate, and the documents will be finalized and transmitted to higher Corps authority. The documents will serve as the basis for a cost-sharing agreement between the Corps and the City of Folsom for construction of the permanent bridge.

**Description of Authorized Project**

The authorized Folsom Dam Raise Project includes raising Folsom Dam about 7.5 feet. Because raising the dam would have an adverse effect on regional transportation that utilizes Folsom Dam Road, the 1999 American River Long-Term Study concluded that construction of a temporary bridge would be required for mitigation for impacts to traffic across Folsom Dam Road.

The non-Federal sponsors for the overall Folsom Dam Raise Project are the State of California Reclamation Board and the Sacramento Area Flood Control Agency, with potential participation in a single feature (L.L. Anderson Dam improvements) by the Placer County Water Agency. The City of Folsom is the non-Federal partner for the

Folsom Bridge Project and plans to assume all non-Federal responsibilities associated with the project.

### **Authorization**

The current project is authorized under Public Law 108-137, Energy and Water Development Appropriation Act, 2004, Section 128 and is quoted as follows:

*1.1(a) IN GENERAL—The Secretary of the Army is authorized to carry out the project for flood damage reduction and environmental restoration, American River Watershed, California, substantially in accordance with the plans, and subject to the conditions, described in the Report of the Chief of Engineers dated November 5, 2002, at a total cost of \$257,300,000, with an estimated Federal Cost of \$201,200,000 and an estimated non-Federal cost of \$56,100,000; except that the Secretary is authorized to accept funds from State and local governments and other Federal agencies for the purpose of constructing a **permanent bridge** instead of the temporary bridge described in the recommended plan and may construct such permanent bridge if all additional cost for such bridge, above the \$36,000,000 provided for in the recommended plan for bridge construction, are provided by such governments or agencies.*

In the fall of 2005, Congress passed Public Law 109-103, Energy and Water Development Act of 2006 which states:

*(b) SECRETARY'S ROLE.—Section 134 of Public Law 108–137 (117 Stat. 1842) is modified to read as follows:*

*“SEC. 134. BRIDGE AUTHORIZATION.*

*“There is authorized to be appropriated to the Secretary of the Army \$30,000,000 for the construction of the permanent bridge described in section 128(a), above the \$36,000,000 provided for in the recommended plan for bridge construction. The \$30,000,000 shall not be subject to cost sharing requirements with non-Federal interests.”*

In early 2006, Congress passed The Energy and Water Development Appropriations Act of 2006, Section 128 which states:

*(b) SECRETARY'S ROLE- Section 134 of Public Law 108-137 is modified to read as follows:*

*Sec. 134. BRIDGE AUTHORIZATION.*

*‘There is authorized to be appropriated to the Secretary of the Army \$30,000,000 for the construction of the permanent bridge described in section 128(a), above the \$36,000,000 provided for in the recommended plan for bridge construction. The \$30,000,000 shall not be subject to cost sharing requirements with non-Federal interests.’*

## **Changes in Scope of Authorized Project**

As part of the authorization of the Folsom Dam Raise Project, Congress authorized construction of a permanent bridge to mitigate for the closure of Folsom Dam Road during construction of the dam raise.

In the 2002 Energy and Water Appropriations Act, Congress authorized constructing a permanent bridge instead of the temporary bridge described in the 1999 recommended plan on condition that all additional cost for the bridge, above the \$36 million provided for in the recommended plan for bridge construction, are provided by other Federal and non-Federal cost sharing partners. In addition, the 2004 Energy and Water Appropriations Act authorized an additional \$30 million (Federal Contribution) for the permanent bridge. The Corps has worked with the City of Folsom to develop a permanent bridge that meets project objectives.

## **Design Changes**

As noted above, the PADD documents the change from a temporary to a permanent bridge at Folsom Dam. Congressional authorization for the permanent bridge required the development of a clear definition and understanding of a permanent bridge's criteria, characteristics, and extents.

The permanent bridge is defined as a public primary traffic corridor that is designed and built to current traffic engineering standards and addresses the current and potential long-term traffic levels of service for the City of Folsom and the region. Traffic is defined to include vehicular, pedestrian, and bicycle circulation.

The analysis determined that a prestressed concrete box girder was the most cost and time efficient. An array of alternatives were developed for addressing current and long-term traffic needs focusing on a four-lane bridge, four-lane roadway.

However, with the passage of the Energy and Water Development Act of 2006, the Corps and Reclamation were authorized to work together to both reduce flood damages and address dam safety at Folsom Dam. The Combined Federal Project is now being formulated and studied. Initial potential modifications associated with improving flood operations include raising embankments and construction of an auxiliary spillway on the left abutment of the dam. While none of these potential modifications are inconsistent with the Folsom Bridge Project, the potential construction of an auxiliary spillway caused the bridge project to modify its initial roadway alignment in the area near the left abutment of the dam to avoid the auxiliary spillway.

The project experienced further delays when it became clear that the limit of both federal funds as outlined in the above authorizations and the availability of local funds might not be sufficient to fund the alternatives as formulated. Instead, a new array of alternatives was formulated to provide for a range of solutions that included both two-lane and four-lane scenarios.

## **Summary of Project First Cost**

The 2006 authorization provides that the \$36 million for the temporary bridge and the \$30 million Federal contribution for the permanent bridge may be increased as set

forth by PL99-662 Section 902 regarding maximum project costs. The maximum project cost allowed by Section 902 includes the authorized cost (adjusted for inflation to the current price level and through the construction period), the current cost of any studies, modifications, and actions authorized by the WRDA of 1986 or any later law, and 20 percent of the authorized cost (without adjustment for inflation). The maximum fully funded costs for the temporary and permanent bridge increments have been computed to be \$49.3 million and \$41.0 million, respectively. Because the Federal contribution toward the permanent bridge is considered a first cost, the Section 902 limit has been adjusted to \$39.7 million at the current October 2005 price level.

In the current plan, the permanent bridge replaces the temporary bridge needed for flood damage reduction. Thus, the cost of the temporary bridge, up to a maximum of \$49.3 million, is distributed to the Folsom Dam Raise Project since the temporary bridge is required for the project and is cost shared accordingly. The cost of the bridge that exceeds \$48.9 million is considered to be the cost of the permanent bridge increment. The permanent bridge increment is not cost shared according to flood damage reduction project rules but the City of Folsom will pay the cost that exceeds the maximum Federal contribution of \$39.7 million.

Table S-3 shows (a) the cost of the project last presented to Congress as described in the 5 November 2002 Long Term Study Chief of Engineers Report at October 2001 price level, (b) the 2004 Congressionally authorized cost, (c) the authorized cost updated to October 2005 price levels, (d) the authorized cost estimate reported in the 2002 Chief's report at October 2005 price levels, and (e) the current plan cost estimate at October 2005 price level. Although the 2002 Long Term Study specified a cost breakdown between flood damage reduction and ecosystem restoration components, there was no breakdown in the authorization. The increased temporary bridge cost from \$42.2 to \$46.9 million reflects engineering updates. The total bridge cost is estimated at \$104.1 million and the remainder of \$57.2 million is applied to the permanent bridge increment. The cost of the temporary bridge at \$46.9 million is less than the Section 902 limit of \$48.7 million.

### **Description of Project Benefits**

Benefits identified in the Folsom Dam Raise authorized project were for a temporary bridge. The PADD documents the economic analysis used to measure beneficial contributions to National Economic Development (NED) from the construction of a permanent bridge across the American River. The analysis considered two alternative bridges to afford alternate transportation across the American River. Other alternatives studied in the main document are based upon a variety of alignments but are not expected to influence the economic benefit estimates of a permanent bridge located in the same general vicinity for all alternatives. The bridge construction is necessitated by the restricted access of the Folsom Dam Road.

The economic evaluation of all benefit categories – the value of travel time delays, and the value of extra miles driven – was done in the generally accepted “without” and “with” project framework of a federal project. The “with” project condition provides for the prevention of these losses and achieves those savings associated with

the project. The resulting savings represents the National Economic Development (NED) benefits. The economic methodology is provided below.

This economic assessment is formulated to be in accordance with ER 1105-2-100. Further, benefits and costs expressed as annual values are calculated utilizing the FY06 discount rate of 5 1/8 percent with a analysis period of 50 years. All benefits and costs are expressed at an October 2005 price level. The base operational year is 2007.

The annual damages prevented through the construction of the 2-lane alternative in 2007 (\$3,801,591), is incrementally changed to reflect an annual damage prevented in 2025 of \$5,496,760. The annual damages prevented are then changed to reflect the reopening of the Folsom Dam Road and the associated benefits derived thereof (\$3,527,781,). These data were computed using excel spreadsheet and annualizing the benefits using a 5 1/8 percent discount rate for 50 years. Combined, the total average annual damage prevented is \$4,410,000.

The annual damages prevented through the construction of the 4-lane alternative in 2007 (\$6,190,309), is incrementally changed to reflect an annual damage prevented in 2025 of \$6,052,798. The annual damages prevented are then changed to reflect the reopening of the Folsom Dam Road and the associated benefits derived thereof (\$3,784,571). These data were computed using excel spreadsheet and annualizing the benefits using a 5 1/8 percent discount rate for 50 years. Combined, the total average annual damage prevented is \$5,650,000.

## **Description of Project Outputs**

The comparison of equivalent average annual benefits and average annual costs for the alternative permanent bridge alternatives shows that none of the alternatives has positive net benefits or a positive benefit-to-cost ratio based on the NED benefits derived from transportation improvements alone.

However, construction of a permanent bridge would provide benefits in the Other Social Effects (OSE) category that are important to the decision-making process. OSE benefits include urban and community impacts; life, health and safety impacts; and displacement impacts.

With the closure of Folsom Dam Road in February 2003, there has been a change in traffic patterns and congestion within the city of Folsom, especially in and around the Folsom Historic District. Commuters that once traveled across Folsom Dam Road now travel through the City of Folsom and the historic district. The increase in traffic and associated congestion in the historic district has led to a decline in visitors and shoppers. City of Folsom Chamber of Commerce have reported an average 30 percent decline in overall business following the road closure. At least six businesses have closed as a result of the road closure. Construction of a permanent bridge would relieve a substantial amount of this congestion and relieve business losses.

An additional non-monetary benefit to a new bridge and roadway outside the security zone but still within proximity of Folsom Dam is improved access to the dam for both homeland security concerns and regular operation and maintenance activities by Reclamation. Providing an additional access route, rather than Folsom Dam Road, would allow a timelier and secure means of reaching both sides of the dam for inspections, evaluations, repairs, and other maintenance activities. This proximity to strategic infrastructure provides an important benefit to the community at large.

Construction of a permanent bridge could also have a beneficial effect on life, health, and safety. Following completion, the project would provide an alternative to Folsom Dam Road for traffic to cross the American River. Beneficial effects on traffic congestion, accident rates, and emergency response times are expected as a result. Area transportation improvements coupled with the alternatives would provide a permanent beneficial effect to public health and safety by improving access and emergency response times.

Construction of a bridge would result in a savings of security costs. Without a bridge project, the City of Folsom would pay USBR to allow limited access across the existing dam road. For the W/O Project condition, security costs are assumed to be incurred beginning in 2026 with the restricted public access on the Folsom Dam Road. Surveillance equipment and installation is expected to cost approximately \$2 million. Annual labor and operation, maintenance and administration is estimated by the city of Folsom Public Works Department at \$1,583,000 annually. These costs are expected to begin in 2026. The annualized cost of installation of equipment and labor and administration is \$602,982.

### **Description of Federal and Non-Federal Cost Responsibilities**

Table S-1 summarizes how the bridge costs are distributed between the permanent and temporary increments. As previously stated, the cost of the permanent bridge increment is the difference between the total bridge cost and the temporary bridge cost. The total bridge costs for each account have been determined by cost estimating. The amounts for each cost account for the temporary and permanent bridge increments were then determined on the basis that (1) the sunk costs for planning, engineering, and design (PED) tasks are all part of the temporary bridge because the PED tasks are flood damage reduction costs, (2) the cultural resources cost is 1% of the Federal construction cost and (3) the temporary bridge would be built fully within Federal property and therefore has no LERRDs; all lands, easements, rights-of-way, and relocations are part of the permanent bridge increment. The remaining costs were determined by approximate ratio of the total bridge cost to the temporary bridge cost.

**Table S- 1. Bridge Cost Distributed to Temporary and Permanent (\$1,000)**

<b>Cost Account</b>	<b>Total Bridge</b>	<b>Temporary Bridge Increment</b>	<b>Permanent Bridge Increment</b>
Total First Cost	99.1 <sup>1</sup>	44.6 <sup>2</sup>	54.5
Lands	6.6	0	6.6
Relocations	4.0	0	4.0
Environmental Mitigation	3.0	1.3	1.7
Cultural Resources	0.7	0.3	0.4
ED/SA	13.2	5.0	8.2
PED Sunk Costs	7.8	7.8	0
Construction	63.8	30.2	33.6

- <sup>1</sup> Estimate of total first cost of the permanent bridge.
- <sup>2</sup> Estimate of first cost of the temporary bridge.
- <sup>3</sup> Estimate of the permanent bridge increment or the difference between the total cost of the permanent bridge and the cost of the temporary bridge.

### **Environmental Considerations**

An evaluation of environmental effects determined that the proposed action could have an adverse effect on some habitat types, some special-status species, air quality, noise, and transportation. With mitigation, effects to these resources, except for transportation, are anticipated to be less than significant.

Traffic mitigation features include operational and physical improvements to the existing roadway system. If implemented, mitigation measures could reduce the adverse effects to less than significant. However, the feasibility of implementing the mitigation measures is uncertain due to: lack of authority of the Corps and City of Folsom to make transportation improvements outside their areas of governance, potential adverse effects associated with acquiring and using necessary right-of-way, and lack of secure funding for transportation projects.

Construction of the bridge project would benefit the area by providing additional roadway/bridge lanes to help accommodate traffic volumes and movement over the American River in the rapidly growing and congested Folsom area. The project would also have a beneficial effect on recreation by providing increased opportunity for bicycle and pedestrian use around the Folsom Lake State Recreation Area and eliminate existing conflicts between vehicle and bicycle/pedestrian access.

## **Public Involvement**

To date, the Corps, together with the Reclamation, SAFCA, Reclamation Board, and City of Folsom, have held three public meetings and one open house to present the status of the project and obtain public input.

At the March 3, 2004, agency meeting a recommendation was made to form a Traffic Advisory Committee (TAC), whose purpose would be to assist in developing a traffic analysis and maintain communication among the concerned agencies.

Potential participants of the TAC were identified within a study area preliminarily identified as extending from Hazel Avenue on the west to Silva Valley Parkway on the east, and from Douglas Boulevard/Folsom Dam Road/Green Valley Road on the north to U.S. 50 on the south. These participants included Reclamation; California Department of Transportation (District 3); State of California Reclamation Board; Sacramento Area Council of Governments; Sacramento County Transportation Authority; City of Folsom and others from Placer and El Dorado Counties.

The Notice of Intent (NOI) to prepare a draft SEIS/SEIR for the Folsom Bridge Project was published in the *Federal Register* on April 1, 2005. The Notice of Preparation (NOP) of a draft EIR was also submitted to the Office of Planning and Research State Clearinghouse by the City of Folsom on March 28, 2005. No comments were received on the NOI. However, letters in response to the NOP were received from six agencies: Reclamation, DPR, CDC, PIA, SMAQMD, and Native American Heritage Commission.

## **Findings and Conclusions**

The following conclusions are based on the results and new information discussed in this PADD:

- A permanent bridge is needed to provide for current and future regional transportation needs.
- A permanent bridge can be built to satisfy Homeland Security standards.
- A permanent bridge can provide increased recreational opportunities to the region.
- A permanent bridge alignment must be near enough to the existing Folsom Dam Road to mitigate for temporary adverse effects to transportation due to construction of the Folsom Dam Raise Project.
- Alternative plans developed, evaluated and compared as part of this study enabled identification of a tentatively selected plan for implementation. Each of the alternatives considered includes measures to mitigate adverse effects to environmental resources.

- The City of Folsom has indicated support for serving as the non-Federal partner in implementing the tentatively recommended plan.

The tentatively recommended plan is Alternative 3, which consists of:

- Re configure existing East Natoma Street-Folsom Dam Road intersection northwest of the existing intersection, including signals and turn lanes and eliminate intersection with Briggs Ranch Drive, “full intersection”.
- Provide 4-lane roadway to the Overlook and a 2-lane roadway to the bridge, and 4-lane bridge with access for dam maintenance, future spillway, city’s water control structure, and CDC firing range.
- Provide 4-lane roadway to intersection with Folsom-Auburn Road, maintaining access to Reclamation facilities.
- Provide new intersection at Folsom-Auburn Road and the new roadway with turn lanes and minor widening, close or restrict access to the existing Folsom Dam Road.
- Construct new intersection and access road to Reclamation facilities.
- Provide Class I bike facilities on the bridge itself and Class II facilities on the roadway, reroute affected sections of the existing bike trail.
- Relocate Reclamation’s storage yard, ARWEC, State Parks offices, and power poles and SMUD towers.

Of the \$104.1 million bridge cost, \$46.9 million represents the temporary bridge increment that is required for the Folsom Dam Raise Project. The \$57.2 million balance is required to construct a permanent bridge. The \$46.9 million is distributed between flood damage reduction and dam safety as described for the total dam raise project in section 5.2.5. The temporary bridge cost is an integral part of the Folsom Dam Raise project and has a cost distribution identical to the rest of the project (58 percent flood damage reduction, 42 percent dam safety). Thus, the flood damage reduction cost is \$27.6 million and the dam safety cost is \$19.3 million. Of the \$27.6 million, the Federal share is 65 percent or \$18.0 million, and the non-Federal share is 35 percent, or \$9.6 million. The non-Federal sponsor will be required to make an up front cash contribution equal to 5 percent of the construction cost, in this case \$8.2 million. The non-Federal sponsor will provide the balance of its share during bridge construction.

The non-Federal responsibility for the dam safety costs will be determined by Reclamation. Reclamation will determine if there is a dam safety non-Federal responsibility applicable to the original Folsom Dam purposes of M&I water supply, irrigation, and hydropower.

All costs above the temporary bridge costs are the responsibility of the non-Federal bridge sponsor, the City of Folsom. However, the 2004 Appropriations Act authorized \$30 million of Federal funding for the permanent bridge. The 2006 Appropriations Act stipulated that the \$30 million is not subject to cost sharing. To allow for cost increases to the bridge, the 2006 Act also stipulates that the \$30 million may be

increased based on Section 902 cost limitation. This limit, as described above, is calculated as \$39.4 million first cost (\$40.8 fully funded). Thus for the permanent portion of the bridge cost the Federal government will provide the first \$39.4 million, and the \$15.1 million balance will be paid by the City of Folsom. Included with the City's cost are \$10.6 million for LERRDS. The alignment of the permanent bridge (Alternative 3) goes into private lands and SMUD power lines and Reclamation's ARWEC facility need to be relocated; thus LERRDs need to be acquired (See Appendix C: Real Estate). The City of Folsom has agreed to purchase these LERRDs.

Flood damage reduction cost share rules do not apply to the City of Folsom's share of the permanent bridge. Agreements on the details of payments will be made during the PCA negotiation process between the Federal government and the City of Folsom.

### Funding Since Authorization

The funding history and expenditures of the Folsom Dam Raise and Bridge Projects are shown in Table S-2.

**Table S-2. Project Funding and Expenditures (\$1,000)**

Year	Bridge Expenditures		Raise Project Expenditures	Total
	Temporary Bridge	Permanent Bridge		
Pre-FY04 (pre-authorization)	2,260	0	13,870	16,130
FY-04	650	500	1,860	3,010
FY-05	<u>2,510</u>	<u>1,890</u>	<u>2,550</u>	<u>6,950</u>
Total Sunk Cost Through FY-05 <sup>1</sup>	5,420	2,390	18,280	26,090

<sup>1</sup> Total expenditures through FY-05 are considered financial sunk costs for cost sharing computations and are not included in the computation of annual costs.

Table S-3 shows (a) the cost of the project last presented to Congress as described in the 5 November 2002 Long Term Study Chief of Engineers Report at October 2001 price level, (b) Congressionally authorized cost in the 2004 Appropriations Act at October 2003 price level, (c) the 2004 Appropriations Act authorized cost updated to October 2005 price level, (d) the cost estimate reported in the 2002 Chief's report at October 2005 price level, and (e) the current plan cost estimate at October 2005 price level. Although the 2002 Long Term Study specified a cost breakdown between flood damage reduction and ecosystem restoration components, there was no breakdown in the authorization shown in columns b and c. The temporary bridge cost in columns d and e has been updated to reflect current design refinements and prices. The total bridge cost is estimated at \$104.1 million. The permanent bridge increment cost in column e is the difference between the total bridge cost and the temporary bridge cost.

**Table S-3. Folsom Raise Project First Costs: Summary of Changes (\$million)**

Item	Project Cost Last Presented to Congress <sup>1</sup> Oct 2001 Price Level	Authorized Cost by Congress <sup>2</sup> Oct 2003 Price Level	Authorized Cost (b) Updated to Oct 2005 Price Level <sup>3</sup>	Authorized Project Cost(a) Updated to Oct 2005 Price Level <sup>4</sup>	Currently Recommended Plan at Oct 2005 Price Level <sup>5</sup>
	a	b	c	d	e
Folsom Dam Raise	174.1			211.0	211.0
L.L. Anderson Dam Spillway Modification	12.1			14.7	14.7 <sup>6</sup>
Ecosystem Restoration	27.4			33.1	33.1
Temporary Bridge	35.0			42.2 <sup>7</sup>	46.9 <sup>8</sup>
Permanent Bridge Increment	0			0	57.2 <sup>9</sup>
<b>Total Project</b>	<b>248.6</b>	<b>257.3</b>	<b>293.0</b>	<b>301.0</b>	<b>362.9 <sup>10</sup></b>

<sup>1</sup> Authorized Project cost estimate as described in the 5 November 2002 Chief of Engineers Report for the Long Term Study, October 2001 price level

<sup>2</sup> Authorized cost cited in the 2004 Energy and Water Development Act, October 2003 price level

<sup>3</sup> Authorized cost updated to October 2005 price level

<sup>4</sup> Cost estimate of the authorized plan, October 2005 price level.

<sup>5</sup> Cost estimate of the currently recommended plan, October 2005 price level.

<sup>6</sup> The total cost of LL Anderson Dam spillway modification. However, since authorization, it has been determined that PCWA would be responsible for the cost of \$6.7 million to modify the spillway for LL Anderson Dam licensing requirements by the State and FERC.

<sup>7</sup> Cost estimate for the temporary bridge in the Long Term Study at October 2005 price level.

<sup>8</sup> Cost of the temporary bridge, including updated engineering studies.

<sup>9</sup> The cost attributed to the permanent bridge increment, which is the total cost of the bridge at \$104.1 million less the cost of the temporary bridge.

<sup>10</sup> Includes PCWA responsibility for LL Anderson dam safety. See footnote 6.

## Changes in Cost Apportionment

**Table S-4. Raise Project: Comparison of Cost Apportionment for Flood Damage Reduction <sup>1</sup> (\$1,000)**

MCACES ACCT <sup>3</sup>	Item	Authorized Project October 2005 Price Level <sup>1</sup>			Currently Recommended Project October 2005 Price Level <sup>2</sup>		
		Fed	Non- Fed	Total	Fed	Non-Fed	Total
	<b>First Costs</b>						
1	Lands	640	290	930	640	290	930
2	Relocations		2840	2840		2,840	2,840
4	Construction	195,720		195,720	196,100		196,100
6	Environmental. Mitigation	4,870		4,870	6,580		6,580
18	Cultural Resources <sup>4</sup>	1,910		1,910	2,220		2,220
30, 31	ED/SA	60,860	740	61,600	63,170	740	63,910
	<b>Total FDR/DS Cost</b>	264,000	3,870	267,870	268,710	3,870	272,580
	<b>Less PCWA LLA<sup>2</sup></b>	-		-	-6,700		-6,700
	<b>Subtotal</b>	264,000	3,870	267,870	262,010	3,870	265,880
	<b>Less Dam Safety</b>	-110,800		-110,800	114,300		114,300
	<b>FDR Subtotal</b>	153,200	3,870	157,070	147,710	3,870	151,580
<b>Distribution of Flood Damage Reduction Costs</b>							
	<b>FDR Subtotal</b>	153,200	3,870	157,070	147,710	3,870	151,580
	Less Cult. Res <sup>3</sup>	-1,190		-1,190	-2,220		-2,220
	Adjust. Subtotal	151,290	3,870	155,160	145,490	3,870	149,360
	5% Cash <sup>4</sup>	-7,850	7,850	0	-7,580	7,580	0
	<b>Subtotal</b>	143,440	11,720	155,160	137,910	11,450	149,360
	Cash Adjustment	-42,950	42,950	0	-40,830	40,830	0
	<b>Subtotal</b>	100,850	54,310	155,160	97,080	52,280	149,360
	Add Cult. Res.	1,910		1,910	2,220		2,220
	<b>Total</b>	102,760	54,310	157,070	99,300	52,280	151,580
	Percent	65%	35%	100%	65%	35%	100%
<p>1. Authorized Project includes all of L.L. Anderson spillway enlargement cost, temporary bridge is \$46.9 million, October 2005 price level update from \$36 million (October 2001). The SCRB percentages are 57 percent flood damage reduction – 43 percent dam safety.</p> <p>2. Since authorization, it has been determined that PCWA is responsible for the portion of the dam safety cost of LL Anderson Dam that is required by FERC and the State.</p> <p>3. Cultural Resources Data Recovery 1% of Federal Total Construction Cost, non-reimbursable. Cultural Resources cost beyond 1 percent the non-Federal sponsor will cost share 34 percent.</p> <p>4. Sponsor required to pay 5 percent cash contribution</p>							

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**American River Watershed Project, California  
Folsom Dam Raise,  
Folsom Bridge  
Post Authorization Decision Document**

**Acronyms and Abbreviations**

AAHU	Average Annual Habitat Unit
AASHTO	American Association of State Highway and Transportation Officials
AFRP	Anadromous Fish Restoration Program
ARWEC	American River Water Education Center
ARWP	American River Watershed Project
ASA (CW)	Assistant Secretary of the Army (Civil Works)
CAS	Corrective Action Study
CDCR Rehabilitation	California Department of Corrections and Rehabilitation
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfs	cubic feet per second
Corps	U.S. Army Corps of Engineers
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
DOD	Department of Defense
DSOD	Division Safety of Dams
EGM	Economic Guidance Memorandum
EIS/EIR report	environmental impact statement/environmental impact report
ESRD	Emergency Release Spillway Diagram
FEIS	final environmental impact statement
FERC	Federal Energy Regulatory Commission
kV	kilovolt
LERRDs	Lands, Easements, Rights-of-Way, Relocations, and Disposals
LOS	Level of Service
MCACES	Micro-Computer Aided Cost Engineering System
NEMDC	North East Main Drainage Canal
NEPA	National Environmental Protection Act

PADD	Post Authorization Decision Document
PCA	Project Cooperation Agreement
PCWA	Placer County Water Agency
PG&E	Pacific Gas & Electric
PM	project manager
Reclamation Board	California Reclamation Board
Reclamation	U.S. Bureau of Reclamation
SAFCA	Sacramento Area Flood Control Agency
SMUD	Sacramento Municipal Utility District
SRA	State Recreation Area
State Parks	California Department of Parks and Recreation
SWRCB	State Water Resources Control Board
WRDA	Water Resources Development Act

**American River Watershed Project, California  
Folsom Dam Raise,  
Folsom Bridge  
Post Authorization Decision Document**

**CHAPTER 1.0  
INTRODUCTION**

**1.1 Project Authorization**

The current project is authorized under Public Law 108-137, Energy and Water Development Appropriation Act, 2004 and is quoted as follows:

1. *Section 128. AMERICAN RIVER WATERSHED, CALIFORNIA.*

- *(a) IN GENERAL—The Secretary of the Army is authorized to carry out the project for flood damage reduction and environmental restoration, American River Watershed, California, substantially in accordance with the plans, and subject to the conditions, described in the Report of the Chief of Engineers dated November 5, 2002, at a total cost of \$257,300,000, with an estimated Federal Cost of \$201,200,000 and an estimated non-Federal cost of \$56,100,000; except that the Secretary is authorized to accept funds from State and local governments and other Federal agencies for the purpose of constructing a **permanent bridge** instead of the temporary bridge described in the recommended plan and may construct such permanent bridge if all additional cost for such bridge, above the \$36,000,000 provided for in the recommended plan for bridge construction, are provided by such governments or agencies.*
- *(b) EXPEDITING BRIDGE DESIGN AND CONSTRUCTION—The Secretary, in cooperation with appropriate non-Federal interests, shall immediately commence appropriate studies for, and the design of, a permanent bridge (including an evaluation of potential impacts of bridge construction on traffic patterns and identification of alternatives for mitigating such impacts) and, upon execution of a cost-sharing agreement with such non-Federal interest, shall proceed to construction of the bridge as soon as practicable; except that such studies, design and construction shall not adversely affect the schedule of design or construction of authorized project for flood damage reduction.*

1.

1. *Section 134. BRIDGE AUTHORIZATION. There is authorized to be appropriated \$30,000,000 for the construction of the permanent bridge in section 128(a).*

In the fall of 2005, Congress passed Public Law 109-103, Energy and Water Development Act of 2006 which states:

*SEC. 128. American River Watershed, California (Folsom Dam and Permanent Bridge)- (a) COORDINATION OF FLOOD DAMAGE REDUCTION AND DAM SAFETY- The Secretary of the Army and the Secretary of the Interior are directed to collaborate on authorized activities to maximize flood damage reduction improvements and address dam safety needs at Folsom Dam and Reservoir, California. The Secretaries shall expedite technical reviews for flood damage reduction and dam safety improvements. In developing improvements under this section, the Secretaries shall consider reasonable modifications to existing authorized activities, including a potential auxiliary spillway. In conducting such activities, the Secretaries are authorized to expend funds for coordinated technical reviews and joint planning, and preliminary design activities.*

*(b) SECRETARY'S ROLE.—Section 134 of Public Law 108–137 (117 Stat. 1842) is modified to read as follows:*

*“SEC. 134. BRIDGE AUTHORIZATION.*

*“There is authorized to be appropriated to the Secretary of the Army \$30,000,000 for the construction of the permanent bridge described in section 128(a), above the \$36,000,000 provided for in the recommended plan for bridge construction. The \$30,000,000 shall not be subject to cost sharing requirements with non-Federal interests.”.*

*(c) CONFORMING CHANGE.—Section 128(a) of Public Law 108–137 (117 Stat. 1838) is modified by deleting “above the \$36,000,000 provided for in the recommended plan for bridge construction,” and inserting in lieu thereof the following: “above the sum of the \$36,000,000 provided for in the recommended plan for bridge construction and the amount authorized to be appropriated by section 134, as amended,”.*

*(d) MAXIMUM COST OF PROJECT.—The costs cited in subsections (b) and (c) shall be adjusted to allow for increases pursuant to section 902 of Public Law 99–662 (100 Stat. 4183). For purposes of making adjustments pursuant to this subsection, the date of authorization of the bridge project shall be December 1, 2003.*

*(e) EXPEDITED CONSTRUCTION.—The Secretary, in coordination with the Secretary of the Interior and affected non-Federal officials (including the City of Folsom, California), shall expedite construction of a new bridge and associated roadway authorized in Public Law 108–137. The Secretary, to the extent practicable, may construct such work in a manner that is compatible with the design and construction of authorized projects for flood damage reduction and dam safety. The Secretary and the Secretary of the Interior shall expedite actions under their respective jurisdictions to facilitate timely completion of construction.*

*(f) REPORT TO CONGRESS.—The Secretary of the Army, in consultation with the Secretary of the Interior and non-Federal interests, shall report to Congress within ninety days of the date*

*of enactment of this Act, and at four-month intervals thereafter, on the status and schedule of planning, design and construction activity.*

## **1.2 Purpose**

The purpose of this post authorization decision document (PADD) is to provide information on the Folsom Bridge portion of the Folsom Dam Raise Project. The Folsom Dam Raise Project is one of the projects authorized by Congress to reduce the risk of flooding in the Sacramento Region.

As part of the authorization of the Folsom Dam Raise Project, Congress authorized construction of a permanent bridge to mitigate for the closure of Folsom Dam Road during construction of the dam raise.

This report provides detailed information on the bridge necessary to support a cost sharing agreement between the U. S. Army Corps of Engineers (Corps) and City of Folsom and provides alternatives that are considered in the associated Supplemental Environmental Impact Statement/Environmental Impact Report (SEIS/EIR). This document also updates the overall Folsom Dam Raise Project costs and cost sharing responsibilities.

## **1.3 American River Watershed Overview**

The American River Watershed drains about 2,100 square miles along the western slope of the Sierra Nevada in northern California (Figure 1). The area has a well-developed drainage system composed of three principal streams—North Fork, Middle Fork, and South Fork—which flow generally westward. There is considerable variation in vegetative cover over the watershed, ranging from light to medium density at low elevations, heavy over most of the intermediate area, moderate and light over the high areas, and practically non-existent in severely glaciated areas around the high peaks. Elevations range from 10,400 feet at the headwaters to about 200 feet mean sea level (msl) at the dam. Flows from the watershed form a flood plain covering roughly 110,000 acres at the confluence of the Sacramento and American rivers. The flood plain includes most of the developed portions of the City of Sacramento and virtually the entire 55,000-acre Natomas basin, an agricultural reclamation area adjacent to the two rivers that is rapidly being urbanized.

## **1.4 American River Watershed Project Overview**

Following the record storm of 1986, the U.S. Army Corps of Engineers (Corps), California Reclamation Board (Reclamation Board), and the Sacramento Area Flood Control Agency (SAFCA) formed a partnership to find ways to reduce the Sacramento region's flood risk. This partnership led to the creation of the American River Watershed Project (ARWP).

The integrated ARWP consists of three Congressionally authorized projects: American River Common Features, Folsom Dam Modification, and Folsom Dam Raise. Following are brief overviews of the projects and their authorizations.

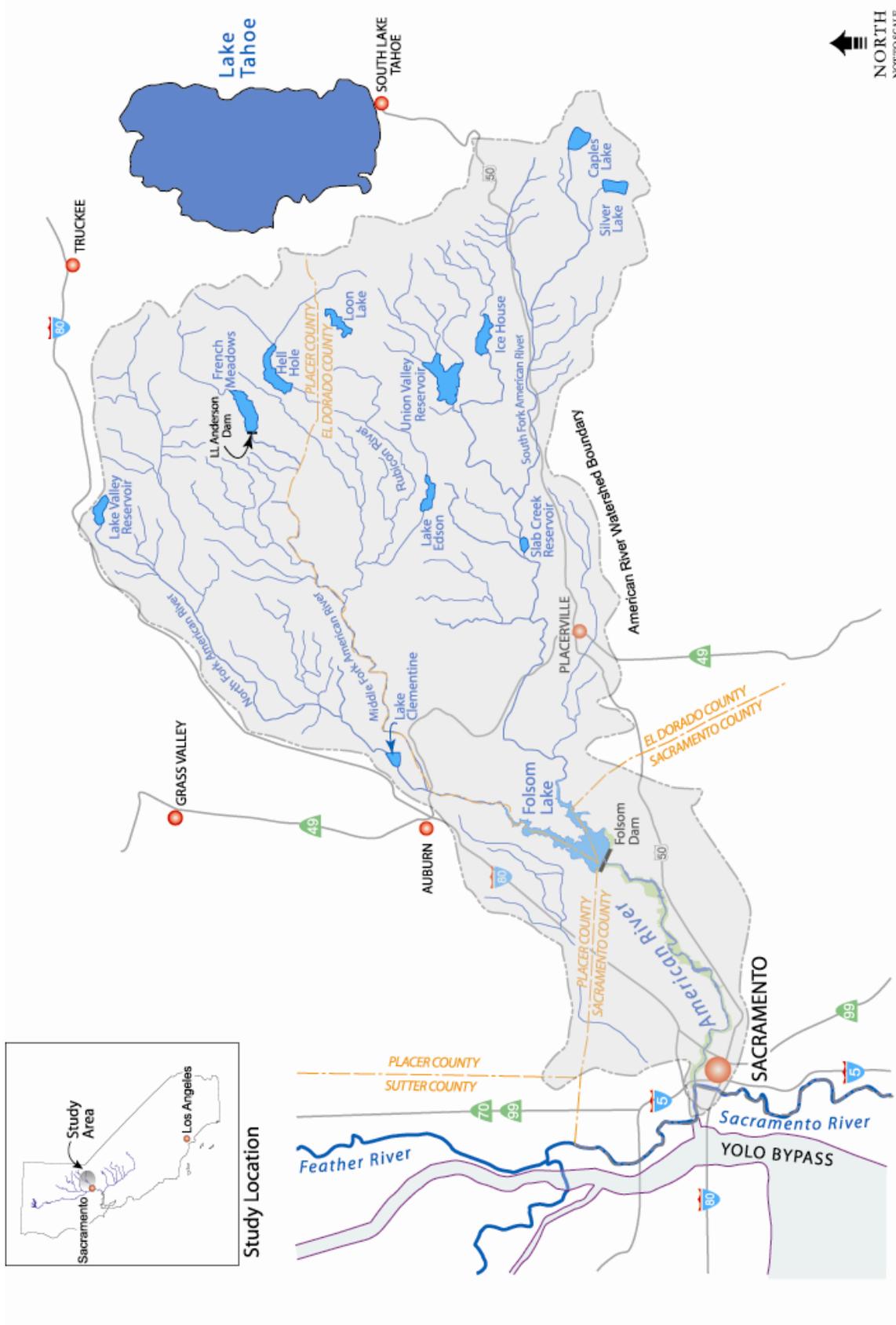
### **1.4.1 American River Common Features**

In the early 1990s, the Corps, Reclamation Board, and SAFCA proposed a flood control dam near Auburn along with levee improvements downstream of Folsom Dam. There was no community consensus for the dam, and Congress directed the Corps to instead focus on the downstream flood control system, and combine a number of features common to three different flood management proposals into one plan to reduce the flood risk to Sacramento; primarily through levee improvements.

The American River Common Features Project consists of levee work on the Lower American River, levee work on the east bank of the Sacramento River adjacent to downtown, levee work in the Natomas Basin, additional upstream river flow gages, and an improved flood warning system along the Lower American River.

The main element of the originally authorized Common Features Project was to install an impervious barrier along almost 20 miles of American River levees. The Corps has strengthened 19 miles of American River levees by constructing slurry cut-off walls and jet grouting in the levees. The most critical worksites were completed at the end of 2004. When the entire levee strengthening and raising is complete, the river's design capacity to safely pass floodwater would increase to 145,000 cubic feet per second (cfs) from its current level of 115,000 cfs.

Construction of Common Features has proven more costly than originally estimated. Because of the increase in cost, about half of the authorized levee improvements will be completed before further spending authorization is required. The bridge study forecasts that the Common Features Project will be completed as authorized in the 1996 and 1999 Water Resources and Development Acts (WRDAs) by 2007. Once construction of the Common Features Project has been completed, the chance of flooding in Sacramento would be reduced to 1 in 100 in any given year. The construction of the Common Features Project is part of the without-project condition.



**Plate 1: American River Watershed**  
 American River Watershed Project - Folsom Dam Raise

## **Project Authorization**

WRDA 1996 authorized the Common Features Project. WRDA 1999 authorized additional modification to the Common Features. These modifications primarily consist of strengthening and raising levees along the American River. In August 2000, the Corps completed an information paper describing refinements to the modification since WRDA 1999.

### **1.4.2 Natomas Levee Features**

As part of the Department of Defense Appropriation Act of 1993, Congress authorized construction of levees at Natomas and reimbursement or credit to SAFCA for constructed work. Concerned about the time frame of completion, SAFCA undertook construction of this aspect of the project. SAFCA has since completed levee improvements and a pumping facility to protect the Natomas Basin from flooding from the North East Main Drainage Canal (NEMDC), Dry Creek, Robla Creek, Arcade Creek, and the NEMDC pump station. In 1999, the Assistant Secretary of the Army for Civil Works (ASA CW) approved reimbursement to SAFCA of \$20,701,000 for features constructed. SAFCA has subsequently requested reimbursement or credit on an additional \$16,003,000. The Corps is currently considering this request and the ASA(CW) will determine if reimbursement or credit of the additional amount is within his authority.

### **1.4.3 Folsom Dam Modification**

The Folsom Dam Modification Project authorization consists of two elements: modification of the outlets in Folsom Dam and the update of the Flood Management Plan to reflect advance release capabilities.

Currently, the Folsom Dam has limited outlet capability to make effective releases in preparation for large storms. Releases through the existing eight outlets combined with releases through the powerhouse are limited to approximately 35,000 cfs. This is less than one-fourth of the capacity of the improved downstream American River levees to pass floodwater. The downstream levees are estimated to safely contain 145,000 cfs during flood operations after completion of the Common Features Project. In order to make these large flood releases, the reservoir must be nearly 75 percent full in order for the water in the reservoir to be high enough to pass through the spillway gates near the top of the dam. By that time, the flood control space behind the dam is approximately 40 percent filled.

Folsom Dam Modifications Project originally consisted of enlarging the existing outlet gates and adding two new outlets to allow for larger releases of up to 115,000 cfs earlier during a flood event. This would create additional floodwater storage space behind the dam, which would, in turn, reduce the peak amounts of floodwater sent down the American River (Figure 2).

These improvements, when combined with the American River Common Features levee work, would reduce the risk of downstream flood damage to about a 1-in-130 chance in any one year.

When the project went to bid for construction, bids far exceeded the construction estimates. A re-evaluation of the project is currently underway.

#### **1.4.4 Flood Management Plan Update**

Also referred to as advance release, this element consists of updating the Flood Management Plan for Folsom Dam to reflect the operational capabilities created by the modification of Folsom Dam and improved weather forecasts as authorized in WRDA 1999. Planning and technical studies are underway to investigate the feasibility of incorporating a “forecast-based operations” flood management strategy into the operation of Folsom Dam and Reservoir. Using National Weather Service 5-day stream flow forecasts that alert of upcoming storms, dam operators could make advance releases from the reservoir before a storm arrives. The releases would create more storage space behind the dam and lower flood flows in the Lower American River.



Figure 2. Folsom Dam

Dam operators would only use advance releases when the current flood pool and the enlarged outlet capacity could not handle the forecasted storm without significantly stressing the system. The forecasted storm would need to be of such a magnitude that even if advance release measures were initiated and then terminated due to less than forecasted storm intensity, the prospect of refill should be extremely high. The National Weather Service updates its forecasts every 6 hours, allowing dam operators to quickly adjust to new predictions.

The Corps does not currently make advance releases based on National Weather Service forecasts at any of its flood control dams. As a result, the use of advance releases at Folsom Dam requires review and approval from Corps headquarters and close coordination with project partners and stakeholders prior to its implementation. The Corps is conducting modeling studies of this type of release to support the advance release criteria for flood control operations. If implemented, the modified flood control criteria would be incorporated within the flood control manual for

the Folsom Dam Modification Project, which is currently planned to be completed before the Folsom Dam Raise Project.

### **Project Authorization**

Modifications of Folsom Dam were authorized by WRDA 1999, which reads in part:

*The Folsom Dam Modification portion of the Folsom Modification Plan described in the United States Army Corps of Engineers Supplemental Information Report for the American River Watershed Project, California, dated March 1996, as modified by the report entitled 'Folsom Dam Modification Report, New Outlets Plan,' dated March 1998, prepared by the Sacramento Area Flood Control Agency, at an estimated cost of \$150,000,000, with an estimated Federal cost of \$97,500,000 and an estimated non-Federal cost of \$52,500,000. The Secretary shall coordinate with the Secretary of the Interior with respect to the design and construction of modifications at Folsom Dam authorized by this paragraph.*

This authorization also states that the Secretary of the Army, in cooperation with the Secretary of the Interior, shall update the Flood Management Plan for Folsom Dam to reflect the operational capabilities created by the modification and improved weather forecasts based on the Advanced Hydrologic Prediction System of the National Weather Service.

### **1.4.5 Folsom Dam Raise**

The main flood damage reduction construction elements of the Folsom Dam Raise Project involve raising the existing dam and associated dikes and auxiliary dams approximately 7 feet. The project also includes enlarging the spillway at the L.L. Anderson Dam located in the upper watershed, ecosystem restoration and the construction of a permanent bridge near Folsom Dam (Figure 3).

Raising Folsom Dam is a key component of reducing Sacramento's flood risk. The dam, and other water resource projects in the basin, is responsible for regulating flows in the Lower American River. Raising the dam will increase the amount of storage capacity and would increase its ability to control larger floods.

Work to improve levees on the Lower American River and modifications planned for Folsom Dam will reduce the risk of flooding; however, the risk remains higher than is acceptable for a large urban area. Local partners want to reduce their flood risk to no greater than a 1-in-200 chance of flooding in any year. Raising Folsom Dam, along with other American River Watershed project components, is estimated to achieve that goal.

When integrated into the flood reduction benefits of the Common Features Project, raising Folsom Dam would reduce Sacramento's flood risk to about a 1-in-233 chance of flooding in any given year.

### **Construction Elements**

The Folsom Dam work involves raising the concrete section of the dam, raising the earth embankments on each side of the dam, adding larger spillway gates, and

raising the Mormon Island auxiliary dam and eight dikes around the lake approximately 7 feet. These improvements will add 95,000 acre-feet of floodwater storage capacity to the lake's current 977,000 acre-foot capacity.

All eight spillway gates will require replacement under this plan. The new gates will be approximately 66 feet high, 16 feet taller than the current gates.

The spillway stilling basin and sidewalls will be extended approximately 60 feet to ensure adequate energy dissipation of the larger flows.

### **Dam, Auxiliary Dam, and Dike Raising**

The methods for raising the concrete dam, the earthen Mormon Island auxiliary dam, and eight dikes differ and are interrelated with dam safety efforts. Currently, raising the concrete dam involves two different efforts. One is to raise the section of the dam containing the spillway gates, and the other is to raise the concrete sections on each side of the spillway gates.

Raising the section with the spillway requires removing the roadway crossing the dam (the road is actually on a bridge that goes over the spillway gate section of the dam), raising the piers for the bridge road, installing larger flood control gates, and replacing the road.

The project involves raising the concrete sections of the dam on each side of the spillway 3.5 feet, and installing a 3.5-foot-high concrete wall on the reservoir side of these sections. The 3.5-foot wall (called a parapet) will keep wave wash from going over the dam when the lake is full.

The Mormon Island auxiliary dam and eight dikes are earthen structures (Figure 4). Methods to raise these structures are being studied along with dam safety considerations. One method is to enlarge them using soil only, and another calls for using a combination of soil and concrete walls similar to the one added to the dam.

### **L.L. Anderson Dam Spillway**

L.L. Anderson Dam is on the middle fork of the American River at French Meadows Reservoir (Plate 1). It is primarily a water supply facility owned by the Placer County Water Agency (PCWA). In the event of the probable maximum flood (PMF) in the American River Watershed, the dam would be unable to contain the extreme flows and could fail, sending additional uncontrolled flood flows into Folsom Lake.

To address this issue, plans call for enlarging the spillway and making other modifications to L.L. Anderson Dam so that it can contain the PMF and thereby reduce potential flood flows into Folsom. Coordinating the flood control improvements to these two dams is a significant part of the watershed approach the Corps and its partners are taking to reduce Sacramento's flood risk.

Additional information on the impacts to Folsom Dam from a failure of L.L. Anderson Dam is located in Appendix D, Cost Distribution, in the section "Dam Safety Risk Problems Associated with LL Anderson and Folsom Dams".

## **Ecosystem Restoration**

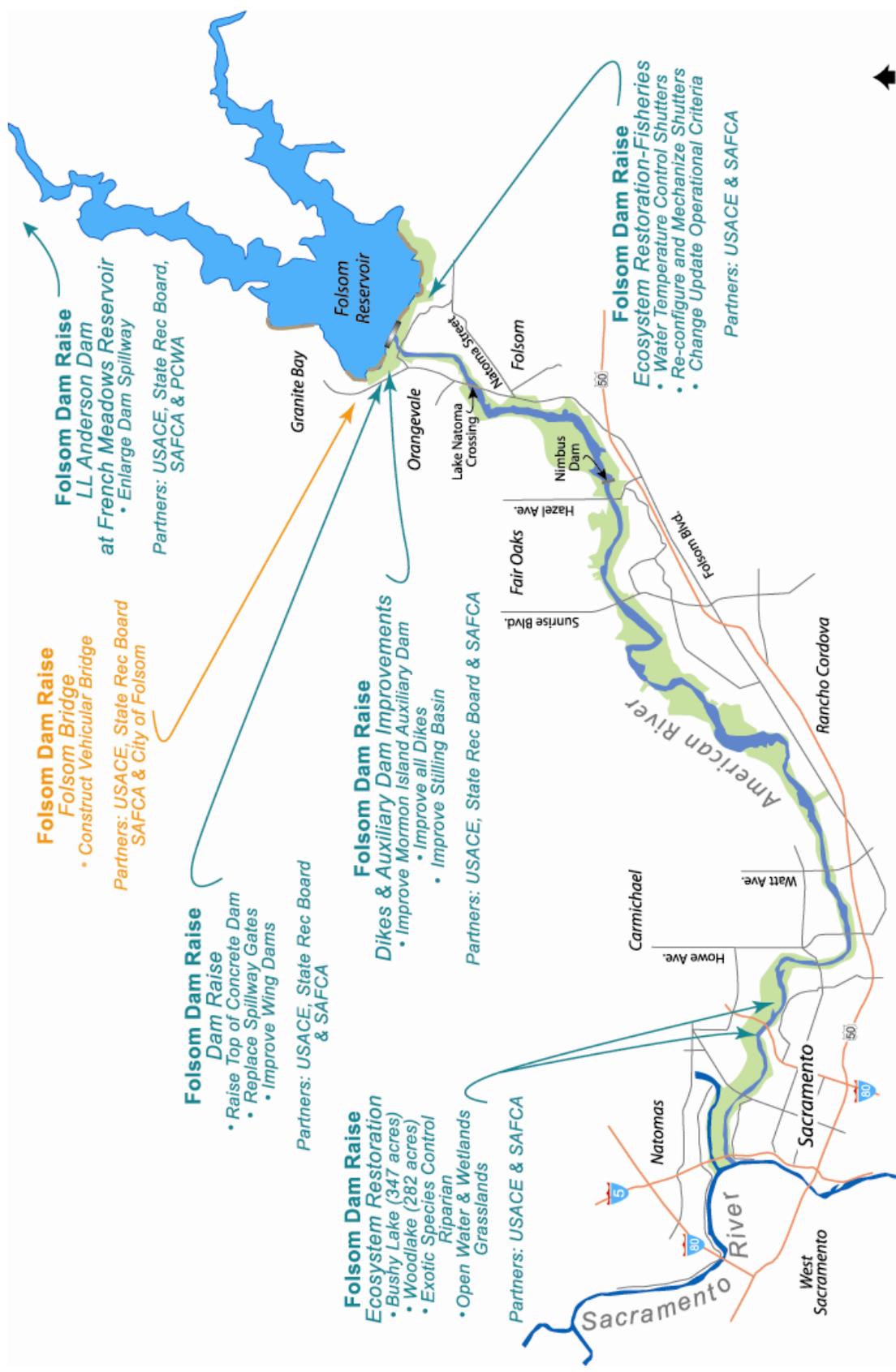
The Folsom Dam Raise Project includes ecosystem restoration as a project purpose. The Lower American River flood plain has significant natural ecosystem assets that have become increasingly valued in California. The ecosystem restoration features of the Folsom Dam Raise Project are construction of automated temperature shutters; planting native riparian, upland, wetland, and woodland vegetation; terracing riverbanks; and controlling non-native plants at two sites totaling about 620 acres.

**Automated Temperature Shutters.** Construction of Folsom Dam restricted salmon and steelhead to the 23-mile Lower American River. Recent biological monitoring indicates that water temperatures in the Lower American River tend to exceed the temperatures necessary to sustain the existing salmon and steelhead populations. Maintenance of optimal water temperatures for spawning and rearing depends on the ability of dam operators to deliver coldwater releases to the Lower American River at critical times of the year.

Currently, dam operators must adjust the temperature shutters manually. This manual operation does not allow for the flexibility and timeliness needed to optimize the coldwater releases. Automating the temperature shutters will reduce this problem by allowing for the greatest flexibility and responsiveness to the fishery needs year-round.

**Woodlake Restoration Site.** The Woodlake site consists of 283 acres of open space located near Cal Expo, located north of the City of Sacramento on the north bank of the American River. The restoration plan includes controlling non-native plants; restoring the interaction between the river and the floodplain; seeding to reestablish native grasslands; and planting reconstructed areas with riparian forest oak woodland and oak savanna species.

**Bushy Lake Restoration Site.** The 337-acre Bushy Lake site is just upstream from the Woodlake site. The restoration plan includes constructing wetlands to improve habitat values. In addition, it calls for the control of non-native plants combined with the construction of side channels planted with wetland species and the installation of a pump-and-delivery system to carry water to Bushy Lake. Further ecosystem restoration includes the creation of a channel from the lake to convey high flows to the river; terracing steep banks; and planting riparian forest, oak woodland, and oak savanna species on newly graded site areas.



**Folsom Dam Raise**  
**Folsom Bridge**  
 • Construct Vehicular Bridge  
 Partners: USACE, State Rec Board  
 SAFCA & City of Folsom

**Folsom Dam Raise**  
**LL Anderson Dam**  
**at French Meadows Reservoir**  
 • Enlarge Dam Spillway  
 Partners: USACE, State Rec Board,  
 SAFCA & PCWA

**Folsom Dam Raise**  
**Dam Raise**  
 • Raise Top of Concrete Dam  
 • Replace Spillway Gates  
 • Improve Wing Dams  
 Partners: USACE, State Rec Board  
 & SAFCA

**Folsom Dam Raise**  
**Ecosystem Restoration**  
 • Bushy Lake (347 acres)  
 • Woodlake (282 acres)  
 • Exotic Species Control  
 • Riparian  
 • Open Water & Wetlands  
 • Grasslands  
 Partners: USACE & SAFCA

**Folsom Dam Raise**  
**Dikes & Auxiliary Dam Improvements**  
 • Improve Mormon Island Auxiliary Dam  
 • Improve all Dikes  
 • Improve Stilling Basin  
 Partners: USACE, State Rec Board & SAFCA

**Folsom Dam Raise**  
**Ecosystem Restoration-Fisheries**  
 • Water Temperature Control Shutters  
 • Re-configure and Mechanize Shutters  
 • Change Update Operational Criteria  
 Partners: USACE & SAFCA



**Plate 2: Folsom Dam Raise**  
 American River Watershed Project



**Plate 3: Folsom Dam Raise Components**  
 American River Watershed Project - Folsom Dam Raise



## Folsom Bridge

The original proposal to raise Folsom Dam included the construction of a temporary vehicle bridge to provide a detour for public traffic that normally used the Folsom Dam Road to cross the American River. When Congress authorized the Corps to raise Folsom Dam in 2004; it directed that the bridge be changed to a permanent bridge so long as there is a non-Federal partner.

In February 2003, the U. S. Bureau of Reclamation (Reclamation) closed Folsom Dam Road due to Homeland Security issues. An environmental document was produced to address the permanent closure of the road by Reclamation. A May 2005 record of decision stated that the preferred alternative would be the limited opening of the Folsom Dam Road until a permanent bridge is built.

The description, analysis, and alignments of a permanent Folsom Bridge and its connecting approaches are presented in Chapter 2 of this report.



Figure 5. Folsom Dam Reservoir and Potential Bridge Crossing Area.

### 1.5 The Central Valley Project

The Central Valley Project (CVP) was authorized by Congress in 1937 to serve water supply, hydropower generation, flood control, navigation, fish and wildlife, recreation, and water quality control purposes. Folsom Dam was constructed in the 1950s as part of the CVP. Construction was completed by the Corps and turned over to the Reclamation for operation. The CVP is now operated by Reclamation to store and transfer water from the Sacramento, San Joaquin, and Trinity River basins to the Sacramento and San Joaquin valleys.

The CVP service area is about 430 miles long, extending through much of California's Central Valley, from the Trinity and Shasta reservoirs in the north to Bakersfield in the south. The CVP currently has contracts to deliver 7.1 million acre-feet annually. In 1988, CVP deliveries totaled about 5.3 million acre-feet, or about 75 percent of its total contract deliveries of 7.1 million acre-feet. These deliveries included almost 1.9 million acre-feet to the Sacramento River service

area, 285,000 acre-feet to the American River service area, and about 3.1 million acre feet to the Delta Export service area.

The CVP is operated as an integrated system to meet multiple authorized purposes. Minimum fishery releases are made from Nimbus Dam, just downstream of Folsom Dam, to the Lower American River in accordance with State Water Resources Control Board (SWRCB) Water Rights Decision 893 (D-893), which stipulated a minimum release of 250 cubic feet per second (cfs) from January 1 and September 15 and 500 cfs during the balance of the year. SWRCB increased the D-893 minimum release schedule in its Decision 1400 (D-1400), however it does not apply to operation of Folsom and Nimbus dams at this time. Despite the fact that D-1400 does not apply, Reclamation operates Folsom and Nimbus dams to meet the recommended Anadromous Fish Restoration Program (AFRP) flows for the Lower American River. The AFRP is a U.S. Fish and Wildlife (USFWS) program designed to increase natural production of anadromous fish in the Central Valley of California. Part of the SFRP plan for the American River is to increase flows downstream of Nimbus Dam for fish. The current flow objectives are between 2,000 and 3,000 cfs during normal water years.

## **1.6 Other Federal Flood Damage Reduction Projects in the Watershed**

Other associated Federal flood damage reduction projects within the American River Watershed include the following:

**South Sacramento County Streams:** The South Sacramento County Streams drainage basin lies south and east of the City of Sacramento. The eastern-most parts of the basin are in the lower foothills of the Sierra Nevada. A portion of the basin lies within the Sacramento city limits, south of the city center. Portions of the south Sacramento flood plain overlap the American River flood plain in the southern part of the study area. This flood control project would protect urban areas in the southern portion of the city and adjacent areas in the county from high flows along four local streams and high water from Beach Stone Lakes farther south. The project includes raising and extending about 24 miles of levees and floodwalls and retrofitting several bridges. Project construction was authorized by WRDA 1999 and is currently in construction.

**Sacramento River Bank Protection Project:** The project is the implementation of streambank protection along the Sacramento River and Lower American River where erosion threatens the integrity and reliability of Federal flood control levees that provide flood protection to the Sacramento Valley and the greater Sacramento metropolitan area. This project, developed cooperatively by a task force composed of government agencies and local interest organizations, comprises a near-term bank protection action and possible longer-term bank protection actions. Near-term actions include bank protection at five critical sites along the Sacramento River comprising 13,800 linear feet of streambank protection. Longer-term actions may be taken at any location along the Lower American River where project flood control levees become threatened

by bank erosion. This is a continuing construction project authorized by the 1960 Flood Control Act.

## **1.7 Combined Federal Project**

The Combined Folsom Dam Federal Project (Combined Federal Project) brings together efforts by the Corps and Reclamation to address objectives associated with both the Corps' flood damage reduction mission and Reclamation's dam safety program at Folsom Dam and its associated structures. The Corps' flood damage reduction mission is to reduce the risk to lives and property from flooding and while contributing to the national economic development. Reclamation's dam safety mission includes operating and maintaining dams in a safe manner, ensured through inspections for safety deficiencies, analyses using current technologies and designs, and corrective actions, if needed, based on current engineering practices (Reclamation, 2005b).

Both agency missions have led to an array of proposed modifications to Folsom Dam and Reservoir. These projects are:

- Folsom Dam Modifications, including the Folsom Dam Reoperation and Flood Management Plan update (Corps/State of California/Sacramento Area Flood Control Agency)
- Folsom Dam Raise (Corps/State of California/Sacramento Area Flood Control Agency)
- Folsom Dam Raise-Folsom Bridge Project (Corps/State of California/Sacramento Area Flood Control Agency/City of Folsom/U.S. Bureau of Reclamation/Central Valley Water Users)
- Folsom Dam Safety (U.S. Bureau of Reclamation/Central Valley Project Water Users)

Because of the economic uncertainties discovered subsequent to project Authorization, the Folsom Dam Modifications project is undergoing reevaluation. That effort, along with Reclamation's ongoing dam safety study, and design work underway on the Folsom Dam Raise project, provide opportunities to coordinate these projects. It is prudent that the Corps and Reclamation work together to ensure their respective projects are compatible and in effect "combined" into one Federal effort. It should be noted that due to separate missions and past project authorizations, it is not likely that the projects would be constructed as one project. Rather, each agencies respective authorities and decisions making processes must be used and coordinated to ensure that the projects are compatible, constructible, and an efficient use of taxpayer funding.

This Combined Federal Project was outlined in the Energy and Water Appropriations Act of 2006 (Public Law 109-103), in which Congress directed the Corps and the Reclamation to work together both reduce flood damages and address dam safety at Folsom Dam. The pertinent text in the law reads:

*The Secretary of the Army and the Secretary of the Interior are directed to collaborate on authorized activities to maximize flood damage reduction improvement and address dam safety needs at Folsom Dam and Reservoir, California. The Secretaries shall expedite technical reviews for flood damage reduction and dam safety improvements. In developing improvements under this section, the Secretaries shall consider reasonable modifications to existing authorized activities, including a potential auxiliary spillway. In conducting such activities, the Secretaries are authorized to expend funds for coordinated technical review and joint planning, and preliminary design activities.*

Therefore, the Combined Federal Project will evaluate and consider issues associated with current hydrologic conditions and major flood events, seismic conditions, and static conditions including seepage and piping through embankments. Initial potential modifications associated with improving flood operations include raising embankments and construction of an auxiliary spillway on the left abutment of the dam. Initial potential modifications associated with improving seismic and static conditions include seismic work at Mormon Island Auxiliary Dam, seismic work at the main concrete dam, and improving static conditions at the main dam and various embankments. Additional modifications may be considered as the project moves forward.

These initial modifications would not affect construction of the Folsom Bridge Project except for the potential construction of an auxiliary spillway on the left abutment of Folsom Dam. Preliminary technical studies for the Combined Federal Project indicate that construction of such an auxiliary spillway is highly likely to be an efficient means of addressing some of the dam safety and flood damage reduction problems under investigation. As a result, the bridge project assumed that a spillway would likely be constructed with or without the bridge project, and this assumption is included as a without-project future condition. Potential construction of an auxiliary spillway has caused the bridge project to modify its initial roadway alignment in the area near the left abutment of the dam.

The Combined Federal Project is studying various gated and ungated spillway options. It is likely that any spillway would be located at or near the Folsom Dam overlook area, and the spillway channel would run slightly northwest to the American River. A potential gated spillway would increase the flexibility for flood releases and operations, and could also be operated to allow overtopping, reducing pressure on the main dam during very large flood events. This type of operation would address both flood damage reduction and dam

safety issues. A potential gated spillway could be about 90 to 125-feet-wide and could include 4 to 6 submerged tainter gates to regulate flood releases from the reservoir.

An ungated spillway could be used to ensure dam safety by overtopping in very large flood events, thereby reducing the pressure on the main dam. This spillway could be about 300 to 600-feet wide and could include earthen fuseplugs that would wash downstream when the spillway is overtopped. An ungated auxiliary spillway would not provide any features to actively manage high flood flows from Folsom Dam.

Since gated spillway options address both flood damage reduction and dam safety, which is consistent with the wording in Public Law 109-103, the bridge project assumed that this option would likely be constructed. Therefore, the bridge project adjusted the roadway design so that no conflicts with the potential gated auxiliary spillway would occur. However, once final designs and a final auxiliary spillway plan are identified, additional environmental documentation could be necessary to evaluate any significant changes in the current construction footprint or project features associated with the Folsom Bridge Project.

In addition to the spillway, there could be other flood control and dam safety features constructed in the future as either part of the Combined Federal Project or as part of the other authorized Corps or Reclamation projects. For this PADD & SEIS/SEIR, it was assumed that the range of features may include raising the dam and modifying the outlet works, and operational changes associated with Folsom Dam flood operations.

## **1.8 Project Sponsors**

The Corps initiated the post authorization decision document following direction from Congress. The City of Folsom is the non-Federal sponsor for the Folsom Bridge project, in coordination with the State of California Reclamation Board (Reclamation Board) and the Sacramento Area Flood Control Agency (SAFCA), who are the non-Federal partners for the overall Folsom Dam Raise Project. Since the Folsom Bridge is considered to be part of the Folsom Dam Raise Project (since the raise project required construction of a temporary bridge) the portion of the permanent bridge cost attributed to the temporary bridge is cost shared in accordance with the Folsom Dam Raise Project and a portion of the funding will be provided by the Reclamation Board and SAFCA.

Cost sharing responsibilities are described in Chapter 5.

## **1.9 Planning Process and Report Organization**

The PADD is organized to roughly follow the six steps of the planning process: (1) Identify water and related land resources problems and opportunities; (2) Inventory, forecast and analyze water and related land resources conditions within the study area; (3) Formulate alternative plans; (4) Evaluate effects of the alternative plans; (5) Compare the alternative plans; (6) Select a recommended plan based on that comparison.

This report documents the study process. The chapters generally follow the planning process. This first chapter provides the introduction. Chapter 2 defines the needs and objectives of the study; Chapter 3 discusses the formulation of alternatives and the evaluation; Chapter 4 identifies the tentatively selected plan; Chapter 5 outlines project coordination, including sponsor views; Chapter 6 discusses project implementation and summarizes cost distribution; Chapter 7 discloses the conclusions and recommendations, and Chapter 8 provides report references.

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**CHAPTER 2.0**  
**NEED FOR AND OBJECTIVES OF ACTION**

**2.1 Study Area**

The study area is in the vicinity of Folsom Dam and mostly on Federal property, with rough boundaries described as follows (Plate 2):

- Northern boundary is Folsom Dam
- Western boundary is at Folsom-Auburn Road
- Eastern boundary is at East Natoma Road
- Southern boundary is down river roughly around Inwood Road

**2.1.1 Folsom Dam**

Folsom Dam is on the main stem of the American River, approximately 29 miles upstream from its confluence with the Sacramento River. It is a multipurpose project operated by Reclamation as part of the CVP. The dam regulates runoff from approximately 1,860 square miles of drainage area and has a total (full-pool) capacity of approximately 977,000 acre-feet.

The designated flood space in Folsom Reservoir was originally authorized at 400,000 acre-feet. Based on current agreements between Reclamation and SAFCA, it now varies between 400,000 and 670,000 acre-feet (maximum balanced control space). With the current Emergency Spillway Release Diagram (ESRD), the maximum allowable water surface is at a pool elevation of 475.4 feet (also referred to as the spillway design flood pool). Water is released from eight gated outlets at the lower level of the dam, five main spillway gates, and three auxiliary spillway gates (used only in emergencies).

**2.1.2 Folsom Dam Road**

Folsom Dam Road provides access to Federal property east of the dam and land adjacent to Folsom State Prison. The dam road, which is a two-lane, undivided road about 2.3 miles long, connects Folsom-Auburn Road to the west of the American River with East Natoma Street to the east. Folsom Dam Road was built to provide maintenance access to the dam structure and was not originally intended for public traffic.

Folsom Dam Road has become an important traffic link in the Sacramento region. The road is one of only three crossings of the American River within the City of Folsom and one of 13 major arterial roadways and thoroughfares that make up the city's circulation system identified in Folsom's General Plan (1993).

The road has been closed indefinitely to public use since February 28, 2003, for security reasons. Prior to the road closure, Reclamation had allowed public use of the road 24 hours a day, supporting traffic volumes of about 16,000 vehicles per day (Corps, 1991; Folsom Mods EA/IS).

### **2.1.3 Folsom Dam Industrial Complex**

The Folsom Dam industrial complex houses Reclamation's Central California Area Office which consists of staff, work shops, warehouses, and administrative buildings. The complex is also the alternative command center for Reclamation, Mid-Pacific Region, and is an operational part of the CVP. The resources at the complex are used to operate and maintain facilities and equipment in support of the dam's core functions of flood damage reduction, water supply, power, and recreation.

The Department of the Interior designated the complex as a National Critical Infrastructure site as governed by the Homeland Security Presidential Directive-7 and the Critical Infrastructure Protection Act of 2001.

#### **State Recreation Area**

The complex also houses California Department of Parks and Recreation (State Parks) staff and shops, and buildings supporting the Folsom Lake State Recreation Area (SRA).

#### **Bureau of Reclamation Central Valley California Area Office**

Reclamation personnel and facilities at the complex have various area-wide responsibilities that include land management, environmental monitoring, contract administration, recreation program administration, and oversight of O&M at remote locations.

#### **American River Water Education Center**

The ARWEC was formed as a partnership between Reclamation and State Parks to promote water education directly related to the American River Watershed. The facility fosters water education and conservation, provides dam tours to school groups, various indoor and outdoor water-related exhibits, picnic areas, amphitheater, and a "waterwise" garden.

### **2.1.4 California Department of Corrections and Rehabilitation Facilities**

On the east side of the river, the project area includes a portion of California State Prison, Sacramento. This multimission institution is located on Prison Road on about 1,200 acres. California's second oldest prison, Folsom State Prison, is located at 300 Prison Road on a 40-acre parcel adjacent to and south of Folsom Dam. Both prisons collectively house nearly 8,000 inmates. The prisons also include the Regional Corporation Yard for Inmate Day Labor, and the main headquarters for the Prison Industry Authority. The prison property includes access to the prison's firing range, office and storage facilities, and the

Green Valley Conservation Camp. Additionally, there are residential areas for staff near East Natoma Street.

## **2.2 Land Uses**

Generally, the land surrounding Folsom Dam and Reservoir is open space, Federally owned and designated for recreation and flood control use. The major land uses in the project area are Reclamation's Central California Area Office and Folsom Dam industrial complex along with a utility corridor.

State Parks, under an agreement with Reclamation, manages Folsom Lake, Lake Natoma, and adjacent lands designated as the Folsom Lake SRA. Most of the project area for the permanent bridge is within the Folsom Lake SRA. A portion of the American River bicycle, pedestrian, and equestrian trail is located within the project area along with the American River District Office of State Parks.

### **2.2.1 Private Lands Adjacent**

An apartment complex, Lake Pointe Apartments, is located in the project area on Folsom-Auburn Road and adjacent to the American River bike trail.

An affected private vacant parcel is located at the eastern end of the study area near the East Natoma Road intersection.

### **2.2.2 Recreational Areas**

Recreational areas include the Folsom Lake SRA for water recreation activities, hiking, picnicking, and camping; the American River Bike Trail for biking; and other regional parks connecting to the overall recreation of Sacramento County.

#### **Folsom Lake State Recreation Area**

The Folsom Lake SRA is an 18,000-acre lake and recreation area, which offers opportunities for hiking, biking, running, camping, picnicking, horseback riding, water-skiing, boating, and fishing. Operated by State Parks, the Folsom Lake SRA is one of the most frequently used State recreation areas in California (State Parks, 2005).

#### **American River Bike Trail**

The American River Bike Trail is a popular corridor for hiking, jogging, and bicycling through Sacramento and the outlying urban and suburban areas. The trail provides an important connection between Sacramento's parks, downtown, the Sacramento and American rivers, and the Folsom Reservoir, although the trail is not continuous around the reservoir. The 8.4-mile paved Class I bike trail at the Folsom Lake SRA connects Beal's Point, just north of Folsom Dam Road, with the American River Bike Trail (also known as the Jedediah Smith Trail) south of Folsom Reservoir. The American River Bike Trail continues into downtown Sacramento (Corps, 2002). There is currently no access from the

American River Bike Trail to the Folsom Lake SRA recreational trails north and east of Folsom Dam.

### **2.2.3 Utilities**

#### **Electric Utilities**

Any utilities affected by relocation of facilities or construction of the intersections, roadway, and bridge would be relocated or replaced. These include at least 10 wooden poles carrying electric, telephone, and cable utilities; utilities associated with the ARWEC, State Parks offices, and Reclamation's storage yard; and up to seven 230kV electric transmission line towers owned by Sacramento Municipal Utilities District (SMUD). The wooden poles would be relocated, and it is assumed that the towers would be relocated to other locations within the project area limits and replaced with appropriate steel pole structures.

However, the City of Folsom is currently working with SMUD to develop an alternative alignment for the SMUD towers north of the proposed bridge and roadway alignment. This north alignment would allow future connections to the WAPA substation. The City and SMUD will evaluate the environmental effects of this northern alignment in separate documentation.

#### **Water Supply**

Folsom Reservoir provides water through a diversion at Folsom Dam to the cities of Folsom and Roseville, the San Juan Water District, and Folsom State Prison. An 84-inch pipeline, which is part of the North Fork distribution system, passes through the right abutment of the dam, providing water to the City of Roseville and San Juan Water District. A second 42-inch pipeline, which is part of the Natoma distribution system or Natoma pipeline, passes through the left abutment, serving the City of Folsom and Folsom State Prison.

### **2.3 Future Without Project Conditions**

This section describes changes expected in the study area over the period of analysis (50-years) assuming a bridge project is not built as a result of this study. The period of analysis begins in 2007. This description of the assumed without-project condition serves as the baseline against which alternative plans will be evaluated to determine their effectiveness and effects that would result from them. This is the condition against which effects to the environment are determined in the accompanying Supplemental EIS/EIR as well as the economic benefits of alternative bridges are derived (See Appendix B, Economics).

#### **2.3.1 Folsom Dam Raise Project**

Under the future without project condition of no permanent bridge it is assumed that the Federal Government would implement the various projects already authorized to reduce flood damages and restore the ecosystem along the American River. These authorized projects include the American River Common Features Project, Folsom Dam Modification Project and Flood Management Plan

Update, and Folsom Dam Raise Project without a temporary or permanent bridge feature. The Folsom Dam Modification Project is undergoing evaluation to redefine project features. A key feature under investigation which has a strong chance of ultimately being recommended for implementation is construction of an auxiliary spillway on the left abutment of Folsom Dam. For the purposes of this study, the Corps assumes that an auxiliary spillway will be constructed.

### **2.3.2 Dam Safety Improvements**

The without project condition assumes that Reclamation would develop, fund, and implement dam safety improvements for Folsom Dam as part of the Combined Federal Project currently under study. At this time, the Corps has assumed that a combination of raising Folsom Dam and construction of an auxiliary spillway is the most likely solution. The current bridge and roadway alternatives have taken that into account to avoid foreseeable conflicts between the bridge project and any dam safety improvements.

Folsom Dam has been identified in the Reclamation dam safety program as a high national priority. Reclamation is currently performing a Corrective Action Study (CAS) for Folsom Dam safety, and when the corrective actions are identified, a schedule will be established, and funding will be requested.

Reclamation bases their dam safety improvements on their own dam safety program criteria, which is risk-based; related to downstream population; and is categorized by hydrologic, seismic, and static risk.

The Corps' dam safety improvements for Folsom Dam are necessitated by the dam raise, which is a major modification to the existing structure(s). The modified structure(s) must be left in a safe condition. The Corps' features to improve dam safety as it relates to the flood control modifications are estimated to have benefits to Reclamation's dam safety issues.

### **2.3.3 Folsom Dam Road**

Under the without-project condition, the Folsom Dam Road, closed for security reasons since February 28, 2003, is to be assumed re-opened in the fall of 2006 and would be managed by Reclamation indefinitely as a "restricted access" road that would be limited to two-way traffic during the peak commute hours (6:00 a.m. to 9:00 a.m. and 4:00 p.m. to 7:00 p.m.) on Monday through Friday. Access of some types of vehicles would be restricted, such as commercial vehicles, trucks, trailers, and recreational vehicles. With the restricted access of Folsom Dam Road, the following results are anticipated:

- Costs and implementation of security measures and road maintenance work would be the responsibility of the City of Folsom, with possible permitting and toll fees imposed by the City.
- Additional short- and long-term direct and indirect costs for a restricted access road would be incurred by the City, regional commuters, local businesses, Reclamation, and other agencies.

- The restricted access would increasingly divert and change traffic patterns to other City streets and affect business traffic and commerce in other areas.
- The City and region would have a progressively inadequate northern connection route across the river, even if another crossing farther down river (Oak Avenue) is constructed.
- Pedestrians and bicyclists would not have a safe and convenient access connection to both sides of the river near the Folsom Reservoir.
- New and continuing Homeland Security measures would require additional long-term costs for the dam.

Reclamation would continue the oversight of all dam facilities, operations, and security. This includes day-to-day operations, regular dam and surrounding facilities maintenance activities, new construction work, and construction upgrades such as dam safety and Homeland Security measures.

It is assumed that Folsom Dam Road would be closed during the construction of the Folsom Dam Raise project. Based on available information, that closure would take place in 2013.

### **Bicycle Access**

The Folsom City Bikeway Master Plan includes recommendations to enhance local existing bicycle facilities, providing consistent access to bike lanes on roads, the completion of trails, and the connection of existing bike trails to local and regional roads and facilities (City of Folsom, 2002). It is assumed that these projects would be completed as funds become available. None of the identified improvements or enhancements have a direct effect on the bridge project.

### **Public Vehicular Access**

As stated previously, public access to Folsom Dam Road has changed since the project authorization. On February 28, 2003, Reclamation indefinitely closed the Folsom Dam Road to public access for Homeland Security to preserve and protect the facility and for public safety. On April 22, 2005, Reclamation released a final EIS for this road access restriction action. The stated preferred alternative was changed from permanent closure to a “restricted access” alternative. The record of decision was signed May 31, 2005, and will require the City of Folsom to comply with stringent Reclamation security measures and be responsible for all associated costs. The preferred alternative generally allows traffic to cross the Dam Road during morning and evening commute hours. The road could be closed due to on-going construction, maintenance, and operational requirements deemed necessary by Reclamation. Folsom Dam and downstream interests will continue to be fully protected under the selected alternative.

All vehicles crossing Folsom Dam Road would be subject to security measures such as random stops and searches. Periodic road closures would be required for dam O&M work by Reclamation. Dam road closures would also be enforced when certain Folsom Lake water levels are reached with estimated closure periods of 3 to 6 months each year. Road closures would also be needed for construction of the Folsom Dam Modification and Raise Projects over an estimated 10-year period. Any traffic closures on Folsom Dam Road due to project construction would be mitigated through scheduling and traffic detours and re-routing.

The Corps' original recommendation for a temporary bridge was based on the previous assumption that Folsom Dam Road would continue to have unrestricted access for transportation as was the case before February 2003. For the current study, the future without project condition has been revised to reflect Reclamation's updated plan for operating the road. While the volume of traffic affected by dam construction activities is reduced under the revised future without project condition, it is still considered necessary to mitigate that adverse effect by providing a replacement transportation corridor.

#### **2.3.4 Natural Resources and Conditions**

No significant changes are expected to the natural resources or conditions in the near future. Future increased growth of the region is expected to elevate traffic, noise, air, and water quality effects in the region. It is assumed that effects to natural resources from other projects in the area would be fully mitigated.

#### **2.3.5 Socioeconomic Resources and Conditions**

The restricted access to the Folsom Dam Road is expected to partially improve local socioeconomic conditions and traffic in the City of Folsom. Future regional growth and traffic will increasingly have impacts on the socioeconomic conditions in the study area.

#### **2.3.6 Oak Avenue Bridge**

It is assumed that without the project, the need for additional traffic crossings would continue to increase and traffic conditions in the study area would continue to decline. For the purposes of this project, a bridge at the Oak Avenue crossing is assumed to be constructed as part of a local transportation project between 2010 and 2025 across the American River just north of the Folsom City Park. Adjoining roadways would connect East Natoma Street just north of Fargo Way on the east to Oak Avenue at Folsom-Auburn Road on the west. The bridge, which would be constructed by the City of Folsom, is included as a potential project in the City's 1993 General Plan. The General Plan identifies the need for 12 lanes in the future across the river. However, with only a net increase of two new lanes since 1993, the City does not consider this permanent bridge project to be an alternative to the Oak Avenue crossing.

Construction of a new Oak Avenue bridge is also a SACOG Tier I project, which means that it is a reasonable foreseeable project with a funding source. The traffic analysis for the permanent bridge assumed that this alignment would be constructed by 2025. Additionally, Reclamation had previously evaluated the environmental effects of this alignment as one alternative in the American River Bridge Crossing Project, Final Environmental Impact Statement, dated September 1996.

## **2.4 Planning Process**

The Corps' planning process to identify a tentatively recommended alternative comprises the formulation, evaluation, and comparison of alternative plans. These steps are often referred to collectively as plan formulation. Plan formulation is a highly iterative process that involves cycling through the formulation, evaluation, and comparison steps many times to develop a reasonable range of alternative plans and then narrowing those plans down to a final array of feasible plans from which a single plan can be identified for implementation.

To meet regional goals of expediting construction of the Folsom Bridge Project, the initial engineering efforts and the environmental documentation (SEIS/EIR) process were developed concurrently.

The following describes the Folsom Bridge plan formulation process that included team working sessions, and engineering design and environmental information input from various stakeholders and consultants. The study scope was initially generated from the plan formulation sessions and independent team discussions and technical work.

### **2.4.1 Plan Formulation Working Sessions**

A Folsom Bridge working group consisting of partners and stakeholders was formed to support the plan formulation process. This allowed for more efficient decision making and kept partners informed of project developments and the overall process direction. The working group consisted of Corps team members and various partners and stakeholders. Participants included the following:

- Corps
- Reclamation
- USFWS
- City of Folsom
- SAFCA
- State Parks
- Technical consultants

Seven working sessions, held over several months, were held focusing on the steps in the plan formulation process to determine a final array of alternative alignments and to identify a tentatively recommended plan.

These working sessions, as well as a series of public scoping and information sharing sessions, enabled the study team to identify the following:

- Opportunities that can be realized through construction of a bridge project
- Planning constraints
- Planning objectives
- Technical attributes required for any permanent bridge
- Measures
- Preliminary alternatives
- Final array of alternatives
- Evaluation criteria
- Evaluation and comparison of alternative plans
- Tentatively recommended alternative

In addition to participating in the planning process, stakeholders emphasized their strong desire (1) for construction of a bridge by December 2007; (2) for sufficient Federal and non-Federal funding to realize the desired construction schedule; (3) to minimize and mitigate for adverse effects to security and security buffers at Folsom Dam Industrial Complex, to Reclamation's O&M practices and National Critical Infrastructure and personnel, to California Department of Corrections and Rehabilitation (CDCR) property, and to Folsom Prison O&M. These issues were taken into account during the planning process. Construction of a bridge and roadway by December 2007 was not attainable even with accelerated construction methods. The effects to surrounding properties were minimized to the extent practicable. Mitigation for any effects was proposed as part of the planning process.

#### **2.4.2 Public Outreach and Scoping**

In March 2004, three public scoping meetings were conducted for the Folsom Bridge as part of the project outreach program and environmental process. These meetings provided the opportunity for the public to be introduced to the project and provide initial comments to assist in defining the scope of the project. Over 170 members of the public attended. The meeting findings are documented in the Folsom Dam Bridge, Summary Report Public Comments, April 8, 2004.

On April 25, 2005, a public open house was conducted again as part of the project outreach program and environmental process (National Environmental Policy Act of 1969 [NEPA] and California Environmental Quality Act [CEQA]), but primarily to provide an update on the project process, progress, and tentative findings. Over 100 people attended. The open house was timed to follow Reclamation's final environmental impact statement (FEIS) determination of the Folsom Dam Road access.

Additional public meetings would be conducted during the public review of this document and the SEIS/EIR.

### **2.4.3 Views of and Coordination with the Non-Federal Sponsors**

There are four agencies that are directly involved in the reports, design, and ultimately construction of the Folsom Bridge Project. To coordinate between these agencies, the Corps initiated routine coordination meetings with the principal team members from the City of Folsom, SAFCA, and Reclamation. The coordination meetings are an efficient means for transferring updates on the status of the project as well as a forum for engaging topics for resolution. Additionally, the Corps established partnering meetings for the senior management of the City of Folsom, SAFCA, State of California Reclamation Board, and Reclamation.

Regular coordination meetings are held with the team members of the City of Folsom, SAFCA, Reclamation, and the Corps. The team meetings are the primary means for coordinating the project status. Additionally, the Corps conducted a series of briefings with Reclamation, the City of Folsom, CDCR, State Parks, and the Prison Industries Authority to brief all parties on the alternative alignments to be presented, to review the assumptions presented in the post authorization change document and supplemental EIS, and to solicit input from the agencies prior to the public release of these documents.

The project coordination groups are structured as follows.

#### **Project Management Group**

The Project Management Group consists of project managers (PMs) from each of the lead agencies (Corps, Reclamation, City of Folsom, and SAFCA). This group typically meets on a monthly basis. The purpose of the meetings is to update each agency's PM on the status of the project scope, schedule, and budget, and to resolve any issues that are outside the purview of the Project Delivery Team.

#### **Overview Management Group**

The Overview Management Group consists of representatives of each of the agencies (Corps, Reclamation, Reclamation Board, City of Folsom, and SAFCA). This group typically meets on a monthly basis. The purpose of the meetings is to update each agency's management representatives on the status of activities, and to resolve any issues that are outside the purview of the Project Management Group or Project Delivery Team.

#### **Executive Committee**

An Executive Committee for the entire American River Project consists of the President of the Reclamation Board; the President of the SAFCA Board of Directors; the Regional Director, Mid-Pacific Region, Reclamation; and the Sacramento District Commander, Corps. The purpose of this group is to resolve any issues that cannot be worked out by the Overview Management Group. The Executive Committee meets as required.

Principal review of documents shall be through the review of planning documents and the supplemental EIS, yet the agencies shall also review the engineering design documents. Coordination meetings were set up to broaden the project definition and facilitate submittal reviews.

#### **2.4.4 Project Need**

A project need statement was developed to guide the planning process. Construction activities associated with the Folsom Dam Raise Project will mean traffic cannot use the existing Folsom Dam Road from about 2012 to 2021. For the purposes of this study, the project need is as follows:

*Provide a bridge to mitigate regional traffic impacts caused by closing Folsom Dam Road during the construction activities at Folsom Dam.*

#### **2.4.5 Project Opportunities**

The potential construction of Folsom Bridge provides the following opportunities:

- **Provide a bridge to permanently address long-term traffic impacts of public access to Folsom Dam Road due to Homeland Security concerns:** Since February 2003, Reclamation and the City of Folsom have been challenged with addressing security concerns associated with a regional transportation corridor on top of a dam. Construction of a new bridge could provide a long-term solution that would permanently and safely re-direct current and future demand traffic away from the Folsom Dam facilities and operations center, and provide a safer traffic corridor.
- **Provide a bridge within the Folsom Dam Road area of influence that meets current industry design and safety standards:** Folsom Dam Road was not originally intended or built as a public road. The Folsom Bridge would provide a crossing that is built to traffic standards to safely and better manage current and future traffic needs.
- **Provide a bridge within the Folsom Dam Road area of influence that addresses current and future traffic demands and needs of the City of Folsom and the surrounding region:** A permanent crossing designed and built to current transportation standards will provide a safe and efficient corridor across the American River to help resolve current and future traffic demands of the City and the region.
- **Provide a bridge within the Folsom Dam Road area of influence to increase recreational opportunities in the City of Folsom and surrounding areas:** Construction of a bridge could provide pedestrian and bicycle access that will provide a much needed access and recreational connection to existing and future pedestrian and bicycle plans to the entire region.

## 2.4.6 Project Constraints

A constraint is a restriction that limits the extents of the planning process and the development and analysis of alternative alignments. The constraints identified for the Folsom Bridge Project are:

- **Project funding limits:** The bridge project authorization allows for unlimited funding to be provided by others. Therefore, there is no maximum total project cost established in bridge authorization. There is a maximum Federal funding limit, which is derived by (a) Congressional language which authorized \$36,000,000 for the temporary bridge and \$30,000,000 for the permanent bridge, then (b) by applying the principles to establish the authorized maximum costs of projects set forth in the Water Resources Development Act of 1986, Section 902. The \$36,000,000 is to be cost shared between the City of Folsom and the Corps (the City plans to enter into local cooperation agreements to obtain the non-Federal share of the temporary bridge increment that is attributed to the flood damage reduction Folsom Dam Raise project partners – the State of California and SAFCA); the \$30,000,000 is an additional Federal share that will be budget for by the Corps. Since the authorizing bridge language did not include an authorized total project cost, Section 902 would not ordinarily apply. However, Congress subsequently directed its application in Public Law 109-103, Energy and Water Development Act of 2006. The maximum Federal contribution to a permanent bridge project is \$70,630,000.
- **Expedited project execution:** The authorization states and the local sponsor requires an expedited project process and execution to relieve Folsom Dam Road closure impacts.
- **Reduce disturbance of Reclamation and CDCR activities and operations during construction:** To the extent practicable, the project should be designed to have minimal disturbance to ongoing Reclamation and CDCR activities and operations during construction. This constraint should not prevent the Corps from identifying the most cost-effective solution.
- **Security and force protection of Folsom Dam (operational and geographic encroachment):** Homeland Security requirements will need to be maintained for Reclamation facilities and the dam complex during construction and when the dam becomes operational. Security requirements need to be maintained for CDCR lands during construction and when the bridge is opened.

## 2.4.7 Objectives

Planning objectives are developed to address identified needs and opportunities. An objective is a statement of the intended purposes of the

planning process; it is a statement of what an alternative plan should try to achieve. The following set of objectives was created through the planning process and provides a specific direction for the formulation of alternatives:

- Provide a bridge to mitigate regional traffic impacts caused by the closing of Folsom Dam Road during construction activities.
- Provide a bridge within the Folsom Dam Road area of influence that addresses current traffic demands and needs of the City of Folsom and the surrounding region.
- Provide a bridge/roadway within the Folsom Dam Road area of influence that addresses future traffic demands and needs of the City of Folsom and the surrounding region and provides a long-term solution to Homeland Security concerns.
- Provide a bridge within the Folsom Dam Road area of influence to increase recreational opportunities in the City of Folsom and surrounding areas.

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**CHAPTER 3.0**  
**ALTERNATIVE PLANS**

**3.1 Project Planning Methodology**

The formulation, evaluation, and comparison of alternative plans - which ultimately lead to recommendation of an alternative plan for implementation - comprises the third, fourth, and fifth steps of the Corps' planning process. These steps are often referred to collectively as plan formulation. Plan formulation is a highly iterative process that involves cycling through the formulation, evaluation, and comparison steps many times to develop a reasonable range of alternative plans and then narrow those plans down to a final array of feasible plans from which a single plan can be identified for implementation. The steps in the methodology are:

- Formulate and screen management measures (referred to hereafter simply as measures) to achieve planning objectives and avoid planning constraints. Measures are the building blocks of alternative plans.
- Formulate, evaluate, and compare an array of alternative plans to achieve the planning objectives.
- Identify an alternative plan to be recommended for implementation.

**3.2 Measures Development**

A measure is a feature or an activity that can be implemented at a specific geographic site to address one or more planning objectives. Measures serve as the building blocks for alternative plan development, and are displayed in Table 3.1 with the objective they address.

**3.3 Preliminary Array of Alternatives**

Development of alternative plans has been a highly iterative process that began with the series of interagency working sessions described in Chapter 2. Preliminary alternatives – an early version of potential alternative project - were later modified to accommodate an increasing likelihood that the overarching Folsom Dam Raise project might ultimately include construction of an auxiliary spillway. Technical attributes common to any bridge project are described in Appendix G. Two previous bridge studies done for the Folsom Dam facility also provided information for early alternative plan development:

- *American River Watershed, Long-Term Study*, U.S. Army Corps of Engineers, February 2002.

**Table 3-1. Objectives-Measures Matrix**

<b>Measure</b>	<b>Objective 1</b> - Provide a bridge to mitigate traffic impacts caused by closing Folsom Dam Road during construction activities.	<b>Objective 2</b> - Provide a bridge within the Folsom Dam Road area of influence that addresses current traffic demands and needs of the City of Folsom and the surrounding region.	<b>Objective 3</b> - Provide a bridge within the Folsom Dam Road area of influence that addresses future traffic demands and needs of the City of Folsom and the surrounding region and a long-term solution to Homeland Security concerns.	<b>Objective 4</b> - Provide a bridge within the Folsom Dam Road area of influence to increase recreational opportunities in the City of Folsom and surrounding areas.
Construct 2-lane steel bridge	X			
Construct 2-lane reinforced concrete bridge	X			
Construct 2-lane approach roads	X	X		
Construct blast and sound walls where required	X	X	X	
Construct a temporary roadway near potential auxiliary spillway	X	X	X	
Construct a four-lane concrete sectional bridge	X	X		
Construct a four-lane steel bridge	X	X		
Construct modified intersection at Auburn-Folsom Road	X	X	X	
Construct modified intersection at East Natoma Road	X	X	X	
Construct a six-lane concrete sectional bridge	X	X	X	
Construct a six-lane steel bridge	X	X	X	
Construct multilane approach roads	X	X	X	

<b>Measure</b>	<b>Objective 1</b> - Provide a bridge to mitigate traffic impacts caused by closing Folsom Dam Road during construction activities.	<b>Objective 2</b> - Provide a bridge within the Folsom Dam Road area of influence that addresses current traffic demands and needs of the City of Folsom and the surrounding region.	<b>Objective 3</b> - Provide a bridge within the Folsom Dam Road area of influence that addresses future traffic demands and needs of the City of Folsom and the surrounding region and a long-term solution to Homeland Security concerns.	<b>Objective 4</b> - Provide a bridge within the Folsom Dam Road area of influence to increase recreational opportunities in the City of Folsom and surrounding areas.
Construct intersection to maintain access to CDCR Shooting Facility	X	X	X	
Construct single road access to eastside of dam and resident office/staging area	X	X	X	
Construct new intersection at Auburn-Folsom Road	X	X	X	
Construct new intersection at E. Natoma Road	X	X	X	
Construct a separated bicycle/pedestrian pathway (Class 1) along the north side of roadways and bridge.				X
Construct bridge and approach shoulders as Class 2 bikepaths.				X
Provide overlook pullout areas with views and possible interpretive displays for bicyclists and pedestrians.				X
Construct a Class 1 bike and pedestrian trail that connects to existing or future bikeway systems for bike and pedestrian circulation.				X

- *Folsom Dam Bridge Appraisal Report*, Bureau of Reclamation, March 1, 2000; and *Folsom Dam Bridge Appraisal Report, Attachment B, Engineering Report of Findings*, March 1, 2000.

These planning and engineering efforts that studied, respectively, potential temporary and permanent bridge crossings at or in the vicinity of the Folsom Dam were used to identify and build upon to develop an initial list of alternatives. A variety of bridge types and alternative roadway alignments were also evaluated. Refinements were made based on information from Reclamation. This collection of alternatives provided an initial array of preliminary alternatives. Refer to Appendix G: Plan Formulation for a more detailed description of these planning efforts and evaluations conducted on those bridge types and alignments.

### **3.3.1 Preliminary Alternatives Description**

Prior to the release of this document, updated information involving the Folsom Modifications Project required a reformulation of that project. It became apparent that an auxiliary spillway would be a potential solution included in the project's array of alternatives. Since the location of this auxiliary spillway would conflict with the roadway alignments evaluated for the Bridge Project, additional alignments in the vicinity of a potential spillway were formulated.

Additionally, initial cost estimates for the bridge project indicated that available local funding may not be sufficient to fund the project as formulated. As a result, a reformulation of alternatives was undertaken. The additional alternatives formulated included features that were less than optimal when compared to the technical attributes described in Appendix G. However, those alternatives that met the screening criteria have been retained for further consideration.

The following are brief descriptions of the preliminary alternatives formulated. Plate 2 shows the north, middle and south alignments of each alternative.

**Alternative 1 – No Action Alternative** – This alternative would consist of no Federal action.

**Alternative 2a – Four-Lane Bridge, Four-Lane Road, Full Intersections (North Alignment)** – This alternative consists of a prestressed concrete, cast-in-place segmental box girder structure. The bridge span and concrete abutments would be approximately 915 feet long. Two support piers would be placed above the mean river water level in the riverbank areas. The bridge span would have an estimated clearance of 180 feet from the river (top of deck to mean river surface). The bridge would be constructed by using the balanced cantilever method for post-tensioned, cast-in-place, segmental concrete bridges. It would be capable of carrying four lanes of traffic, plus a Class 1 bike path.

The roadway would consist of four lanes of traffic plus a Class 1 bike path. New signaled intersections would be constructed at Folsom-Auburn Road and East Natoma Road.

The north alignment of the Folsom Bridge Road would cross two existing dam service roads and cut through existing Reclamation facilities and infrastructure, affecting eight to nine buildings as it curves to connect with the existing Folsom Dam Road and Folsom-Auburn Road intersection. This alignment would separate the ARWEC from the other Reclamation facilities. The west bridge abutment (400 feet west of the river) would be located northeast of an existing Reclamation storage area (“bone yard”).

**Alternative 2b (Middle Alignment)** - This alternative would be the same as Alternative 2a except the west approach road would turn directly west from the west bridge abutment and continue just south of the Reclamation facilities. The bridge abutment would cross between an existing Reclamation storage area (“bone yard”) and service road, and connect to Folsom-Auburn Road across from an existing commercial driveway. The middle alignment would affect the ARWEC, some existing Reclamation storage and parking, and private apartment complex facilities south of the alignment.

**Alternative 2c (South Alignment)** - This alternative would be the same as Alternative 2a until approximately 600 feet east of the river. The south alignment would then turn in a southwest direction. The bridge would cross the river at a point roughly 700 feet below the bridge location for the north and middle alignments. The abutment of the bridge would cross between the Lake Pointe Apartment Complex and a commercial storage facility, and connect to Folsom-Auburn Road approximately 1,000 feet north of Inwood Road. The road alignment would directly affect a private residence just north of the commercial storage facility.

**Alternative 3a- Four-Lane Bridge, Two-Lane Road, Full Intersections (North Alignment)** – This alternative would consist of a four-lane concrete, segmental bridge as described in Alternative 2.

This alternative is the same as Alternative 2a with the exception of a two lane roadway from the east abutment of the bridge to the new intersection at East Natoma Road. The roadway would have a Class 2 bike lane in both directions.

**Alternative 3b (Middle Alignment)** – This alternative would be the same as Alternative 3a except the west approach road would turn directly west from the west bridge abutment and continue just south of the Reclamation facilities. The bridge abutment would cross between an existing Reclamation storage area (“bone yard”) and service road, and connect to Folsom-Auburn Road across from an existing commercial driveway. The middle alignment would affect the ARWEC, some existing Reclamation storage and parking, and private apartment complex facilities south of the alignment.

**Alternative 3c (South Alignment)** - This alternative would be the same as Alternative 3a until approximately 600 feet east of the river. The south alignment would then turn in a southwest direction. The bridge would cross the river at a point roughly 700 feet below the bridge location for the north and middle alignments. The abutment of the bridge would cross between the Lake Pointe Apartment Complex and a commercial storage facility, and connect to Folsom-Auburn Road approximately 1,000 feet north of Inwood Road. The road alignment would directly affect a private residence just north of the commercial storage facility.

**Alternative 4a – Four Lane Bridge, Two-Lane Road, Partial East Intersection (North Alignment)** – This alternative consists of a four-lane concrete, segmental bridge as described in Alternative 3.

A newly constructed intersection at Folsom-Auburn Road as described in Alternative 3a would be built.

The west bridge abutment (400 feet west of the river) would be located northeast of an existing Reclamation storage area (“bone yard”). The new roadway would cross two existing dam service roads and cut through existing Reclamation facilities and infrastructure, affecting eight to nine buildings as it curves to connect with the existing Folsom Dam Road and Folsom-Auburn Road intersection. This alignment would separate the ARWEC from the other Reclamation facilities. The roadway would have a Class 2 bike lane in both directions.

The existing intersection of Folsom Dam Road and East Natoma Road would be modified to eliminate cross traffic onto Briggs Ranch Drive. The approach road from East Natoma Road would be the same as Alternative 3.

**Alternative 4b (Middle Alignment)** – This alternative would be the same as Alternative 4a except the west approach road would turn directly west from the west bridge abutment and continue just south of the Reclamation facilities. The bridge abutment would cross between an existing Reclamation storage area (“bone yard”) and service road, and connect to Folsom-Auburn Road across from an existing commercial driveway. The middle alignment would affect the ARWEC, some existing Reclamation storage and parking, and private apartment complex facilities south of the alignment.

**Alternative 4c (South Alignment)** - This alternative would be the same as Alternative 4a until approximately 600 feet east of the river. The south alignment would then turn in a southwest direction. The bridge would cross the river at a point roughly 700 feet below the bridge location for the north and middle alignments. The abutment of the bridge would cross between the Lake Pointe

Apartment Complex and a commercial storage facility, and connect to Folsom-Auburn Road approximately 1,000 feet north of Inwood Road. The road alignment would directly affect a private residence just north of the commercial storage facility.

**Alternative 5a – Four-Lane Bridge, Two-Lane Road, Two Partial Intersections Alternative (North Alignment)** - This alternative consist of a four-lane concrete, segmental bridge. The bridge is similar in description to Alternative 2 but would be striped to allow only two lanes of traffic.

The intersection at Auburn-Folsom Road would be constructed to allow two lanes of traffic to turn onto the new Folsom Bridge Road, merging into one lane at the bridge. The intersection at East Natoma Road would be the same as Alternative 4a.

The approach roads would be the same as described under Alternative 4a. The roadway would have a Class 2 bike lane in both directions.

**Alternative 5b (Middle Alignment)** – This alternative would be the same as Alternative 5a except the west approach road would turn directly west from the west bridge abutment and continue just south of the Reclamation facilities. The bridge abutment would cross between an existing Reclamation storage area (“bone yard”) and service road, and connect to Folsom-Auburn Road across from an existing commercial driveway. The middle alignment would affect the ARWEC, some existing Reclamation storage and parking, and private apartment complex facilities south of the alignment.

**Alternative 5c (South Alignment)** - This alternative would be the same as Alternative 5a until approximately 600 feet east of the river. The south alignment would then turn in a southwest direction. The bridge would cross the river at a point roughly 700 feet below the bridge location for the north and middle alignments. The abutment of the bridge would cross between the Lake Pointe Apartment Complex and a commercial storage facility, and connect to Folsom-Auburn Road approximately 1,000 feet north of Inwood Road. The road alignment would directly affect a private residence just north of the commercial storage facility.

**Alternative 6a – Two-Lane Bridge, Two-Lane Road, Two Partial Intersections Alternative (North Alignment).** This alternative consists of a prestressed concrete, cast-in-place segmental box girder structure. The bridge span and concrete abutments would be approximately 915 feet long. Two support piers would be placed above the mean river water level in the riverbank areas. The bridge span would have an estimated clearance of 180 feet from the river (top of deck to mean river surface). The bridge would be constructed by using the balanced cantilever method for post-tensioned, cast-in-place,

segmental concrete bridges. It would be wide enough for two lanes of traffic and a Class 2 bike path.

The intersections would be the same as Alternative 5a.

The approach road from East Natoma Road to the bridge would consist on one eastbound and one westbound lane of traffic using minor modifications to the existing intersection.

**Alternative 6b (Middle Alignment)** – This alternative would be the same as Alternative 6a except the west approach road would turn directly west from the west bridge abutment and continue just south of the Reclamation facilities. The abutment would cross between an existing Reclamation storage area (“bone yard”) and service road, and connect to Folsom-Auburn Road across from an existing commercial driveway. The road alignment would affect the ARWEC, some existing Reclamation storage and parking, and private apartment complex facilities south of the alignment.

**Alternative 6c (South Alignment)** – This alternative would be the same as Alternative 6a until approximately 600 feet east of the river. The south alignment would then turn in a southwest direction. The bridge would cross the river at a point roughly 700 feet below the bridge location for the north and middle alignments. The abutment of the bridge would cross between the Lake Pointe Apartment Complex and a commercial storage facility, and connect to Folsom-Auburn Road approximately 1,000 feet north of Inwood Road. The road alignment would directly affect a private residence just north of the commercial storage facility.

### **3.4 Screening of Preliminary Alternatives**

For the purposes of screening the preliminary alternatives, the four planning criteria were reviewed and it was determined that cost-effectiveness was a suitable screening criteria. An alternative is cost effective if no other alternative has a greater level of output for the same cost or the same or greater level of output at a lower cost. Based on traffic modeling, there was no substantive difference between the various alignments for the overall traffic capacity. Table 3-1 shows that the north (a) and south (c) alignments were not cost-effective and were therefore dropped from further consideration.

**Table 3-2 Cost-Effectiveness of Preliminary Alternatives.**

Preliminary Alternatives	Transportation Benefit <sup>1</sup>	Recreation Benefit	Total Output	Total First Cost	Annualized First Cost	Cost Effective
2a	5,600,000	28,000	5,628,000	110,708,000	6,670,000	No
2b	5,600,000	28,000	5,628,000	103,820,000	6,497,000	Yes
2c	5,600,000	28,000	5,628,000	111,378,000	6,709,000	No
3a	5,300,000	28,000	5,328,000	106,028,000	6,395,000	No
3b	5,300,000	28,000	5,328,000	99,140,000	5,989,000	Yes
3c	5,300,000	28,000	5,328,000	106,698,000	6,434,000	No
4a	5,000,000	28,000	5,028,000	100,958,000	6,096,000	No
4b	5,000,000	28,000	5,028,000	94,070,000	5,691,000	Yes
4c	5,000,000	28,000	5,028,000	101,628,000	6,136,000	No
5a	4,500,000	28,000	4,528,000	99,810,000	7,032,000	No
5b	4,500,000	28,000	4,528,000	92,930,000	5,624,000	Yes
5c	4,500,000	28,000	4,528,000	100,488,000	6,069,000	No
6a	4,000,000	28,000	4,028,000	86,928,000	5,271,000	No
6b	4,000,000	28,000	4,028,000	80,040,000	4,866,000	Yes
6c	4,000,000	28,000	4,028,000	87,598,000	5,310,000	No

<sup>1</sup>Transportation benefits were estimated based on initial traffic modeling and best professional judgment. More refined benefits were done for the final alternatives analysis.

Additionally, Alternative 6 was determined to not to meet the project objectives. Preliminary traffic studies indicated that a two-lane permanent bridge would not meet current traffic demands. Initial design investigations determined that the two-lane bridge would not be expandable to meet current and future demands. Instead, an entirely new bridge would have to be constructed adjacent to the two-lane bridge. Since a two-lane bridge did not adequately mitigate for the effects of the dam raise and it would not meet current traffic demands and it was not an economical means of allowing for future expansion by the local sponsors, Alternative 6 was eliminated from further consideration.

### **3.5 Final Array of Alternatives**

Following is a description of the final array of bridge and roadway plans based on the screening process outlined above.

#### **3.5.1 Description of the Final Array of Bridge and Roadway Plans**

The basic features of each plan are described below. Since many features of the various alternatives are similar, subsequent descriptions of the alternatives will focus only on those features that differ from the alternative previously described.

### **3.5.2 Alternative 1: No Action Alternative (Future Without-Project Condition)**

The no action alternative is the same as the future without-project conditions described previously in Section 3.4, Future Without-Project Conditions. This alternative serves as the baseline against which the costs, benefits, and effects of the action plans are evaluated.

Under this alternative, the Federal Government would implement the features of the various projects already authorized to increase flood protection along the American River. These already authorized projects include the Common Features Project, Folsom Dam Modification Project, Folsom Dam Re-operation, Folsom Dam Flood Management Plan Update, and Folsom Dam Raise Project without the temporary or permanent bridge feature.

The Folsom Dam Road would be managed indefinitely as a “restricted access” road (as defined by Reclamation) that would be limited to two-way non-commercial traffic during peak commute hours (6:00 a.m. to 9:00 a.m. and 4:00 p.m. to 7:00 p.m.) on Monday through Friday. All vehicles would be subject to security measures, and periodic road closures would be required for O&M work. Road security costs will be City of Folsom’s responsibility. These costs have been estimated and included in the economic analysis as a benefit of a permanent bridge.

Construction of the Folsom Dam Raise project would close Folsom Dam Road for a period of approximately 12 years. The effects of the temporary closure were identified in the 2002 Chief’s Report for the Folsom Dam Raise project.

Natural resources would be indirectly affected by the traffic changes of a restricted access roadway that would divert vehicles to other routes increasing air, noise, trip length, and traffic factors to the city and region.

Socioeconomic impacts have already been realized with the total closure of the dam road to businesses and local traffic circulation and patterns. The restricted access will relieve some of that at the commute hours, but long-term changes to the socioeconomics will continue.

### **3.5.3 ALTERNATIVE 2 – FOUR-LANE BRIDGE, FOUR-LANE ROAD, FULL INTERSECTIONS**

The main features of Alternative 2 are described in this section. The main features/intersections are shown on Plate 3.

#### **Folsom Dam Road and Bridge**

##### **East Approach**

Intersection of Folsom Dam Road and East Natoma Street. The existing intersection at Folsom Dam Road and East Natoma Street would be reconfigured

to accommodate four lanes of traffic flow and improve traffic circulation. A new signaled T-intersection would be constructed to the northwest of the existing intersection. This new intersection would replace the existing four-way intersection. At the T-intersection, two left turn lanes and one right turn lane northbound, and two left turn lanes and one right turn lane eastbound would be provided to accommodate traffic flow. New four-lane segments of roadway would be constructed east and southwest from the new intersection, eventually transitioning into the existing two lanes of East Natoma Street.

This new configuration would eliminate the existing intersection with Briggs Ranch Drive. This would reduce traffic and minimize disturbance in the adjacent residential neighborhoods. A new segment of Briggs Ranch Drive would be constructed, providing access to the residential area from East Natoma Street. A new T-intersection of Briggs Ranch Drive would be located southwest of the new intersection of Folsom Dam Road and East Natoma Street. At the T-intersection, one left turn lane and one right turn lane would be provided to accommodate traffic flow; however, left turns onto the new segment of Briggs Ranch Drive would not be allowed.

Portions of the old intersection of Folsom Dam Road and East Natoma Street would be removed. The existing segment of East Natoma Street south of the old intersection would likely be abandoned. All intersection work would be constructed in accordance with applicable Corps, Caltrans, Sacramento County, and City of Folsom standards (Plates 6 and 7).

Roadway from Intersection to Bridge. The new four-lane roadway segment from the intersection at East Natoma Street would generally follow the existing Folsom Dam Road alignment to a veer-off point about 1,000 feet south of the Folsom Dam Overlook driveway. Construction of this portion of the roadway would include some cut into the existing hillside to provide clearance for the new four-lane roadway. Additionally, there would be a 300-foot-long retaining wall along the east side of the road to support the fill material for the roadway. At the veer-off point, the road would rotate to the southwest below the new gated auxiliary spillway structure and then continue west above the CDC facilities to the river. The roadway would cross about 9 acres of CDC property.

Construction of each new roadway segment would include site preparation (cut or ripping, fill, and grading), laying a base of gravel, laying the riding surface of asphalt, and finishing the road with striping. The excess cut or ripped material would be removed, temporarily stockpiled, and reused for future work by Reclamation or the City of Folsom. Construction right-of-way on the roadway would be 10 to 15 feet beyond the cut and fill line. The new four-lane roadway would have 12-foot-wide lanes and 8-foot-wide shoulders, and be designed for traffic traveling at 45 miles per hour

Work along the existing Folsom Dam Road alignment would be done in stages (half the roadway at one time) to accommodate movement of traffic during construction. The old roadway surface (asphalt) would be removed, incorporated into roadway fill, or recycled. All roadway work would be constructed in accordance with applicable Corps, Caltrans, Sacramento County, and City of Folsom standards.

Reclamation and Prison Access Roads. Construction of the gated auxiliary spillway would convert part of the staging area for the Folsom Dam Modification Project to a concrete structure for outflow management and/or dam safety. The remaining portion of this area would likely be used as a staging area for the bridge project, and an access road for vehicles, equipment, and construction materials would be provided.

An intersection with left and right turn lanes would be constructed at the west end of the new retaining wall. This intersection would provide access to the Overlook and to the dam for Reclamation's operations and maintenance activities. In addition, a paved left turn pocket would be included in the roadway design to facilitate future construction of a spur to provide access for maintenance of the spillway.

Farther west, an access driveway from the new Folsom Dam Road would be provided to Reclamation and City of Folsom's water control structure. In addition, a non-signalized, at-grade intersection with a left turn lane would be constructed at the existing access road to allow continued access to CDC's Sacramento-Folsom firing range. The locked gate at the CDC access road would be replaced.

### **Bridge Across American River**

The new Folsom Dam Road would continue west and connect to the east bridge abutment, which would be located 500 feet east of the river. The bridge's orientation would align slightly south to allow the road to connect to Folsom-Auburn Road just south of most of Reclamation facilities.

Two roads would provide access for workers, vehicles, and equipment to the bridge construction area. Access from the east would be provided via an existing dirt road that would connect with a new segment of Folsom Dam Road. Access from the west would be provided via the Reclamation's existing road to the powerhouse.

The area just west of the new bridge is covered with about 80 feet of fill material previously excavated during construction of the Folsom Dam. This material is not suitable for construction and would need to be excavated and removed prior to construction of the new bridge.

The new bridge would be a pre-stressed concrete, cast-in-place, segmental box girder structure. The bridge span and concrete abutments would

be approximately 935 feet long. The span would be supported by two piers placed above the mean river water level in the river bank areas below. The bridge span would have an estimated clearance of 180 feet from the river (top of deck to mean river surface). Figure 5 shows an illustration of the new proposed bridge.

The bridge would be constructed by using the balanced cantilever method. Steps in construction of the bridge would include (1) construct abutments at new roadway edge, (2) mine holes in bedrock and form bridge foundations to support piers, (3) form piers, (4) form pier tables at top of piers, (5) set steel forms, (6) pump concrete into forms, (7) form cast-in-place concrete sections on both sides of the piers, (8) repeat forming concrete sections, and (9) join the sections in the center or join to abutments. An asphalt or concrete riding surface would then be placed on the bridge span, and the roadway would be finished with striping for four lanes of traffic.

An elevator along each pier would transport workers and materials up to the work areas. Tower cranes (one for each pier) would be used to transport heavy equipment, materials, and concrete up to the span area. The contractor would develop a spill management plan to avoid or deal with any accidental spills of concrete material and fuels.

The bridge would be designed to allow stormwater to drain by gravity off the roadway surface to the edges of the bridge. This stormwater would also contain oils, fuels, and other potentially hazardous materials from the vehicle traffic crossing the bridge. To avoid contamination of the land or river below, the bridge would have a water collection system. The stormwater would flow into drains at the end of the bridge, collect in pipelines, if needed, gravity flow off the bridge, and discharge into a siltation basin containing riparian or similar vegetation to bio-remediate the runoff.

### **West Approach**

Roadway from Bridge to Intersection. The west bridge abutment would be located 400 feet west of the river. From the abutment, the alignment of the new four-lane roadway segment would cross the north side of the existing Reclamation storage yard, a dam service road, the northeast edge of the Lake Point Apartment complex, and south side of the ARWEC facilities, and connect to the existing Folsom-Auburn Road across from the existing driveway to the Auto Spa. This alignment would affect the ARWEC, some existing Reclamation storage and parking, and Lake Point Apartment complex facilities.

The steps in the construction of the roadway would be the same as the other segments of the roadway east of the river. A 1,000-foot-long sound wall and landscaping would be constructed between the new roadway and the apartment complex to mitigate sound due to traffic on the new roadway. In

addition, a 600-foot-long sound wall would be constructed between the new roadway and Reclamation facilities, likely along the new bike trail.

Intersection of Folsom Dam Road and Folsom-Auburn Road. A new intersection would be constructed at the terminus of the new roadway at Folsom-Auburn Road. The new four-way intersection would include the Auto Spa driveway opposite the new roadway segment. The new intersection would consist of two left-turn lanes from southbound Folsom-Auburn Road onto the new roadway, one dedicated southbound lane, and one combination lane for southbound or right turns. Northbound Auburn-Folsom Road would have two dedicated northbound lanes, a right-turn lane onto the new roadway, and a left-turn lane. The existing Folsom-Auburn Road along the Lake Point Apartment complex would need to be widened for a distance of 500 feet to add a right turn lane. Signals and medians would be provided.

The existing Folsom Dam Road intersection would be closed or be a restricted non-signalized driveway access to Folsom Dam for emergency and maintenance vehicles.

A new signalized T-intersection and two-lane access road about 1,200 feet northwest of the existing Folsom Dam Road intersection would be constructed for Reclamation use, secured access to their facilities, and possible access to new ARWEC facilities.

## **Relocations**

Several existing facilities or functions would need to be relocated prior to construction of the Folsom Dam Road segment west of the new bridge. These include Reclamation's storage yard, the ARWEC, State Parks Folsom Lake SRA offices, and perhaps some Lake Point Apartment complex features.

Materials and parking at the Reclamation's storage yard would be relocated to an area east of the Reclamation shop buildings near the existing HTRW storage area. The Federal Government would continue to own the existing storage yard property and likely leave it as open space.

The existing public functions of the ARWEC and State Parks offices would be relocated to new buildings in a suitable location within an area of about 5 acres near the new intersection. Relocation of ARWEC and State Parks personnel and functions would be coordinated to minimize disruption as much as possible. Some of the existing buildings would be demolished and some would be retained for other uses.

Apartment complex facilities including parking, storage, and two tennis courts would be replaced or compensated.

## **Utilities**

Types of utilities in the project area include electricity, gas, telephone, cable, waste water and sewer, and water supply. Any utilities affected by relocation of facilities or construction of the intersections, roadway, and bridge would be relocated or replaced. These include at least 10 wooden poles carrying electric, telephone, and cable utilities; utilities associated with the ARWEC, State Parks offices, and Reclamation's storage yard; and up to seven high-powered electric utility towers owned by SMUD. The wooden poles would be relocated, and the towers would be relocated to other locations within the project area limits and replaced with appropriate steel pole structures. Four of the seven SMUD towers would be relocated as part of this project. Costs for relocating the other three towers would be the responsibility of SMUD.

## **Bicycle/Pedestrian Trails**

Two types of bicycle trails would be constructed for this alternative to provide continuous access between East Natoma Street and Auburn-Folsom Road, as well as additional recreational opportunities for biking and walking. A new Class 1 bike trail would extend along the north side of the new Folsom Dam Road and bridge. This 10-foot-wide trail would be surfaced with asphalt and be physically separate from the roadway. Both bicyclists and pedestrians could use this bike trail.

Two new Class 2 bike trails would extend along the north and south shoulders of the new roadway. These 8-foot-wide trails would be surfaced in asphalt and physically part of the new roadway surface. While bicyclists could use these trails, pedestrian use would be restricted to the Class 1 bicycle/pedestrian trail.

Currently, there are several segments of existing bike trail in the project area. These include (1) Class 1 bike trails on each side of the roadway at the intersection of Briggs Ranch Drive and East Natoma Street and (2) Jedediah Smith bike trail on the west side of the river. These trails were constructed, and are currently maintained by, the City of Folsom and State Parks, respectively. The new Class 1 bike trail would connect to these existing bike trails, as well as incorporate the segment of trail along the alignment of Folsom Dam Road north of East Natoma Street into the design.

Near the bridge, a new bike trail underpass would be designed and constructed about 800 feet east of the existing Folsom Dam Road intersection with Folsom-Auburn Roadway. The new bike trail at the bridge would be connected with the realigned trail. In addition, a segment of the existing Jedediah Smith bike trail would be rerouted along the river slope edge under the new bridge abutment and reconnected to the existing trail.

Along Folsom-Auburn Road, the existing segment of bike trail near the new T-intersection north of Reclamation facilities would be relocated with a grade separation to facilitate public access to the ARWEC and State Parks facilities.

## **Security Measures**

Security measures would be implemented to prohibit public access to secured CDC, Reclamation, and State Parks facilities and to ensure public safety both during construction and after completion of the project. These measures would include setbacks, fencing, walls, locked gates, lights, and signs. Open railings would be installed along both edges of the new bridge, and parking would be prohibited along the shoulders of the new Folsom Dam Road and bridge.

Security is of particular concern to the CDC. Permanent 6- and 8-foot security fencing approved by CDC would be constructed along both sides of the new roadway along CDC property lines east of the new bridge. If necessary, a security berm constructed to CDC standards would be constructed to limit public view of the Sacramento-Folsom firing range.

Interagency Security Committee (ISC) guidelines for new federal construction were designed for large buildings such as courthouses and office buildings and wouldn't be applicable to this project. The ISC guidelines do not mandate security standards in the way fire codes mandate life safety standards for buildings. The ISC approach is rather to categorize possible security threats and determine what levels of risk can be accepted given the budget available for mitigation.

An evaluation of the relocated facilities was done by an interagency committee based on potential threats to the facility. The group recommended that secured, separated parking for employee and government vehicles be provided; wide counters and a receptionist controlled door for the public lobby of the State Parks facility; and barriers in the form of large boulders be placed between the facilities and public parking with a minimum 100 foot standoff distance. The committee also recommended a number of other security measures that do not affect the design of the relocated facilities and deal more with the actual operation of the facilities. These security recommendations will be considered during the design of the relocated facilities.

## **Staging and Worker Parking Areas**

Although the contractor would be responsible for identifying the final staging areas, the most likely locations would be the Reclamation storage yard, the staging area constructed for the Folsom Dam Modifications project, and the triangle intersection area near the intersection of Folsom Dam Road and East Natoma Street. Other possible areas include the overlook area and the storage area near CDC's Sacramento-Folsom firing range intersection.

The work would require between 80 and 100 workers per day. Parking for the worker vehicles would be provided near East Natoma and Folsom-Auburn Roads, and the workers would be transported to the work areas.

### **Excavation, Temporary Stockpile, and Disposal Areas**

Some of the suitable excavated soil material would be used as fill elsewhere on the Folsom Bridge Project. Since the quantity of this excavated material would be sufficient to meet the fill needs of the project, no soil would need to be obtained and imported for the project. Material such as gravel, concrete, and asphalt material needed to construct the roadway, bridge, and bike trails would be obtained and transported by truck from local commercial sources.

Excess excavated material would be temporarily stockpiled within one-half mile of the excavated area. The exact site(s) have not been determined. Coordination with Reclamation and the Combined Federal Project on use and placement of excess excavated material from the bridge and spillway are ongoing.

Disposal of excavated material not suitable for fill, such as vegetation, debris, and old fill, would be disposed of at a local landfill. Asphalt, concrete, and other material from the old roadway segments would be removed, incorporated into roadway fill, or recycled. Materials from the SMUD tower structure would remain the property of SMUD, who would recycle or dispose of the materials. Building debris from relocation of ARWEC, State Parks offices, and apartment complex facilities would be recycled or disposed of at a local landfill.

### **Operation and Maintenance**

The City of Folsom would be responsible for the operation and maintenance of the new intersections, Folsom Dam Road, and bridge over the American River following transfer of ownership from the Federal Government. The intersections, roadway, and bridge would be included in the City's plan and schedule for regular street operation and maintenance.

### **Construction Schedule**

Roadway segments and the new bridge would be constructed at the same time. Prior to initiation of construction, the contractor would prepare a traffic management plan identifying measures to minimize traffic congestion and delays and ensure public safety. These measures could include scheduling construction activities to avoid commute hours, posting warning signs and speed limits, and using flaggers.

Construction of the new roadway and bridge could begin in the summer/fall of 2007 and be completed in 1.5 to 2 years. Work would be normally limited to daylight hours, with possible suspensions of work during local commute hours when traffic is allowed on the Folsom Dam Road segment. If necessary, work could be conducted during evening or night hours in areas away from residential neighborhood or commercial areas.

### **Real Estate**

This alternative would require the replacement of the affected buildings, cause an isolation of their operations, and require a rerouting of existing roads. The estimated total acreage this alternative affects is approximately 55 acres, with an additional 23 acres in temporary work easements. Refer to Appendix C: Real Estate Plan for acreages.

Estimated cost of lands, easements, right-of-way, relocation and disposal (LERRDs) for this alternative: \$7,400,000

**Relocations.** Several existing facilities would need to be relocated including Reclamation's storage yard, ARWEC, and State Parks Folsom Lake SRA offices. Relocation of Reclamation personnel and functions would be coordinated to minimize disruption. The Lake Pointe Apartment complex facilities affected include parking, storage, and two tennis courts that would require relocation or compensation.

Estimated cost of relocations: \$3,000,000

**Utilities.** Utilities and infrastructure associated with the Reclamation buildings would be relocated or replaced. Up to seven high-powered utility tower and lines (SMUD) would be relocated. Four of the seven SMUD towers would be relocated as part of this project. Costs for relocating the other three towers would be the responsibility of SMUD. Utilities at Folsom-Auburn Road would also be affected.

Estimated cost for SMUD and other utility relocations: \$1,000,000

### **Costs and Benefits**

#### **Estimated Construction Cost:**

The total project first cost for this alternative plan is estimated to be \$103,820,000. Annual OMRR&R costs are estimated to be \$158,000. Refer to Tables 3-4 and 3-6.

**Transportation Benefits.** The estimated total transportation benefits are \$5.65 million with the construction of Alternative 2. Transportation benefits were based on two benefit categories: the value of travel time delays and the value of extra miles driven. The analysis was done in the generally accepted "without" and "with" project framework of a federal project. The "with" project condition provides for the prevention of these losses and achieves those savings

associated with the project. The resulting savings represents the National Economic Development (NED) benefits.

Benefit categories included prevention of traffic delays and induced benefits associated with increased traffic resulting from lower congestion options available. Transportation benefits were calculated in accordance with ER 1105-2-100 and expressed as annual values to compare with annual costs. Refer to Appendix B: Economics for additional details on the methodology and the calculations.

Also see Appendix A: Folsom Bridge Engineering and Appendix D: Cost Distribution for support information.

**Recreational Benefits.** Total recreational benefits are defined as the sum of the maximum amount individuals are willing to pay to engage in a recreation activity, rather than forego it. This concept is referred to as willingness-to-pay and it is the method recommended by the Water Resources Council as an appropriate economic measure of the benefits of outdoor recreation. The unit day value approach is considered appropriate for estimating the benefits from recreation activities at small sites and is deemed appropriate for this analysis. This approach relies on expert judgment to determine benefits to bicyclists, or the average user's willingness-to-pay for the opportunity to recreate at the site in question.

Based on the quality of the bike riding experience, the rating was converted to the dollar values illustrated in the EGM. Accordingly, the recreational value assigned to additional recreational use as a result of the bridge is \$5.27 per user.

Estimates of swimming and wading, popular water-dependent activities around the American River Parkway, are estimated at 523,000 visits annually. Using the 523,000 visitation number for bicycling, the benefits ascribed to bicycling each year on the American River Parkway is estimated to be (523,000 x \$5.27) \$2,756,000 for existing conditions.

The effect on improved access around the lake because of the proposed bridge is expected to increase bicycle visitation in and around the American River Parkway, Folsom Lake SRA, and Lake Natoma. Preliminary estimates of benefits concluded that a 1 percent increase in bicycle visitation would likely result from the construction of the new bridge and associated bike lanes. A 1 percent could increase the beneficial use around the Parkway by \$28,000 annually. See Appendix G for a full discussion of the recreational benefits methodology.

**Other Social Benefits.** Categories of Other Social Effects (OSE) include Urban and community impacts; life, health, and safety; and displacement. Alternative 2 would provide a benefit to the community by relieving traffic congestion in Folsom, alleviating business losses, improving public health and

safety by reducing emergency response times, and provide an alternative access route for Homeland Security concerns and routine maintenance at Folsom Dam.

### **3.5.4 ALTERNATIVE 3 – FOUR-LANE BRIDGE, TWO-LANE ROAD, FULL INTERSECTIONS**

The features of Alternative 3 are very similar to Alternative 2 except for (1) the segment of new Folsom Dam Road between the Folsom Dam Overlook to the new bridge over the American River and (2) bicycle/ pedestrian trails. This section describes only those features that differ from Alternative 2. All of the features of Alternative 3 are shown on Plate 3.

#### **Folsom Dam Road and Bridge**

##### **East Approach**

Roadway from Intersection to Bridge. The new roadway segment from the intersection at East Natoma Street would generally follow the existing Folsom Dam Road alignment to about 1,000 feet south of the Folsom Dam Overlook area, and this portion of the roadway would remain as four lanes as described in Alternative 2. However, when the roadway veers to the southwest and extends below the new gated auxiliary spillway and above the CDC facilities, it would transition to a two-lane roadway to the river. This alignment would cross about 9 acres of CDC property.

The site preparation, roadway construction, and right-of-way would be the same as described for Alternative 2. This portion of the roadway would be a new two-lane roadway with 12-foot-wide lanes and 8-foot-wide shoulders, and be designed for traffic traveling at 45 miles per hour. Access to Reclamation facilities and access roads would be the same as described for Alternative 2.

##### **Bicycle/Pedestrian Trails**

For Alternative 3, only one type of bicycle trail (Class 2) would be constructed to provide continuous access between East Natoma Street and Auburn-Folsom Road, as well as additional recreational opportunities for biking and walking. Two new Class 2 bike trails would extend along the north and south shoulders of the new roadway. These 8-foot-wide trails would be surfaced in asphalt and physically part of the new roadway surface. These trails would be for bicyclists only. The Class 2 bike trails would connect to the existing trails as described in Alternative 2.

##### **Real Estate**

This alternative would require the replacement of the affected buildings, cause an isolation of their operations, and require a rerouting of existing roads. The estimated total acreage this alternative affects is approximately 55 acres. Refer to Appendix C: Real Estate for acreages.

Estimated cost of LERRDs for this alternative: \$7,400,000

**Relocations.** Several existing facilities would need to be relocated including Reclamation's storage yard, ARWEC, and State Parks Folsom Lake SRA offices. Relocation of Reclamation personnel and functions would be coordinated to minimize disruption. The Lake Pointe Apartment complex facilities affected include parking, storage, and two tennis courts that would require relocation or compensation.

Estimated cost of relocations: \$3,000,000.

**Utilities.** Utilities and infrastructure associated with the Reclamation buildings would be relocated or replaced. Up to seven high-powered utility lines (SMUD) would be temporarily relocated. Four of the seven SMUD towers would be relocated as part of this project. Costs for relocating the other three towers would be the responsibility of SMUD. Utilities at Folsom-Auburn Road would also be affected.

Estimated cost for SMUD and other utility relocations: \$1,000,000.

## **Costs and Benefits**

### **Estimated Construction Cost:**

The total project first cost for this alternative plan is estimated to be \$104,090,000. Annual OMRR&R costs are estimated to be \$158,000. Refer to Tables 3-4 and 3-6.

**Transportation Benefits.** The estimated total transportation benefits are \$5.65 million with the construction of Alternative 2. Transportation benefits were based on two benefit categories: the value of travel time delays and the value of extra miles driven. Transportation benefits were calculated in accordance with ER 1105-2-100 and expressed as annual values to compare with annual costs. Refer to Appendix B: Economics for additional details on the methodology and the calculations.

Refer to Appendix A: Folsom Bridge Engineering and Appendix D: Cost Distribution for support information.

**Recreational Benefits.** The estimated recreational benefits of bicycle access to both sides of Folsom Lake is estimated at \$22,000 annually.

**Other Social Benefits.** Alternative 3 would provide a benefit to the community by relieving traffic congestion in Folsom, alleviating business losses, improving public health and safety by reducing emergency response times, and provides an alternative access route for Homeland Security concerns and routine maintenance at Folsom Dam. Alternative 3 would provide slightly less social benefits than Alternative 2 since it would not reduce congestion to the same level as Alternative 2.

### **3.5.5 ALTERNATIVE 4 – FOUR-LANE BRIDGE, TWO-LANE ROAD, PARTIAL INTERSECTION (EAST)**

Alternative 4 is very similar to Alternative 3 except for the intersection of the new roadway with East Natoma Road. This section describes only the features that differ from Alternative 3. All of the features of Alternative 4 are shown on Plate 4, and the intersections are shown on Plates 6 and 7.

#### **Folsom Dam Road and Bridge**

##### **East Approach**

Intersection of Folsom Dam Road and East Natoma Street. A new partial intersection would be constructed to accommodate two lanes of traffic flow. The reconfigured, signaled T-intersection would be constructed across from Briggs Ranch Drive. At the T-intersection, a forced turn island would direct two left turn lanes onto northbound East Natoma Street. No right turn lane would be provided. In addition, eastbound traffic would not have access to Briggs Ranch Drive. A right turn lane would be constructed from southbound East Natoma Street onto Folsom Dam Road to accommodate westbound traffic.

New four lane segments of roadway would be constructed north and south of the intersection, transitioning into the exiting two lanes of East Natoma Street after 2,000 feet. The four lanes would consist of two northbound lanes, a left turn lane, and one southbound lane. At the intersection of Briggs Ranch Drive and East Natoma Street, a forced turn island would be constructed to direct traffic either north or southbound on East Natoma Street. Traffic would not be allowed to transition westbound to Folsom Dam Road.

##### **Real Estate**

This alternative would require the replacement of the affected buildings, cause an isolation of their operations, and require a rerouting of existing roads. The estimated total acreage this alternative affects is approximately 51 acres. Refer to Appendix C: Real Estate for acreages.

Estimated cost of LERRDs for this alternative: \$3,375,000

Relocations. Several existing facilities would need to be relocated including Reclamation's storage yard, ARWEC, and State Parks Folsom Lake SRA offices. Relocation of Reclamation personnel and functions would be coordinated to minimize disruption. The Lake Pointe Apartment complex facilities affected include parking, storage, and two tennis courts that would require relocation or compensation.

Estimated cost of relocations: \$3,000,000.

Utilities. Utilities and infrastructure associated with the nine Reclamation buildings would be relocated or replaced. Up to three high-powered utility lines

(SMUD) would be temporarily relocated. Four of the seven SMUD towers would be relocated as part of this project. Costs for relocating the other three towers would be the responsibility of SMUD. Utilities at Folsom-Auburn Road would also be affected.

Estimated cost for SMUD and other utility relocations: \$1,000,000.

### **Costs and Benefits**

Estimated Construction Cost:

The total project first cost for this alternative plan is estimated to be \$94,070,000. Annual OMRR&R costs are estimated to be \$158,000. Refer to Tables 3-4 and 3-6.

**Transportation Benefits.** The estimated total transportation benefits are \$4.4 million with the construction of Alternative 2. Transportation benefits were based on two benefit categories: the value of travel time delays and the value of extra miles driven. Transportation benefits were calculated in accordance with ER 1105-2-100 and expressed as annual values to compare with annual costs. Refer to Appendix B: Economics for additional details on the methodology and the calculations.

Refer to Appendix A: Folsom Bridge Engineering and Appendix D: Cost Distribution for support information.

**Recreational Benefits.** The estimated recreational benefits of bicycle access to both sides of Folsom Lake is estimated at \$22,000 annually.

**Other Social Benefits.** Alternative 4 would provide a benefit to the community by relieving traffic congestion in Folsom, alleviating business losses, improving public health and safety by reducing emergency response times, and provides an alternative access route for Homeland Security concerns and routine maintenance at Folsom Dam. Alternative 4 would provide slightly less social benefits than Alternative 3 since it would not reduce congestion to the same level as Alternative 3.

### **3.5.6 ALTERNATIVE 5 – FOUR-LANE BRIDGE, TWO-LANE ROAD, PARTIAL INTERSECTIONS**

Alternative 5 is very similar to Alternative 4 except for (1) the segment of new roadway east and west of the new bridge, (2) striping on the bridge, and (3) the intersection of the new roadway with Folsom-Auburn Road. This section describes only the features that differ from Alternative 4. All of the features of Alternative 5 are shown on Plate 4, and the intersections are shown on Plates 6 and 7.

## **Folsom Dam Road and Bridge**

### **East Approach**

Roadway from Intersection to Bridge. With Alternative 5, the new roadway segment from the intersection at East Natoma Street would generally follow the existing Folsom Dam Road alignment to a veer-off point about 1,000 feet south of the Folsom Dam overlook driveway. Construction of the entire portion of the roadway would be two lanes and would include minimal cut into the existing hillside to provide clearance for the shoulders. With Alternative 5, a retaining wall would not be needed. The road would also veer to the southwest below the new gated auxiliary spillway structure and continue west above the CDC facilities to the river. The roadway would cross about 9 acres of CDC property.

### **Bridge Across American River**

The new bridge would be striped for a total of two lanes of traffic to accommodate the two-lane segments of roadway on the east and west.

### **West Approach**

Roadway from Bridge to Intersection. The new roadway would leave the west abutment of the bridge as a two-lane road. Approximately 300 feet east of the Folsom-Auburn intersection, the westbound lane would transition into two lanes. The eastbound lane starting at the intersection, would transition from two lanes, (a merge lane roughly 1,000 feet long), and the other dedicated eastbound lane into a single eastbound lane at the bridge.

Intersection of Folsom Dam Road and Folsom-Auburn Road. A new partial intersection would be constructed at the terminus of the new roadway at Folsom-Auburn Road. The new four-way intersection would include the Auto Spa driveway opposite the new roadway segment. The new intersection would consist of two left turn lanes from southbound Folsom-Auburn Road onto the new roadway, one dedicated southbound lane, and one combination lane for southbound or right turns. Northbound Auburn-Folsom Road would have a right turn lane, one dedicated northbound lane, and one combination lane for northbound or right turns. The new roadway would have one right turn lane and one combination lane for left turns or westbound traffic. It would also have two lanes to receive the two left turn lanes from southbound Folsom-Auburn Road, transitioning to one lane by the west abutment of the bridge.

### **Real Estate**

This alternative would require the replacement of the affected buildings, cause an isolation of their operations, and require a rerouting of existing roads.

The estimated total acreage this alternative affects is approximately 51 acres. Refer to Appendix C: Real Estate for acreages.

Estimated cost of LERRDs for this alternative: \$3,330,000

**Relocations.** Several existing facilities would need to be relocated including Reclamation's storage yard, ARWEC, and State Parks Folsom Lake SRA offices. Relocation of Reclamation personnel and functions would be coordinated to minimize disruption. The Lake Pointe Apartment complex facilities affected include parking, storage, and two tennis courts that would require relocation or compensation.

Estimated cost of relocations: \$3,000,000

**Utilities.** Utilities and infrastructure associated with the nine Reclamation buildings would be relocated or replaced. Up to three high-powered utility lines (SMUD) would be temporarily relocated. Four of the seven SMUD towers would be relocated as part of this project. Costs for relocating the other three towers would be the responsibility of SMUD. Utilities at Folsom-Auburn Road would also be affected.

Estimated cost for SMUD and other utility relocations: \$1,000,000

## **Costs and Benefits**

Estimated Construction Cost:

The total project first cost for this alternative plan is estimated to be \$92,930,000. Annual OMRR&R costs are estimated to be \$158,000. Refer to Tables 3-4 and 3-6.

**Transportation Benefits.** The estimated total transportation benefits are \$4.4 million with the construction of Alternative 2. Transportation benefits were based on two benefit categories: the value of travel time delays and the value of extra miles driven. Transportation benefits were calculated in accordance with ER 1105-2-100 and expressed as annual values to compare with annual costs. Refer to Appendix B: Economics for additional details on the methodology and the calculations.

Refer to Appendix A: Folsom Bridge Engineering, Appendix B: Economics, and Appendix D: Cost Distribution for support information.

**Recreational Benefits.** The estimated recreational benefits of bicycle access to both sides of Folsom Lake is estimated at \$22,000 annually.

**Other Social Benefits.** Alternative 5 would provide a benefit to the community by relieving traffic congestion in Folsom, alleviating business losses, improving public health and safety by reducing emergency response times, and provides an alternative access route for Homeland Security concerns and routine maintenance at Folsom Dam. Alternative 5 would provide slightly less social

benefits than Alternative 4 since it would not reduce congestion to the same level as Alternative 4.

### 3.6 Comparison of Alternative Plans

#### 3.6.1 Screening of Alternative Plans

Four specific screening criteria assist in plan selection for Corps water resource studies: completeness, effectiveness, efficiency, and acceptability.

These criteria are generally subjective and are useful in narrowing down the array of possible alternative plans. With the exception of completeness, these criteria are also useful in screening potential measures:

- **Completeness.** To be complete, an alternative must not rely on other alternatives to function. An alternative plan is either complete or it is not complete. Each alternative plan is considered to be complete.
- **Effectiveness.** Effectiveness is the extent to which a measure or alternative plan achieves the planning objectives. In order to be retained for further analysis, an alternative must meet or partially meet at least two of the four planning objectives. Table 3-3 identifies each alternative’s ability to meet the planning objectives.
- **Efficiency.** Efficiency is a measure of the cost effectiveness of the plan expressed in net benefits. Benefits can be both monetary and non-monetary. Table 3-4 identifies the cost-effectiveness of each alternative.
- **Acceptability.** Acceptability is a measure of the ability to implement a measure or alternative plan. In other words, acceptability means a measure or plan is technically, environmentally, economically, and socially feasible. Unpopular plans are not necessarily infeasible, just unpopular. For the purposes of this screening, the alternative plans are considered to be acceptable.

**Table 3-3 Effectiveness of Alternatives in Attaining Planning Objectives.**

Alternatives	Mitigate Effects of Closure	Addresses Current Traffic Demand	Addresses Future Traffic Demand	Increases Recreational Opportunities
2	Yes	Yes	Partial	Yes
3	Yes	Partial	No	Yes
4	Yes	Partial	No	Yes
5	Partial	Partial	No	Yes

The future-without project condition assumes that a total of 2,760 vehicles would use the restricted Folsom Dam Road per day from an estimated 5,000 vehicles per day before security restrictions. Therefore, an estimated

2,300 vehicles per day in traffic volume has been adversely affected by the partial closure of Folsom Dam Road. In order for the alternatives to effectively mitigate those effects, they must at least restore that loss. Each of these alternatives accomplishes that traffic volume.

Typically, the cost effectiveness analysis is the basis for determining the level of Federal participation in a project. However, for this project, the maximum Federal contribution, based on Congressional authorization, is \$70,630,000. This is based on an updated cost estimate for the temporary bridge increment and application of the principles of Section 902 of WRDA 1986 and escalation of the Federally authorized \$30,000,000 for Section 902. This is the maximum Federal contribution for any permanent bridge project. Therefore, the cost effectiveness analysis (Table 3-3) and benefit-cost ratios (Table 3-5) are displayed as useful information for the City of Folsom to determine which project they prefer to implement.

Transportation benefits of the alternatives were evaluated for a four-lane and two-lane scenarios. The regional transportation model used in the evaluation was not sensitive enough to distinguish traffic volumes and traffic delays for mixtures of two- and four-lane scenarios. Evaluations of levels of service for each alternative indicated that the intersections at Folsom-Auburn Road and East Natoma Road are the prime control points for traffic capacity. For the purposes of this evaluation, transportation benefits for Alternatives 3 and 4 were derived from the assumption that full intersections would allow for the benefits gained as evaluated in the four-lane analysis and any combination of partial intersections would have benefits gained as evaluated for the two-lane analysis.

**TABLE 3-4 Cost Effectiveness Screening for Efficiency of Final Array Action Alternative Plans<sup>1</sup>**

Alternative	Annualized Transportation Benefits	Annualized Recreation Benefits	Total First Costs	Total Annual Costs	Net Benefits
Alt. 2	5,650,000	28,000	109,400,000	6,226,000	(548,000)
Alt. 3	5,650,000	22,000	104,090,000	5,917,000	(239,000)
Alt. 4	4,410,000	22,000	97,800,000	5,527,000	(1,089,000)
Alt. 5	4,410,000	22,000	96,500,000	5,451,000	(1,071,000)

<sup>1</sup> Based on October 2005 prices levels, 5.125% rate of interest, and a 50-year period of analysis.

### 3.6.2 Evaluation of Alternative Plans

The Principles and Guidelines established four accounts to facilitate evaluation and the display of the effects of alternative plans. These accounts were devised to encompass all significant effects of alternative plans. The four

accounts are NED, regional economic development (RED), environmental quality (EQ) and other social effects (OSE).

The NED account is the account that includes the estimates of project benefits and costs used to calculate net economic benefits. Net benefits are average annual equivalent benefits minus average annual equivalent costs. The NED plan is the plan that maximizes net benefits. Table 3-5 displays the cost estimates for the alternatives.

**TABLE 3-5 Estimated First Costs of Final Array Alternatives<sup>1</sup>**

MCACES Account <sup>2</sup>	Item	Alternative 2	Alternative 3	Alternative 4	Alternative 5
01	Lands and Damages <sup>3</sup>	8,140,000	8,140,000	3,486,000	3,441,000
02	Relocations <sup>4</sup>	4,000,000	4,000,000	4,000,000	4,000,000
06	Environmental Mitigation <sup>5</sup>	3,000,000	3,000,000	3,000,000	3,000,000
08	Bridge <sup>6</sup>	73,712,000	68,868,000	67,374,000	66,229,000
18	Cultural Resources <sup>7</sup>	581,000	527,000	511,000	498,000
30/31	Engineering and Design <sup>8</sup> Supervision and Administration <sup>9</sup>	12,161,000	11,749,000	11,623,000	11,526,000
	Sunk PED Costs	7,806,000	7,806,000	7,806,000	7,806,000
	<b>Total First Cost</b>	<b>\$109,400,000</b>	<b>\$104,090,000</b>	<b>\$97,800,000</b>	<b>\$96,500,000</b>

<sup>1</sup> Based on October 2005 prices levels, 5.125% rate of interest, and a 50-year period of analysis.

<sup>2</sup> Micro Computer Aided Cost Engineering System (MCACES) is the software program and associated format used by the Corps in developing cost estimates. Costs are divided into various categories identified as "accounts." Detailed cost estimates are presented in Appendix A: Folsom Bridge Engineering.

<sup>3</sup> Real estate land costs.

<sup>4</sup> Relocations consist of relocating affected and any affected Reclamation facilities including ARWEC and State Parks.

<sup>5</sup> Includes mitigation for affected habitat and special-status species. May increase if mitigation for other resources, such as air quality and/or transportation, becomes necessary.

<sup>6</sup> Includes bridge and roadway construction costs.

<sup>7</sup> The cultural resources data recovery cost is assumed to be 1% of the total federal construction cost of the temporary and permanent bridge.

<sup>8</sup> Based upon incurred and future costs after September 30, 2005, with scope-based cost adjustments for Alternatives 2-5.

<sup>9</sup> Assumes 6.55% of first costs (MCACES Accts. 06,08 and 18)

Table 3-6 displays the comparison of equivalent average annual benefits and average annual costs. The display shows that none of the alternatives has positive net benefits or a positive benefit-to-cost ratio based on the NED benefits derived from transportation improvements.

**3.6.3 Other Social Effects**

However, construction of a permanent bridge would provide benefits in the Other Social Effects (OSE) category that are important to the decision-making

process. OSE benefits include urban and community impacts; life, health and safety impacts; and displacement impacts.

With the closure of Folsom Dam Road in February 2003, there has been a change in traffic patterns and congestion within the city of Folsom, especially in and around the Folsom Historic District. Commuters that once traveled across Folsom Dam Road now travel through the City of Folsom and the historic district. The increase in traffic and associated congestion in the historic district has led to a decline in visitors and shoppers. Businesses within the district have experienced a decrease in business because of increased commuter traffic congestion due to travelers using the Rainbow Bridge (Riley Street Crossing) and Lake Natoma Crossing (Folsom Boulevard Crossing). Some business losses have been severe, while some businesses have closed.

Some members of the City Chamber of Commerce have reported an average 30 percent decline in overall business following the road closure. Specific businesses that have experienced significant loss of business since the closure include Cevitas (business decreased 35 percent), Clouds (business decreased 21 percent), Village Cleaners (business decreased 30 percent), and Mission Rogelio (business decreased 25 to 30 percent). At least six businesses have closed as a result. Construction of the bridge would relieve a substantial amount of this congestion and relieve business losses.

**TABLE 3-6 Benefits and Costs of Final Array Alternatives 1**

Item	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Investment Cost				
Total First Cost	\$109,400,000	\$104,090,000	\$97,800,000	\$96,500,000
Less Cultural Resources <sup>2</sup>	-\$581,000	-\$527,000	-\$511,000	-\$498,000
Interest during Construction <sup>3</sup>	\$6,439,000	\$6,161,000	\$5,445,000	\$5,373,000
Less PED Sunk Cost <sup>4</sup>	-\$7,806,000	-\$7,806,000	-\$7,806,000	-\$7,806,000
<b>Total Investment Cost</b>	<b>\$107,452,000</b>	<b>\$101,918,000</b>	<b>\$94,928,000</b>	<b>\$93,569,000</b>
Annual Cost				
Interest and Amortization	\$6,000,000	\$5,691,000	\$5,301,000	\$5,225,000
OMRR&R Cost <sup>4</sup>	\$226,000	\$226,000	\$226,000	\$226,000
<b>Total Annual Cost</b>	<b>\$6,226,000</b>	<b>\$5,917,000</b>	<b>\$5,527,000</b>	<b>\$5,451,000</b>
Annual Benefits				
Transportation	\$5,650,000	\$5,650,000	\$4,410,000	\$4,410,000

**TABLE 3-6 Benefits and Costs of Final Array Alternatives 1**

Item	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Recreation	\$28,000	\$22,000	\$22,000	\$22,000
<b>Total Annual Benefits<sup>5</sup></b>	<b>\$5,678,000</b>	<b>\$5,678,000</b>	<b>\$4,438,000</b>	<b>\$4,380,000</b>
Net Benefits	(\$548,000)	(\$239,000)	(\$1,089,000)	(\$1,071,000)

<sup>1</sup> Based on October 2005 price levels, 5.125% rate of interest, and a 50-year period of analysis.

<sup>2</sup> Excludes Cultural Resource Preservation cost.

<sup>3</sup> Assumes 18 month period of construction.

<sup>4</sup> Operation, Maintenance, Repair, Replacement, and Rehabilitation.

<sup>5</sup> Recreation benefits include Class 2 and a Class 1 trail for Alternative 2 and Class 2 trail for all others.

Additionally, in Reclamation's 2005 Folsom Dam Road Access Restriction EIS, an evaluation of economic impacts associated with various restricted access alternatives was included. This evaluation surveyed businesses affected by the dam road closure. The businesses reported experiencing revenue losses of about 21 percent. However, data were not available to determine if these losses may be offset by increased revenue elsewhere in the city of county. This evaluation also indicated that other factors that may have affected revenue losses such as business competition, industry demand, and regional economic conditions were not quantitatively factored into the analysis. The analysis concluded that although revenue losses of up to 21 percent may have occurred immediately after the February 2003 road closure, it remains uncertain what portions of these losses can be directly attributed to the closure of the dam road.

An additional non-monetary benefit to a new bridge and roadway outside the security zone but still within proximity of Folsom Dam is improved access to the dam for both homeland security concerns and regular operation and maintenance activities by Reclamation. Providing an additional access route, rather than Folsom Dam Road, would allow a timelier and secure means of reaching both sides of the dam for inspections, evaluations, repairs, and other maintenance activities. This proximity to strategic infrastructure provides an important benefit to the community at large.

Construction of a permanent bridge could also have a beneficial effect on life, health, and safety. Following completion, the project would provide an alternative to Folsom Dam Road for traffic to cross the American River. Beneficial effects on traffic congestion, accident rates, and emergency response times are expected as a result. Area transportation improvements coupled with the alternatives would provide a permanent beneficial effect to public health and safety by improving access and emergency response times.

Construction of a bridge would result in a savings of security costs. Without a bridge project, the City of Folsom would pay USBR to allow limited access across the existing dam road. For the W/O Project condition, security costs are

assumed to be incurred beginning in 2026 with the restricted public access on the Folsom Dam Road. Surveillance equipment and installation is expected to cost approximately \$2 million. Annual labor and operation, maintenance and administration is estimated by the city of Folsom Public Works Department at \$1,583,000 annually. These costs are expected to begin in 2026. The annualized cost of installation of equipment and labor and administration is \$602,982.

#### **3.6.4 Federal funding limit**

The maximum Federal contribution to any of the bridge alternatives is \$77,100,000. This is determined (a) by Congressional language which authorized \$36,000,000 for the temporary bridge and \$30,000,000 for the permanent bridge, then (b) by applying the principles to establish the authorized maximum costs of projects set forth in the Water Resources Development Act of 1986, Section 902, which states:

*Section 902. MAXIMUM COST OF PROJECTS.*

*In order to insure against cost overruns, each total cost set forth in this Act, or an amendment made by this Act, for a project shall be the maximum cost of that project, except that such maximum amount –(1) may be increased by the Secretary for modifications which do not materially alter the scope or functions of the project as authorized, but not by more than 20 percent of the total cost stated for the project in this Act or in an amendment made by this Act; and (2) shall be automatically increased for –(A) changes in construction costs applied to unconstructed features (including real property acquisitions, preconstruction studies, planning, engineering, and design) from the date of enactment of this Act (unless otherwise specified) as indicated by engineering and other appropriate cost indexes; and (B) additional studies, modifications, and actions (including mitigation and other environmental actions) authorized by this Act or required by changes in Federal law.*

The \$36,000,000 is to be cost shared between the dam raise project flood damage reduction partners (Corps, State of California and SAFCA); the \$30,000,000 is an additional Federal share that will be budget for by the Corps. Since the authorizing bridge language did not include an authorized total project cost, Section 902 would not ordinarily apply. However, Congress subsequently directed its application in Public Law 109-103, Energy and Water Development Act of 2006. The Section 902 calculations are set forth in Table 3-7.

	<b>Authorized (2003 Price Levels)</b>	<b>Section 902 Limit (Fully Funded)</b>	<b>Section 902 Limit (2005 Price Levels)</b>
Temporary Bridge <sup>1</sup>	\$36,000	\$48,700 <sup>2</sup>	\$46,900
Permanent Bridge	\$30,000	\$41,000	\$39,700
Total	\$66,000	\$89,700	\$86,600
Total Federal Share			\$77,100

<sup>1</sup> The temporary bridge amount is to be cost shared between the City of Folsom and the Corps. The City plans to enter into a local cooperation agreement with the non-Federal partners of the Folsom Dam Raise project: the State of California and SAFCA.

<sup>2</sup> The Section 902 limit for the \$36,000,000 is \$49,300,000. However, while Section 902 allows for up to a 20 percent increase in project cost based on design refinements, design refinements of the temporary bridge did not total 20 percent. Therefore, the Section 902 "limit" for the temporary bridge increment is \$48,700,000, less than the maximum allowable.

The authorized \$36 million for the temporary bridge was based on a preliminary planning estimate by the Corps in the 2002 Folsom Dam Mini Raise Report. The temporary bridge cost estimate has been updated as part of this current bridge study and has increased, but not to the full 20 percent allowed under Section 902. The authorized \$30 million for the permanent bridge was based on a USBR preliminary planning estimate for a much different permanent bridge. The permanent bridge cost increased – based on current detailed designs – in excess of the 20 percent allowed under Section 902. These adjusted amounts, combined with cost sharing rules for the temporary bridge increment, determine the maximum Federal participation.

### **3.6.5 Local funding constraints**

Prior to submittal of the final report, the City of Folsom will provide a letter stating its intent to cost share implementation of the permanent bridge project. As a chartered local Government, the city of Folsom has a wide range of funding streams available which could be utilized to partially fund this project. However, the majority of the local sponsor funds will come from Sacramento County Transportation Measure A revenues. The 30 year extension of this local county-wide ½ cent sales tax was approved by County voters in November 2004. While the extension of this measure does not become effective until 2009, with this voter approval advance funding can be made available via the issuing of bonds. The City of Folsom has informed the Corps that the maximum amount available from Measure A is an estimated \$22 million dollars. This amount is subject to inflation, which may increase available non-Federal funding.

The State of California and SAFCA, as the non-Federal partners for the overall Folsom Dam Raise project, would provide an estimated \$8,895,000 via a local cooperation agreement with the City of Folsom, towards the bridge. That funding, combined with the City of Folsom’s Measure A funding of about \$22 million, and maximum Federal share of \$77.1 million set the maximum funding available for the project at about \$107,995,000.

For the purposes of identifying a tentatively preferred alternative, that amount is considered the limit for an implementable project. Since Alternative 2's first cost exceeds that limit, Alternative 3 appears to be the plan that reasonably maximizes the Federal and non-Federal investment. The City has indicated a strong preference for Alternative 2 and it is assumed that should additional funding to implement it be secured by the City or construction bids are low enough that the available funds can construct Alternative 2, then Alternative 2 would be the preferred alternative.

### **3.6.6 Identification of the Tentatively Preferred Plan**

Based on the monetary and non-monetary benefits described, Alternative 3 has been identified as the tentatively preferred alternative. The project first cost was estimated on the basis of October 2005 price levels and amounts to \$104,100,000. Estimated average annual costs were based on a 5.125 percent interest rate, a period of analysis of 50 years, and construction ending in September 2008. The estimated annual OMRR&R cost is \$226,000 (October 2005 price levels). The Federal portion of the estimated first cost is \$77,100,000. The estimated fully funded Federal first cost, based on projected inflations rates specific by Corps budget guidance is \$79,800,000. The Federal share was derived from the authorized cost for the temporary bridge increment (\$36,000,000) which is subject to non-Federal cost sharing flood damage reduction and dam safety rules and maximum project cost limit calculations set forth in Section 902 of WRDA 1986; and the authorized Federal share of the permanent bridge increment (\$30,000,000) which is also subject to the maximum project cost limit calculation rules. The authorized temporary and permanent bridge costs were derived based on preliminary planning estimates. These amounts have since been improved via detailed designs and associated cost estimates. The cost estimate associated with the temporary bridge has increased, though not to the maximum extent allowed under Section 902 of WRDA 1986. The permanent bridge cost estimate has increased beyond the maximum extent allowed under Section 902, thus capping Federal participation in costs above \$77,100,000.

The non-Federal sponsor portion of the estimated first cost is \$27,000,000 which is divided between flood damage reduction (temporary bridge) at \$9,500,000 and the non-Federal portion of the permanent bridge at \$17,500,000.

Reclamation will determine if there is a dam safety non-Federal responsibility applicable to the original Folsom Dam purpose of M&I water supply, irrigation, and hydropower. Dam safety cost share is further discussed in Chapter 5.

**American River Watershed Project, California**  
**Folsom Dam Raise,**  
**Folsom Bridge**  
**Post Authorization Decision Document**

**CHAPTER 4.0**  
**TENTATIVELY PREFERRED ALTERNATIVE**

The evaluation of the final array of alternatives determined a preferred alternative for the project—Alternative 3 (Plate 5).

Alternative 3 best achieves the objectives and meets the criteria for a permanent bridge for the funds available to provide a transportation corridor for the City of Folsom and enable regional traffic to cross the American River during construction activities at Folsom Dam.

Alternative 3 also provides the most effective solution for the demonstrated non-Federal funds available for the project. Should additional funding be secured prior to construction, any alternative could be selected since the Federal investment is the same for all the alternatives in the final array of alternatives.

**4.1 Estimated Construction Cost**

The project first cost was estimated on the basis of October 2005 price levels and amounts to \$104,100,000. Estimated average annual costs were based on a 5.125 percent interest rate, a period of analysis of 50 years, and construction ending in September 2008. The estimated annual OMRR&R cost is \$226,000 (October 2005 price levels). Lands, easements, rights-of-way, relocations, and disposal areas (LERRDs) for the tentatively preferred alternative is estimated at 55 acres. The Federal portion of the estimated first cost is \$77,100,000. The estimated fully funded Federal first cost, based on projected inflations rates specific by Corps budget guidance is \$89,700,000. The Federal share was derived from the authorized cost for the temporary bridge increment (\$36,000,000) which is subject to non-Federal cost sharing flood damage reduction rules and maximum project cost limit calculations set forth in Section 902 of WRDA 1986; and the authorized Federal share of the permanent bridge increment (\$30,000,000) which is also subject to the maximum project cost limit calculation rules. The authorized temporary and permanent bridge costs were derived based on preliminary planning estimates. These amounts have since been improved via detailed designs and associated cost estimates. The cost estimate associated with the temporary bridge has increased, though not to the maximum extent allowed under Section 902 of WRDA 1986.

The non-Federal sponsor portion of the estimated first cost is \$27,000,000 which is divided between flood damage reduction (temporary bridge) at \$9,500,000 and the non-Federal portion of the permanent bridge at \$17,500,000.

## **4.2 Project Benefit**

**Transportation Benefits.** The estimated total transportation benefits are \$5.65 million with the construction of Alternative 2. Transportation benefits were based on two benefit categories: the value of travel time delays and the value of extra miles driven. Transportation benefits were calculated in accordance with ER 1105-2-100, Planning Guidance Notebook, and expressed as annual values to compare with annual costs. Refer to Appendix B: Economics for additional details on the methodology and the calculations.

**Recreational Benefits.** The estimated recreational benefits of bicycle access to both sides of Folsom Lake is estimated at \$22,000 annually.

**Other Social Benefits.** Alternative 3 would provide a benefit to the community by relieving traffic congestion in Folsom, alleviating business losses, improving public health and safety by reducing emergency response times, and provides an alternative access route for Homeland Security concerns and routine maintenance at Folsom Dam. Alternative 3 would provide slightly less social benefits than Alternative 2 since it would not reduce congestion to the same level as Alternative 2.

**American River Watershed Project, California**  
**Folsom Dam Raise,**  
**Folsom Bridge**  
**Post Authorization Decision Document**

**CHAPTER 5.0**

**PROJECT IMPLEMENTATION**

**5.1 Future Documents Anticipated**

**5.1.1 Folsom Dam Raise**

Ongoing studies of features of the Folsom Dam Raise Project may result in changes to the project that would necessitate development of future documents. These current efforts are (1) the Combined Federal Project that is a joint effort between the Corps and Reclamation for re-evaluating the raising of Folsom Dam and modification of LL Anderson Dam spillway, (2) future updates of the cost distribution process that will be required as more information becomes available, (3) Reclamation, with Corps consultation, is developing cost estimates for dam safety, (4) PCWA's determination of the required dam safety fix to L.L. Anderson Dam, and (5) a study to determine if adding an auxiliary spillway to the Raise Project would increase overall project efficiency. Should noteworthy revisions to the authorized project be determined to be necessary from any of these studies, the appropriate post authorization document would be prepared to report the changes.

**5.1.2 Folsom Bridge**

Upon completion of the public and agency review of this draft document, comments will be addressed and a final report submitted. The South Pacific Division (SPD) Commander will issue a notice of completion of the final report, submit the report to Corps Headquarters, and file the report with the U.S. EPA. The Division Commander will issue the Division Engineer's Transmittal Letter, which will be published in the *Federal Register*, starting a 30-day public review period as prescribed by NEPA. Corps Headquarters will coordinate the public comments, receive comments from affected Federal and State agencies, and complete its own independent review of the final report.

Corps Headquarters will review and approve the final report and PCA. The Corps will then execute PCA with the City of Folsom to construct the permanent bridge project upon signing the environmental document Record of Decision (ROD). The PCA and ROD will be signed by the Sacramento District Commander. It is not anticipated that any other planning documents will be necessary after this report is finalized. The City of Folsom, as the lead CEQA agency, is responsible for certifying that the final EIR was prepared in compliance with CEQA. The City of Folsom may enter into agreements with SAFCA and the State of California obtaining flood damage reduction – related funding.

## 5.2 Folsom Dam Raise Project Cost Update

An update of key project features and associated costs is described in this chapter. The Folsom Dam Raise Project includes (1) raising Folsom Dam and its appurtenant dikes and Mormon Island Dam, (2) enlarging the L.L. Anderson Dam spillway, (3) constructing a bridge immediately downstream of Folsom Dam, and (4) accomplishing ecosystem restoration at three sites. The update of key project features and associated costs consists of the following items.

- The dam raise cost estimate has increased due to price level changes. There has been no change to the plan to raise Folsom Dam.
- The cost of L.L. Anderson Dam spillway enlargement, which was 100% Federal, has been distributed between the Corps' responsibility of flood damage reduction and the PCWA's responsibility for dam safety of L.L. Anderson Dam. The feasibility level (20%) design and cost estimate has been updated for price level. PCWA is currently developing a more detailed design.
- The cost estimate for the ecosystem restoration features has only changed due to price level changes.
- The major change to the project is the development of a permanent bridge as an added increment to the temporary bridge. Identification of the permanent bridge project necessitates an updating of the overall Folsom Dam Raise project cost and cost-sharing responsibilities.

### 5.2.1 Project Authorization and Cost Estimate

The project authorization is complex and understanding it is important to understanding the cost distribution for the bridge; therefore, the authorization is restated below.

*Energy and Water Development Appropriations Act, 2004 (Public Law 108-137) Section 128. AMERICAN RIVER WATERSHED, CALIFORNIA.*

*(a) IN GENERAL—The Secretary of the Army is authorized to carry out the project for flood damage reduction and environmental restoration, American River Watershed, California, substantially in accordance with plans, and subject to the condition described in the Report of the Chief of Engineers dated November 5, 2002, at a total cost of \$257,300,000, with an estimated Federal Cost of \$201,200,000 and an estimated non-Federal cost of \$56,100,000; except that the Secretary is authorized to accept funds from State and local governments and other Federal agencies for the purpose of constructing a permanent bridge instead of the temporary bridge described in the recommended plan and may construct such permanent bridge if all additional costs for such bridge, above the \$36,000,000 provided for in the recommended plan for bridge construction, are provided by such governments or agencies.*

*Section 134. BRIDGE AUTHORIZATION. There is authorized to be appropriated \$30,000,000 for the construction of the permanent bridge in section 128(a).*

The Energy and Water Development Appropriations Act of 2006

*Section 128. American River Watershed, California (Folsom Dam and Permanent Bridge)-*

*(b) SECRETARY'S ROLE- Section 134 of Public Law 108-137 is modified to read as follows:*

*Sec. 134. BRIDGE AUTHORIZATION.*

*'There is authorized to be appropriated to the Secretary of the Army \$30,000,000 for the construction of the permanent bridge described in section 128(a), above the \$36,000,000 provided for in the recommended plan for bridge construction. The \$30,000,000 shall not be subject to cost sharing requirements with non-Federal interests.'*

*(c) CONFORMING CHANGE- Section 128(a) of Public Law 108-137 is modified by deleting 'above the \$36,000,000 provided for in the recommended plan for bridge construction,' and inserting in lieu thereof the following: 'above the sum of the \$36,000,000 provided for in the recommended plan for bridge construction and the amount authorized to be appropriated by section 134, as amended,'.*

*(d) MAXIMUM COST OF PROJECT- The costs cited in subsections (b) and (c) shall be adjusted to allow for increases pursuant to section 902 of Public Law 99-662 (100 Stat. 4183). For purposes of making adjustments pursuant to this subsection, the date of authorization of the bridge project shall be December 1, 2003.*

Table 5-1 shows (a) the cost of the project last presented to Congress as described in the 5 November 2002 Long Term Study Chief of Engineers Report at October 2001 price level, (b) Congressionally authorized cost in the 2004 Appropriations Act at October 2003 price level, (c) the 2004 Appropriations Act authorized cost updated to October 2005 price level, (d) the cost estimate reported in the 2002 Chief's report at October 2005 price level, and (e) the current plan cost estimate at October 2005 price level. Although the 2002 Long Term Study specified a cost breakdown between flood damage reduction and ecosystem restoration components, there was no breakdown in the authorization shown in columns b and c. The temporary bridge cost in columns d and e has been updated to reflect current design refinements and prices. The total bridge cost is estimated at \$104.1 million. The permanent bridge increment cost in column e is the difference between the total bridge cost and the temporary bridge cost.

**TABLE 5-1 Folsom Raise Project First Costs: Summary of Changes (\$million)**

Item	Project Cost Last Presented to Congress <sup>1</sup> Oct 2001 Price Level	Authorized Cost by Congress <sup>2</sup> Oct 2003 Price Level	Authorized Cost (b) Updated to Oct 2005 Price Level <sup>3</sup>	Authorized Project Cost(a) Updated to Oct 2005 Price Level <sup>4</sup>	Currently Recommended Plan at Oct 2005 Price Level <sup>5</sup>
	a	b	c	d	e
Folsom Dam Raise	174.1			211.0	211.0
L.L. Anderson Dam Spillway Modification	12.1			14.7	14.7 <sup>6</sup>
Ecosystem Restoration	27.4			33.1	33.1
Temporary Bridge	35.0			42.2 <sup>7</sup>	46.9 <sup>8</sup>
Permanent Bridge Increment	0			0	57.2 <sup>9</sup>
Total Project	248.6	257.3	293.0	301.0	362.9 <sup>10</sup>

<sup>1</sup> Authorized Project cost estimate as described in the 5 November 2002 Chief of Engineers Report for the Long Term Study, October 2001 price level

<sup>2</sup> Authorized cost cited in the 2004 Energy and Water Development Act, October 2003 price level

<sup>3</sup> Authorized cost updated to October 2005 price level

<sup>4</sup> Cost estimate of the authorized plan, October 2005 price level.

<sup>5</sup> Cost estimate of the currently recommended plan, October 2005 price level.

<sup>6</sup> The total cost of LL Anderson Dam spillway modification. However, since authorization, it has been determined that PCWA would be responsible for the cost of \$6.7 million to modify the spillway for LL Anderson Dam licensing requirements by the State and FERC.

<sup>7</sup> Cost estimate for the temporary bridge in the Long Term Study at October 2005 price level.

<sup>8</sup> Cost of the temporary bridge, including updated engineering studies.

<sup>9</sup> The cost attributed to the permanent bridge increment, which is the total cost of the bridge at \$104.1 million less the cost of the temporary bridge.

<sup>10</sup> Includes PCWA responsibility for LL Anderson dam safety. See footnote 6.

## 5.2.2 Principles of Funding

The Corps is responsible for determining funding obligations for each respective cost-share partner. The term “funding obligation” means the amount of funds that each of the Federal (Corps) and non-Federal (SAFCA, the State of California, and City of Folsom) partners will provide to initiate and complete the project. The method used by the Corps in determining the individual funding obligations is based upon statutory requirements associated with flood damage reduction projects and other public laws specific to this Folsom Dam Raise project. Methods and assumptions for determining individual funding obligations will not supersede Reclamation cost recovery requirements.

Reclamation is responsible for recovering Federal expenditures, as appropriate, once the project is completed and transferred into service. The term “cost recovery” refers to repayment by project beneficiaries, in this case the Contractors, of certain Federal (Corps) costs in completing the project. All cost recovery actions, including determinations of ability to reimburse, allocation of costs among project purposes, water

rates, direct billings, etc. will be determined by Reclamation in accordance with reclamation law, policies, standards, and directives. At this time Reclamation's position is that no bridge costs will be assigned to the Central Valley Project.

### 5.2.3 Changes in Cost Distribution

Since authorization, changes have occurred that have necessitated revisions to distribution of costs, and subsequent economic evaluation and cost sharing. In the 2002 Chief of Engineers Report for the Long Term Study, which was the project last reported to Congress, all of the L.L. Anderson Dam spillway enlargement costs were flood damage reduction costs. Now, a portion of these costs have been determined to be the responsibility of PCWA toward the dam safety of LL Anderson Dam.

The portion of the flood damage reduction cost that may be recognized as a cost to fix the existing hydrologic dam safety problems at Folsom Dam has been changed slightly. This change is due to (1) price level update, (2) a decrease in dam safety costs due to a determination that the PCWA is responsible for dam safety costs to LL Anderson Dam, and (3) correction of a calculation error in the 2002 Special Analysis that supplements the Long Term Study report. The cost allocation will change in the future first due to revision of the least-cost dam safety plan for the Folsom Dam Raise project. Reclamation and the Corps are developing a joint Federal project that would be a coordinated effort to implement Folsom Dam Modifications, Folsom Dam Raise, and Reclamation's Safety of Dams program. This effort will include a revised distribution of costs.

### 5.2.4 Funding and Expenditures

The funding history and expenditures of the Folsom Dam Raise and Bridge Projects are shown in Table 5-2.

**Table 5-2 Project Funding and Expenditures (\$1,000)**

Year	Bridge Expenditures		Raise Project Expenditures	Total
	Temporary Bridge	Permanent Bridge		
Pre-FY04 (pre-authorization)	2,260	0	13,870	16,130
FY-04	650	500	1,860	3,010
FY-05	<u>2,510</u>	<u>1,890</u>	<u>2,550</u>	<u>6,950</u>
Total Sunk Cost Through FY-05 <sup>1</sup>	5,420	2,390	18,280	26,090

<sup>1</sup> Total expenditures through FY-05 are considered financial sunk costs for cost sharing computations and are not included in the computation of annual costs.

### **5.2.5 Raise Project Fully Funded Costs and Section 902 Limit**

This section compares the Section 902 maximum project cost limit with the total project fully funded cost. The maximum project cost allowed by Section 902 of WRDA 1986, as amended, includes the authorized cost (adjusted for inflation), the current cost of any studies, modifications, and actions authorized by the WRDA of 1986 or any later law, and 20 percent of the authorized cost (without adjustment for inflation). The fully funded estimate is the flood damage reduction project first cost at the current interest rate inflated through the construction period. If the fully funded cost exceeds the Section 902 limit, then new authorization would be required.

The authorized project features are:

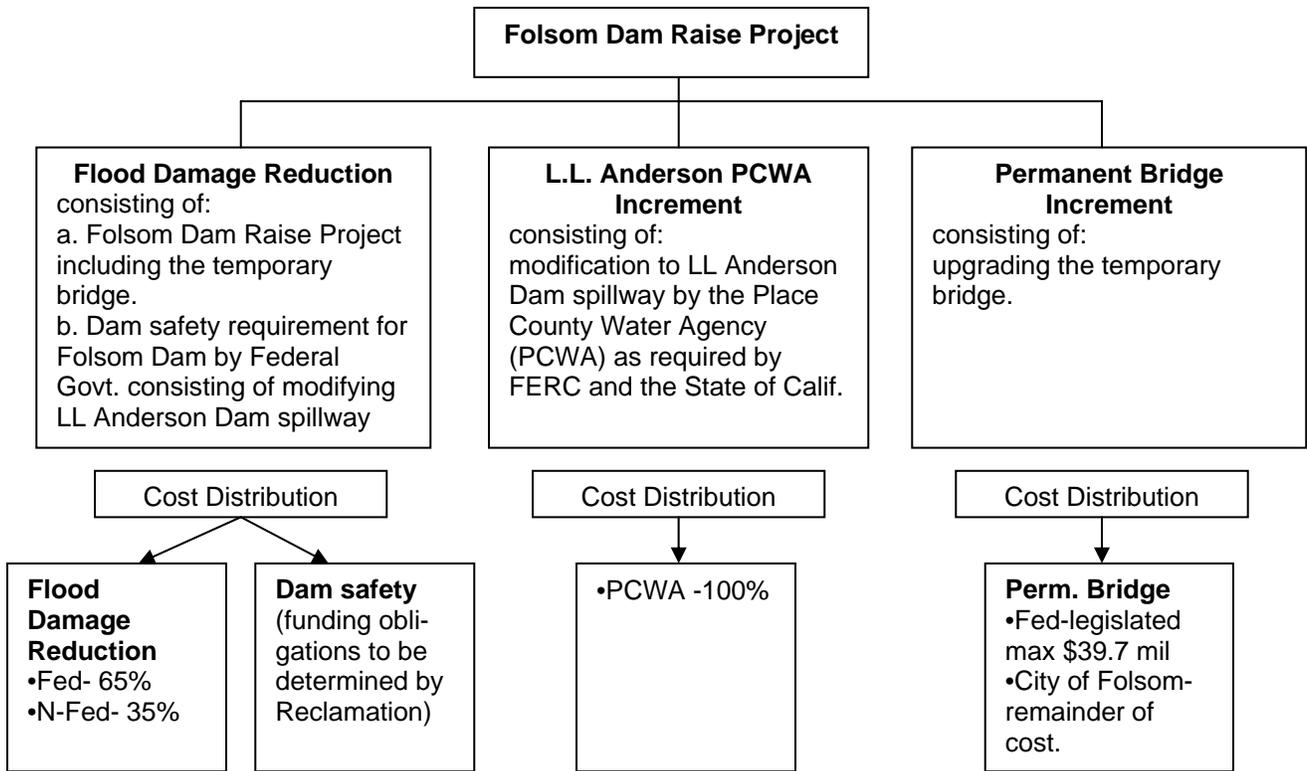
- Raise Folsom Dam and dikes
- Ecosystem restoration.
- Folsom Bridge – Only the temporary bridge increment is required for the flood damage reduction project. The permanent bridge increment is not part of the flood damage reduction project but was added by the 2004 Appropriations Act as a Federal contribution toward a permanent bridge for the City of Folsom. The 2006 Appropriations Act allows increasing the bridge cost pursuant to Section 902 that includes inflating to current price level and through the construction period and adding 20% of the authorized cost for pursuing engineering refinements.
- L.L. Anderson Dam spillway modification – Only that portion of the spillway modification cost that is required for the safety of Folsom Dam is part of the flood damage reduction project. It does not include that portion of the cost that is for the safety of LL Anderson Dam that is the responsibility of PCWA. Of the total spillway modification cost of \$14.7 million, \$8 million is the flood damage reduction project portion.

The Section 902 limit is \$396.7 million and the fully funded flood damage reduction project estimate is \$344.8 million.

### **5.3 Update Folsom Dam Raise Distribution and Appropriation of Costs**

The distribution of costs between project purposes, dam safety, permanent bridge, and PCWA responsibility is complex. This is discussed in detail in Appendix D and is summarized below. Costs are distributed so that the economic feasibility of flood damage reduction may be evaluated and also because there are different cost-sharing rules and different sponsors between flood damage reduction, dam safety, and the permanent increment of the bridge. Cost distribution and funding obligations (cost sharing) are discussed in detail in Appendix D.

The two basic purposes of the Folsom Dam Raise Project are flood damage reduction and ecosystem restoration. Ecosystem restoration costs are fully separable from flood damage reduction and are not included in the following cost distribution analysis. The following figure illustrates the basic distribution of costs.



### **5.3.1 Flood Damage Reduction**

Flood damage reduction includes (1) the Folsom Dam Raise Project consisting of raising Folsom Dam and dikes, and construction of the temporary bridge, and (2) modifications to the L.L. Anderson Dam spillway. The Folsom Dam raise is a major modification that compels the Corps to correct any dam safety deficiencies as part of the project. The raise itself corrects much of the hydrologic dam safety problem. L.L. Anderson Dam, an upstream dam, has an undersized spillway, thus the dam would fail during a PMF, exposing Folsom Dam to very high flows. Thus the project includes L.L. Anderson Dam spillway enlargement. FERC and the State safety of dams office are requiring PCWA to enlarge the L.L. Anderson Dam spillway to renew its operating license. That portion of the L.L. Anderson Dam spillway modification required by FERC and the State is the sole responsibility of PCWA. If PCWA is to modify the spillway to meet Folsom Dam Raise project requirements, L.L. Anderson would no longer be a project feature. L.L. Anderson spillway enlargement that is in addition to PCWA's work is part of the flood damage reduction project.

### **5.3.2 PCWA Responsibility at L.L. Anderson Dam**

The part of the spillway modification that PCWA would be required to fix to meet FERC and State obligations is the same modification that the Corps would need to undertake as part of the Folsom Dam Raise Project dam safety requirements. Although the PCWA portion will be built by the Corps, it is not part of the Federal project because it represents a without-project condition and the PCWA would reimburse the Corps for this cost. The 2002 Long Term Study Chief's Report showed the full cost for L.L. Anderson Dam spillway enlargement as a federal flood damage reduction cost but now a portion of this cost is the responsibility of PCWA. Project costs for improvements at L.L. Anderson are distributed, based upon Separable Cost—Remaining Benefits (SCRB) method, between PCWA and federal flood damage reduction. PCWA's portion of L.L. Anderson Dam spillway enlargement cost amounts to \$6.7 million out of the total \$14.7 million.

### **5.3.3 Permanent Bridge Increment**

In the 2004 authorization, a permanent bridge "increment" was added to the temporary bridge identified in the 2002 Long Term study for traffic access mitigation, and a cost estimate has been developed as part of the current project. The permanent bridge replaces the temporary bridge in the current plan.

The maximum allowable cost of the temporary bridge for cost allocation purposes has been set in Section 134 of the 2006 Energy and Water Development Appropriations Act at \$36 million increased to the Section 902 limit of \$49.3 million (fully funded at October 2005 price level). Cost engineering refinements have increased the first cost estimate of the temporary bridge from \$42.2 to \$46.9 million. Thus \$46.9 million is part of the flood damage reduction purpose. Bridge costs that exceed \$46.9 million are permanent bridge costs. Of the total bridge cost of \$104.1 million, the temporary bridge cost of \$46.9 million is flood damage reduction and the remainder of \$57.2 million is distributed to the permanent bridge.

The permanent bridge cost is a non-Federal responsibility except for the authorized Federal contribution of \$30 million. Section 134 of the 2006 Energy and Water Appropriations Act allowed that this amount could be increased using the Section 902 method. Thus, the maximum Federal contribution to the permanent bridge is \$39.7 million (first cost at October 2005 price level). There is no authorized permanent bridge cost to compare to the \$39.7 million; therefore, this maximum Section 902 cost is limited only by the cost of the bridge minus the temporary bridge cost; in other words, \$104.1 million minus 46.9 million equals \$57.2 million. Since \$57.2 million is greater than \$39.7 million, the full \$39.7 million is the Federal permanent bridge contribution. The \$17.5 million balance is the non-Federal contribution to be paid by the City of Folsom.

The City of Folsom will obtain all LERRDs. The cost of the LERRDs is part of the \$17.5 million. Since cost sharing does not apply to the permanent bridge, there is no up-front 5 percent cash contribution. However, the flood damage reduction portion of the temporary bridge, shown on Figure 5-2, does have a 5 percent up-front cash contribution.

### 5.3.4 Costs Attributable to Flood Damage Reduction

The flood damage reduction costs are shown in Table 5-3. The costs attributable to flood damage reduction for the authorized project are the total project costs less ecosystem restoration and bridge costs that are in excess of the temporary bridge. The cost in excess of the temporary bridge is the total bridge cost of \$104.1 million less the authorized temporary bridge cost of \$46.9 million (see Table 5-1). In the authorized plan, the total cost for dam safety is part of the flood control project.

The costs attributable to flood damage reduction for the current plan are the total project costs less ecosystem restoration, and less bridge costs that are in excess of the temporary bridge and dam safety costs only for Folsom Dam. Since authorization, the cost of the temporary bridge increased from \$42.2 million to \$46.9 million due to changes in unit prices in the cost estimate. Also since the authorization, part of the cost for LL Anderson Dam has been determined to be the responsibility of PCWA. This amounts to \$6.7 million.

**TABLE 5- 3 Raise Project Cost Attributable to Flood Damage Reduction (\$1 million)**

Project Elements	Authorized Plan at Price Level Oct 2005	Currently Recommended Plan at Price Level Oct 2005
Total Folsom Dam Raise Project	301.0	362.9
Less Ecosystem Restoration	-33.1	-33.1
Less Total Bridge Cost in Excess of the Temporary Bridge Cost <sup>1</sup>	0	-57.2
Less Dam Safety Costs for LL Anderson Dam	0	-6.7
Total Flood Damage Reduction Cost	267.9	265.9

<sup>1</sup> The authorized flood damage reduction project includes the temporary bridge at a cost of \$42.2 million, but not a cost for a permanent bridge. The currently recommended plan includes a temporary bridge at a cost of \$46.9 million.

### **5.3.5 Distribution of Flood Damage Reduction Costs to Dam Safety**

The 2002 Long Term Study Chief's Report identifies division of dam safety costs from the flood damage reduction costs as part of the recommended plan. Dam safety is not a project purpose; however, besides providing a reduction in flood risk, the project solves many of Folsom Dam's existing dam safety deficiencies. Moreover, the remaining flood damage reduction costs would be cost-shared with project non-Federal sponsors for flood control. The project benefits would include flood damage reduction and dam safety. Dam safety benefits, as calculated by the Corps, are equal to dam safety costs.

Some dam safety costs may be recovered from non-Federal parties by Reclamation or the Corps, depending on purposes involved. See Dam Safety Cost Share below.

In order to determine respective costs for flood damage reduction and dam safety, the SCRB method was applied to the total project cost. Costs were allocated between flood damage reduction and dam safety using a modified SCRB method. Inputs to the SCRB are the cost of the least-cost dam safety only plan, and the cost of the least-cost flood damage reduction only plan. The least-cost dam safety only plan is a 3-foot high parapet wall on Folsom Dam, lowering the spillway 6 feet, and enlargement of L.L. Anderson Dam spillway less the cost determined to be PCWA's responsibility. The least-cost flood damage reduction only plan is a 7-foot dam raise plan less the total L.L. Anderson Dam spillway modification.

The SCRB analysis, shown in Appendix D, determined that 57 percent of the total cost is assigned to flood damage reduction and 43 percent to dam safety. Of the total cost of \$265.9 million, \$151.6 million is allocated to flood damage reduction and \$114.3 million to dam safety.

The flood damage reduction – dam safety split is anticipated to be significantly revised. Reclamation and the Corps are exploring employing an auxiliary spillway to resolve both flood damage reduction and hydrologic dam safety problems. A new least cost dam safety only plan will be developed by Reclamation as part of its corrective action study. The least-cost dam safety only plan will be revised to be the same as Reclamation's plan dam safety only plan. SCRB would be revised in turn, and the flood damage reduction–dam safety split would be revised accordingly. Determination of least-cost dam safety and revisions to Folsom Modifications will be made by October 2006.

### **5.3.6 Dam Safety Cost Share**

The Corps has a duty, under 33 USC § 467n, to recover some Dam Raise costs assigned to dam safety. Under that same statute the Secretary of the Interior has a duty to recover costs assigned to irrigation in accordance with repayment provisions of Public Law 98-404. Reclamation It is possible that some dam safety costs may not be assignable to irrigation under PL 98-404 and regulations implementing that statute. Distribution of dam safety costs will be revised as needed for the dam raise project as a

whole, and bridge funding may be affected to the extent that some dam safety costs cannot be assigned to irrigation.

Corps guidance for dam safety cost-distribution is outlined in the Corps' Civil Works Policy Guidance Letter No. 43, updated 19 May 1999. This provides guidance for determining the apportionment of costs of project modification for dam safety assurance purposes, under Section 1203 of WRDA 86. The guidance stipulates that 85 percent of dam safety costs are Federal costs and 15 percent shall be assigned to project purposes in accordance with the cost distribution in effect for the Folsom Dam Raise Project at the time the work is initiated. Non-Federal interests shall share the costs assigned to each purpose in accord with the cost distribution in effect at the time of when the Folsom Dam project was first constructed in 1951. Costs are repaid to the Federal government with interest. Vendible purposes could be recovered by Reclamation or the Corps. The State would be responsible for the CVPIA (Central Valley Project Improvement Act) share.

The Corps' cost sharing rules differ slightly from Reclamation's rules. Reclamation guidance for dam safety cost-distribution stipulates 85 percent of dam safety costs are Federal costs and 15 percent is allocated between vendible purposes only; thus, all the 15 percent is recovered.

Regardless of which agency rules are applied, Reclamation determines the relative percentages for each purpose. The relative percent distribution varies from year to year depending on actual water deliveries. The dam's purposes are:

- Flood damage reduction - Federal
- Navigation - Federal
- Fish and wildlife - Federal
- Irrigation - Vendible
- Municipal water supply - Vendible
- Hydropower - Vendible
- CVPIA – State of California

Reclamation will determine non-Federal responsibility for, and administer recovery for dam safety costs. Since dam safety non-Federal costs are recovered after construction, these costs must be budgeted up-front by the Federal government. At this time Reclamation's position is that no bridge costs will be assigned to the Central Valley Project.

## **5.4 Changes in Benefits and Costs for Flood Damage Reduction and Ecosystem Restoration**

### **5.4.1 Flood Damage Reduction**

As earlier indicated in this report, project costs have changed due to a combination of several factors, including (1) updated interest rate and price level, (2) changes in L.L. Anderson Dam spillway enlargement cost division between the flood damage reduction project and PCWA, and (3) sunk PED costs. Based upon the without-project condition that

the Folsom Dam Modification project (without advance release) is in place, there is a slight incremental increase to the flood damage reduction benefit-cost ratio based on what is proportionately reflected in the cost allocation. The cost estimates for flood damage reduction and ecosystem restoration are presented in Table 5-4 and are based on an October 2005 price level. The estimated benefit-to-cost ratio for flood damage reduction is 2.3. Thus, the project is still economically feasible.

#### **5.4.2 Ecosystem Restoration**

The ecosystem restoration component of the project has not changed from the authorized project; therefore, there is no change to the restoration benefits and costs except for the updated price levels. It is recognized that ecosystem restoration benefits are not monetary and are expressed in outputs as Average Annual Habitat Units (AAHUs). The only difference between the authorized plan and the current plan for ecosystem restoration is the small incremental change in dollars spent per AAHU based upon the cost updated to October 2005 price level. Based upon no changes to ecosystem restoration benefits and a small incremental increase to the dollars spent per AAHU, ecosystem restoration continues to be economically feasible.

**TABLE 5- 4 Raise Project Comparison of Benefits and Costs for Flood Damage Reduction and Ecosystem Restoration (\$1,000)**

	Authorized Project in the February 2002 Long Term Report October 2005 Price Level <sup>1</sup>	Currently Recommended Project October 2005 Price Level <sup>2</sup>
<b>Flood Damage Reduction</b>		
Investment Cost		
Total First Cost	268	265
Less Cult. Res.	-2	-2
Less Sunk PED Cost	-24	-24
Interest during Construction <sup>2</sup>	138	138
Subtotal Investment Cost	380	377
Annual Cost		
Interest and Amortization	21	21
O&M Costs	0.2	0.2
Subtotal Annual Cost	21	21
Average Annual Benefits		
Inundation Reduction	21	21
Folsom Modification Project surcharge <sup>3</sup>	4	4
Advance replacement of spillway bridge <sup>4</sup>	0.2	0.2
	25	25
Total Benefits		
Annual Cost Allocable to Flood Damage Reduction	12	11
Benefit-to-Cost Ratio	2.1	2.3
<b>Ecosystem Restoration</b>		
Investment Cost		
Total First Cost	33	33
Less Cult. Res	0	0
Int During Constr	30	30
Less Sunk PED	0	0
Subtotal Investment Cost	63	63
Annual Cost <sup>7</sup>		
Interest and Amortization	4	4
O&M Cost	0.1	0.1
Subtotal Annual Cost	4	4
Annual Benefits (AAHU)	893.7	893.7

<sup>1</sup> Based upon the results presented in the Special Analysis Report, Appendix B. Based on 5.125% interest rate and 50 year period of economic analysis. FDR = 59 percent, Dam Safety = 41 percent

<sup>2</sup> Based on 5.125% interest rate and 50 year period of economic analysis. FDR = 57 percent, Dam Safety = 43 percent

<sup>3</sup>The annual cost of the surcharge component of Folsom Modification Project would no longer be necessary with this alternative.

<sup>4</sup> The spillway bridge would be built earlier than it would otherwise be under the no-action alternative, resulting in a cost savings, as it would not have to be replaced at the end of its useful life.

<sup>7</sup> 1% Cultural resources data recovery cost is not included in the annual costs.

## **5.5 Cost Sharing**

### **5.5.1 Flood Damage Reduction Cost Share**

The total flood damage reduction costs of \$265.9 million constitute the raise of Folsom Dam, Mormon Island Dam, wing dams, and dikes, temporary bridge cost, and L.L. Anderson Dam spillway enlargement minus PCWA's responsibility. The cost share for flood damage reduction is shown in Table 5-5. The table summarizes the authorized and currently recommended plans at the October 2005 price level including Federal and non-Federal cost share. The flood damage reduction project cost is distributed between flood damage reduction and dam safety. The State of California is the non-Federal sponsor which is cost sharing on the project.

The Corps' Federal share is 65 percent of the flood damage reduction cost. The State of California non-Federal share is 35 percent of the flood damage reduction cost. The Federal flood damage reduction cost for the authorized plan at October 2005 price level is \$102.8 million, and the non-Federal flood damage reduction cost is \$54.3 million. The Federal flood damage reduction cost for the current recommended plan is \$99.3 million, and the non-Federal flood damage reduction cost is \$52.3 million. Dam safety distribution of Federal and non-Federal costs are shown in Table D-10 in Appendix D: Cost Distribution.

**TABLE 5- 5 Raise Project: Comparison of Cost Apportionment for Flood Damage Reduction <sup>1</sup> (\$1,000)**

MCACES ACCT <sup>3</sup>	Item	Authorized Project October 2005 Price Level <sup>1</sup>			Currently Recommended Project October 2005 Price Level <sup>2</sup>		
		Fed	Non- Fed	Total	Fed	Non-Fed	Total
	<b>First Costs</b>						
1	Lands	640	290	930	640	290	930
2	Relocations		2,840	2,840		2,840	2,840
4	Construction	195,720		195,720	196,100		196,100
6	Environmental. Mitigation	4,870		4,870	6,580		6,580
18	Cultural Resources <sup>4</sup>	1,910		1,910	2,220		2,220
30, 31	ED/SA	60,860	740	61,600	63,170	740	63,910
	<b>Total FDR/DS Cost</b>	264,000	3,870	267,870	268,710	3,870	272,580
	<b>Less PCWA LLA<sup>2</sup></b>	-		-	-6,700		-6,700
	<b>Subtotal</b>	264,000	3,870	267,870	262,010	3,870	265,880
	<b>Less Dam Safety</b>	-110,800		-110,800	114,300		114,300
	<b>FDR Subtotal</b>	153,200	3,870	157,070	147,710	3,870	151,580
<b>Distribution of Flood Damage Reduction Costs</b>							
	<b>FDR Subtotal</b>	153,200	3,870	157,070	147,710	3,870	151,580
	Less Cult. Res <sup>3</sup>	-1,190		-1,190	-2,220		-2,220
	Adjust. Subtotal	151,290	3,870	155,160	145,490	3,870	149,360
	5% Cash <sup>4</sup>	-7,850	7,850	0	-7,580	7,580	0
	<b>Subtotal</b>	143,440	11,720	155,160	137,910	11,450	149,360
	Cash Adjustment	-42,950	42,950	0	-40,830	40,830	0
	<b>Subtotal</b>	100,850	54,310	155,160	97,080	52,280	149,360
	Add Cult. Res.	1,910		1,910	2,220		2,220
	<b>Total</b>	102,760	54,310	157,070	99,300	52,280	151,580
	Percent	65%	35%	100%	65%	35%	100%

1. Authorized Project includes all of L.L. Anderson spillway enlargement cost, temporary bridge is \$46.9 million, October 2005 price level update from \$36 million (October 2001). The SCRB percentages are 57 percent flood damage reduction – 43 percent dam safety.

2. Since authorization, it has been determined that PCWA is responsible for the portion of the dam safety cost of LL Anderson Dam that is required by FERC and the State.

3. Cultural Resources Data Recovery 1% of Federal Total Construction Cost, non-reimbursable. Cultural Resources cost beyond 1 percent the non-Federal sponsor will cost share 34 percent.

4. Sponsor required to pay 5 percent cash contribution

## 5.5.2 Bridge Cost Sharing

The \$46.9 million for the temporary bridge is distributed between flood damage reduction and dam safety as described for the total dam raise project in section 5.2.5. The temporary bridge cost is an integral part of the Folsom Dam Raise project and has a cost distribution identical to the rest of the project (57 percent flood damage reduction, 43 percent dam safety). Thus, the flood damage reduction cost is \$27.6 million and the dam safety cost is \$19.3 million. Of the \$27.6 million, the Federal share is 65 percent or \$18.0 million, and the non-Federal share is 35 percent, or \$9.6 million.

Normal cost share rules apply to the non-Federal flood damage reduction piece of the bridge. There are no LERRD's required for a temporary bridge, therefore the non-Federal sponsor has no requirements in this regard. The non-Federal sponsor will be required to make an up front cash contribution equal to 5 percent of the construction cost, in this case \$1.4 million. The non-Federal sponsor will provide the balance of its share during bridge construction.

The non-Federal responsibility for the dam safety costs will be determined by Reclamation. The current position of Reclamation is that no bridge-related dam safety costs are assignable to any non-Federal entities who are in any way sponsors of or beneficiaries of the original Folsom Dam project under Reclamation arrangements or contracts. This leaves the non-Federal dam safety costs assignable to the original flood control purpose. As there was no non-Federal sponsor for flood damage reduction on the original Folsom Dam, it may be that all dam safety costs assigned to the bridge will be the responsibility of the Federal government. Dam safety cost expenditures correct the original Folsom project, and sponsors for Folsom Dam Bridge, Modifications and Raise projects will not be responsible for those legacy dam safety costs under their new Project Cooperation Agreements.

All costs above the temporary bridge costs are the responsibility of the non-Federal bridge sponsor, the City of Folsom. However, the 2004 Appropriations Act authorized \$30 million of Federal funding for the permanent bridge. The 2006 Appropriations Act stipulated that the \$30 million is not subject to cost sharing. To allow for cost increases to the bridge, the 2006 Act also stipulates that the \$30 million may be increased based on Section 902 cost limitation. This limit, as described above, is calculated as \$39.7 million first cost (\$41.0 fully funded). Thus for the permanent portion of the bridge cost the Federal government will provide the first \$39.7 million, and the \$17.5 million balance will be paid by the City of Folsom. Included with the City's cost are \$12.1 million for LERRDS. The alignment of the permanent bridge (Alternative 3) goes into private lands and SMUD power lines and Reclamation's ARWEC facility need to be relocated; thus LERRDs need to be acquired (See Appendix C: Real Estate). The City of Folsom has agreed to purchase these LERRDs. The cost apportionment for the permanent bridge is shown in Table 5-6 and Figure 5-2.

Flood damage reduction cost share rules do not apply to the City of Folsom's share of the permanent bridge. Agreements on the details of payments will be made during the PCA negotiation process between the Federal government and the City of Folsom.

**TABLE 5-6 Bridge Project: Cost Apportionment (\$1000)**

MCACES ACCT <sup>2</sup>	Item	Currently Recommended Project <sup>1</sup>		
		First Costs	Fed	Non-Fed
<b>TEMPORARY BRIDGE</b>				
1	Lands <sup>3</sup>	0	0	0
2	Relocations <sup>4</sup>	0	0	0
08, 11	Construction <sup>5</sup>	32,837	0	32,837
6	Environmental Mitigation	1,710	0	1,710
18	Cultural Resources <sup>6</sup>	306	0	306
30, 31	ED/SA <sup>7</sup>	6,647	0	6,647
	PED Sunk Costs	5,420		5,420
	<b>Subtotal</b>	<b>46,920</b>	<b>0</b>	<b>46,920</b>
<b>TEMPORARY BRIDGE – FLOOD DAMAGE REDUCTION</b>				
	Minus Dam Safety	<b>-19,350</b>	<b>0</b>	-19,350
	<b>Subtotal, Flood Damage Reduction</b>	<b>27,570</b>	<b>0</b>	27,570
	<b>Less Cultural Resources</b>	<b>-306</b>	<b>0</b>	-306
	<b>Subtotal</b>	<b>27,264</b>	<b>0</b>	27,264
	5 % CASH	-1,379	1,379	0
	<b>Subtotal</b>	<b>25,886</b>	<b>1,379</b>	27,264
	Cash Adjustment <sup>8</sup>	-8,160	8,160	0
	<b>Subtotal</b>	<b>17,726</b>	<b>9,539</b>	27,264
	Add Cultural Resources	306	0	306
	<b>Subtotal</b>	<b>18,032</b>	<b>9,539</b>	27,570
	Percent	65	35	100
<b>TEMPORARY BRIDGE – DAM SAFETY</b>				
	Temporary Bridge Subtotal	46,920	0	46,920
	Flood Damage Red Adjustment	-27,570	0	-27,570
	<b>Subtotal, Dam Safety <sup>9</sup></b>	<b>19,350</b>	<b>0</b>	19,350
<b>PERMANENT BRIDGE</b>				
	Lands	0	8,140	8,140
	Relocations	0	4,000	4,000
	Construction	36,031	0	36,031
	Environmental Mitigation	1,290	0	1,290
	Cultural Resources	221	0	221
	ED/SA	4,102	1,000	5,102
	PED Sunk Costs	2,386	0	2,386
	<b>Subtotal</b>	<b>44,030</b>	<b>13,140</b>	57,170
	Cash Adjustment <sup>10</sup>	-4,330	4,330	0
	<b>Subtotal</b>	<b>39,700</b>	<b>17,470</b>	57,170
<b>TOTAL BRIDGE</b>				
	<b>Permanent + Flood Damage Reduction + Dam Safety</b>	<b>77,082</b>	<b>27,009</b>	104,090
	Percent	71%	29%	100%

footnotes next page

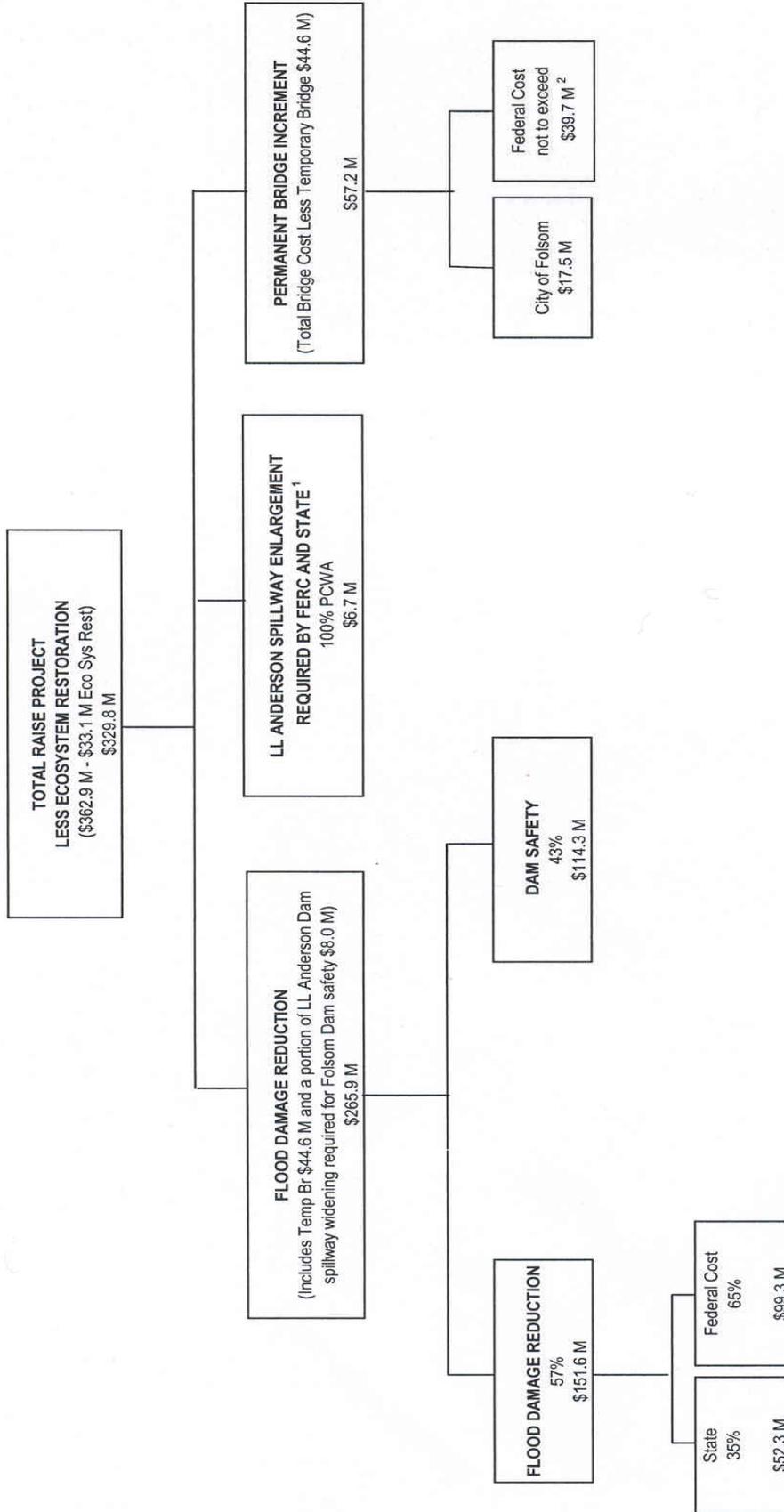
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- <sup>1</sup> Oct 2005 Price Level.
  - <sup>2</sup> Micro Computer Aided Cost Engineering System (MCACES) is the software program and associated format used by the Corps in developing cost estimates. Costs are divided into various categories identified as “accounts.” Detailed cost estimates are presented in Appendix A: Folsom Bridge Engineering.
  - <sup>3</sup> Real estate land costs. Land costs are required by the permanent bridge increment. The temporary bridge requires no lands besides existing project lands.
  - <sup>4</sup> Relocations consist of relocating affected utilities including replacement of Reclamation’s American River Water Education Center. All relocation costs are with the permanent increment.
  - <sup>5</sup> Construction costs (& other costs) were distributed between temporary and permanent increments as shown on Table D-4
  - <sup>6</sup> Cultural resources data recovery cost is 1% of the total Federal construction cost of the permanent bridge
  - <sup>7</sup> Engineering and Design, Supervision and Administration.
  - <sup>8</sup> Adjustment to meet flood damage reduction cost sharing rules of 65 percent Federal, 35 percent non-Federal.
  - <sup>9</sup> All dam safety cost initially Federal funded. Reclamation will determine non-Federal responsibility for dam safety costs when dam safety costs for the larger Folsom Dam Raise project are revised.
  - <sup>10</sup> Federal contribution to the permanent bridge increment is \$39.7 million (Section 902 limit on \$30 million at current October 2005 price level).
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### **5.3.3 Summary of Flood Damage Reduction Project Cost Sharing**

Figure 5-1 shows a summary of the cost sharing for the flood damage reduction portion of the Folsom Dam Raise project and Figure 5-2 shows cost sharing for the bridge.

# FOLSOM DAM RAISE PROJECT COST SHARING

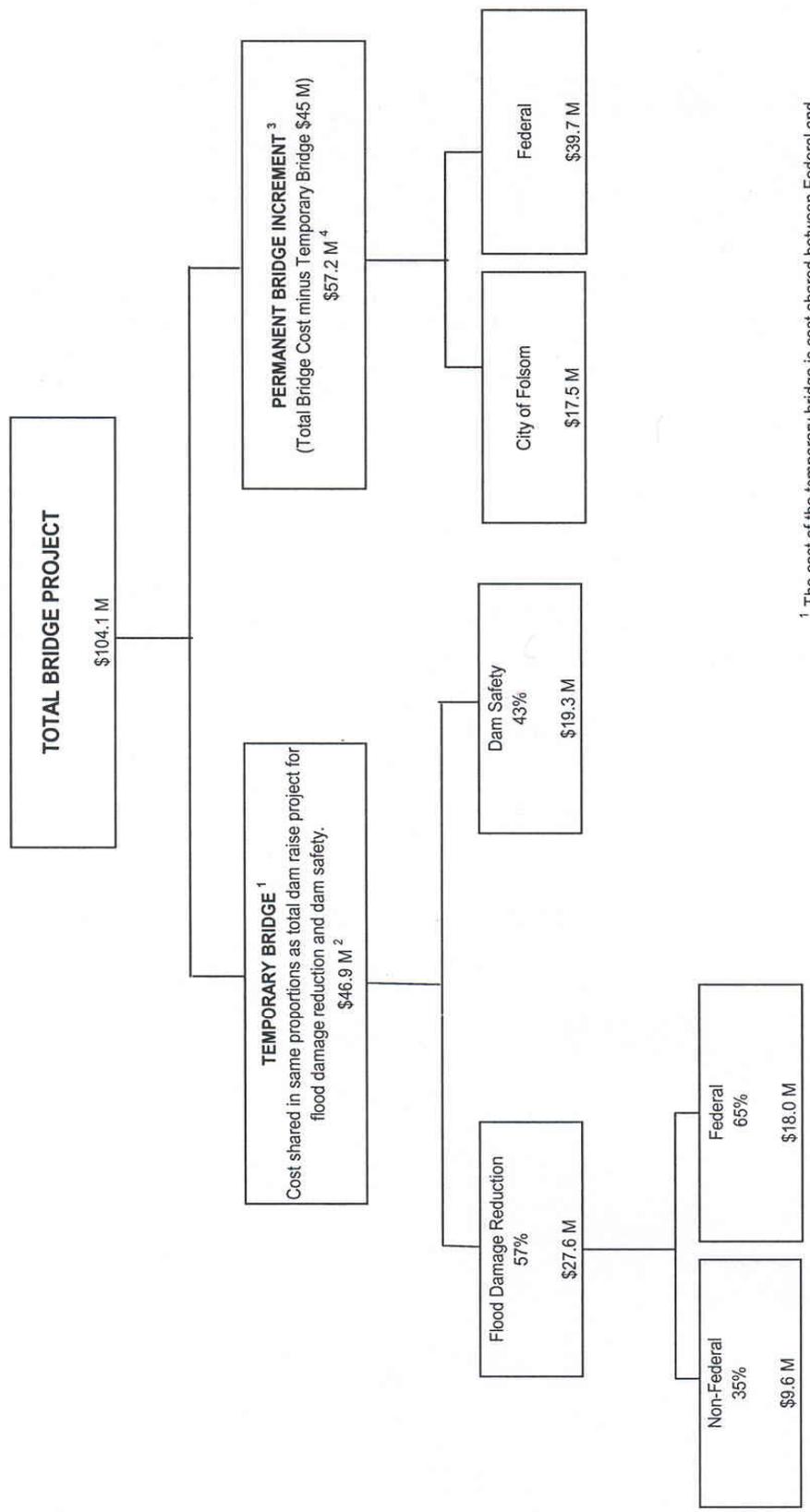
27 April 2006



<sup>1</sup> The dam safety improvement for LL Anderson Dam is needed by the Corps for Folsom Dam and PCWA for LL Anderson Dam. The total cost of \$14.7 million is split between the Corps (\$8 M) and PCWA (\$6.7 M).  
<sup>2</sup> The permanent bridge increment is not cost shared. The maximum Federal contribution toward the permanent bridge is authorized at \$30M increased pursuant to Section 902 to \$39.7 M.

Figure 5-1 Folsom Dam Raise Project Cost Distribution

**FOLSOM BRIDGE PROJECT  
COST SHARING**  
27 April 2006



<sup>1</sup> The cost of the temporary bridge is cost shared between Federal and local partners.  
<sup>2</sup> The maximum cost of the temporary bridge is authorized at \$36M increased pursuant to Section 902 to \$44.6 M.  
<sup>3</sup> The cost of the permanent bridge increment is not cost shared.  
<sup>4</sup> The maximum Federal contribution toward the permanent bridge is authorized at \$30M increased pursuant to Section 902 to \$39.7 M.

Figure 5-2 Folsom Bridge Cost Distribution

#### **5.5.4 Ecosystem Restoration Cost Share**

The ecosystem restoration component of the authorized project includes the improvement of the aquatic environment for Federal and State-listed anadromous salmonid species such as Central Valley steelhead, other special status species such as fall-run chinook salmon, and other fishes inhabiting the American River by installing temperature shutters at Folsom Dam to maintain cooler waters needed by salmonids; and the restoration of riparian and terrestrial habitats at Woodlake and Bushy Lake. The cost apportionment for ecosystem restoration has not changed from the authorized project, which is shown in Table 5-8 as it applies an updated October 2005 price level for the authorized project.

**TABLE 5- 8 Ecosystem Restoration Project Cost Apportionment (\$1,000)<sup>1</sup> (No change since authorized project)**

MCACES ACCT <sup>2</sup>	Item	Temperature Shutters			Woodlake			Bushy Lake			Total		
		Fed	Non-Fed	Total	Fed	Non-Fed	Total	Fed	Non-Fed	Total	Fed	Non-Fed	Total
1	Lands	0	0	0	0	577	577		547	547	0	1,124	1,124
4, 6	Construction	15,518	0	15,518	2,812	0	2,812	6,291	0	6,291	24,621	0	24,621
	Cultural Resources <sup>3</sup>	0	0	0	179	0	179	901	0	901	1,080	0	1,080
30, 31	ED/SA <sup>4</sup>	4,202	0	4,202	732	0	732	1,371	0	1,371	6,305	0	6,305
	<b>Subtotal</b>	19,720	0	19,720	3,723	577	4,300	8,563	547	9,110	32,006	1,124	33,130
	Less Cultural Resources	0	0	0	-26	0	-26	-55	0	-55			
	Subtotal	19,720	0	19,720	3,697	577	4,274	8,508	547	9,055			
	Adjust Cash	-6,902	6,902	0	-919	919	0	-2,622	2,622	0			
	Subtotal	12,818	6,902	19,720	2,778	1,496	4,274	5,886	3,169	9,055			
	Add Cultural Resources	0	0	0	26	0	26	55	0	55			
	<b>Subtotal</b>	12,818	6,902	19,720	2,804	1,496	4,300	5,941	3,169	9,110	21,563	11,567	33,130
	Percent	65%	35%	100%	57%	43%	100%	61%	39%	100%	63%	37%	100%

<sup>1</sup> October 2005 price level, \$1,000

<sup>2</sup> Micro Computer Aided Cost Engineering System (MCACES) is the software program and associated format used by the Corps in developing cost estimates. Costs are divided into various categories identified as "accounts." Detailed cost estimates are presented in Appendix A: Folsom Bridge Engineering.

<sup>3</sup> Cultural Resources Data Recovery 1% of federal total construction cost, no reimbursable. Construction cost beyond 1% the non-federal sponsor will cost share 35%. See Section 7(a) of Public Law 93-291.

<sup>4</sup> Engineering and Design, Supervision and Administration

### **5.5.5 Budgeting Considerations**

The 2002 Chief's Report provided that Reclamation would be responsible for Federal dam safety costs. Since then, an agreement was reached between the Corps and Reclamation that the Corps would be responsible for, and budget for these costs. Thus the Corps will budget for all Federal flood damage reduction construction costs as shown in Table 5-9. In addition, the Corps will budget for the Federal and non-Federal dam safety costs. The dam safety cost-share rules are that the non-Federal interests, in this case CVP users will pay back the dam safety cost, with interest, after construction. Thus, the full \$114.3 million dam safety cost will be budgeted by the Corps. The present position of Reclamation is that some or all dam safety costs may not be assignable to CVP purposes. As described earlier, the dam raise is included in the Combined Federal Plan currently being developed by Reclamation and the Corps. This may result in further changes to how the Folsom Dam Raise project is budgeted.

For ecosystem restoration, the Corps will budget for the Federal share only. PCWA will pay upfront its share of the L.L. Anderson spillway enlargement cost, thus the Corps will not budget for this amount. At this time no vehicle or process to allow use of PCWA funding has been identified other than a separate PCA with PCWA. Likewise the City of Folsom will pay up front or during construction its share of the cost of the bridge.

Table 5-10 shows a summary of Corps and non-Federal agencies cost share, by facility for the entire, larger project.

**TABLE 5- 9 Raise Project: Corps Project Budget Items of Current Plan  
(\$1,000, October 2005 Price Level)**

<b>BY PROJECT PURPOSE</b>				
<b>Item</b>	<b>Total Cost</b>	<b>Sunk Costs</b>	<b>FY 2006 Tentative Budget</b>	<b>Post 2006 Budget</b>
Federal Flood Damage Reduction <sup>1</sup> ;	213,600	23,700	5,000	
Federal & Non-Federal Dam Safety <sup>2</sup>				184,900
Federal Ecosystem Restoration Share	21,500	0	0	21,500
Federal Contribution to Permanent Bridge	39,700	2,400	9,900	27,400
<b>TOTAL TO BUDGET</b>	<b>274,800</b>	<b>26,100</b>	<b>14,900</b>	<b>233,800</b>
<b>BY FACILITY</b>				
<b>Item</b>	<b>Total Cost</b>	<b>Sunk Costs</b>	<b>FY 2006 Tentative Budget</b>	<b>Post 2006 Budget</b>
Bridge <sup>3</sup>	77,100	7,800	9,900	59,400
LL Anderson	6,400			6,400
Folsom Dam Raise	169,700	18,300	5,000	146,400
Ecosystem Restoration	21,500	0		21,500
<b>TOTAL TO BUDGET</b>	<b>274,700<sup>4</sup></b>	<b>26,100</b>	<b>14,900</b>	<b>233,700</b>

- <sup>1</sup> Flood damage reduction share includes Folsom Dam Raise, LL Anderson spillway enlargement.
- <sup>2</sup> The Corps will budget for the non-Federal dam safety share because this is required before construction, but may be recovered after construction.
- <sup>3</sup> Federal flood damage reduction portion, plus the dam safety portion of the temporary bridge, plus the Federal contribution to the permanent bridge increment.
- <sup>4</sup> Difference in total cost by facility compared to project purpose is due to round off error.

**TABLE 5- 10 Raise Project: Summary of Cost-Sharing Responsibilities by Facility  
(\$1,000, Oct. 2005 price level)**

Facility	PCWA <sup>1</sup>	City of Folsom <sup>2</sup>	SAFCA <sup>3</sup>	State Of CA <sup>4</sup>	Non-Fed Total	Federal Total Corps <sup>5</sup>	Federal and Non-Federal Total
Bridge							
Temporary				9,500	9,500	37,400	46,900
Permanent		17,500			17,500	39,700	57,200
L.L. Anderson	6,700			1,600	8,300	6,400	14,700
Folsom Dam Raise				41,300	41,300	169,700	211,000
Ecosystem Restoration			11,600		11,600	21,500	33,100
Total	6,700	17,500	11,600	52,400	88,200	274,700	362,900

<sup>1</sup> Although it has no specific statutory responsibility to participate in this WRDA project, PCWA is willing to be responsible for the non-Federal share of L.L. Anderson Dam spillway enlargement total cost that is not part of flood damage reduction or dam safety.

<sup>2</sup> The City of Folsom is responsible for the permanent portion of the bridge minus the Federal contribution not to exceed \$39.4 million.

<sup>3</sup> SAFCA is responsible for the non-Federal share (35%) of the ecosystem restoration projects (Bushy Lake, Woodlake, and Temperature Shutters).

<sup>4</sup> The State of California is responsible for the non-Federal share (35%) of flood damage reduction, including the temporary bridge, L.L. Anderson Dam spillway enlargement, and Folsom Dam Raise. SAFCA will be providing a major portion of the funding through side agreements with the State.

<sup>5</sup> The Federal share of the temporary bridge is 65 percent of the flood damage reduction costs and the dam safety costs (non-Federal responsibility not determined). For the permanent bridge, the Federal share is \$39.4 million. For LL Anderson Dam spillway enlargement, as well as Folsom Dam Raise, the Federal share is 65 percent of flood damage reduction costs and all the dam safety costs (unless & until Reclamation determines a non-Federal responsibility). Reclamation would determine final dam safety costs and recovery. Dam safety costs may be assigned to the original flood control purpose if Reclamation is unable to assign costs to purposes under its purview.

## 5.6 Financial Analysis

Prior to submittal of the final report, the City of Folsom will provide a letter stating its intent to cost share implementation of the permanent bridge project. As a chartered local Government, the city of Folsom has a wide range of funding streams available which could be utilized to partially fund this project. Possible sources of revenue include local property tax, a portion of the State sales tax and gas tax, the ability to establish a local assessment district, assess development impact fees and impose a toll to recover locally funded costs. However, the majority of the local sponsor funds will come from Sacramento County Transportation Measure A revenues. The 30 year extension of this local county-wide ½ cent sales tax was approved by County voters in Nov 2004. While the extension of this measure does not become effective until 2009, with this voter approval advance funding can be made available via the issuing of bonds.

The Non-Federal sponsor of the L.L. Anderson Dam improvements will be the Placer County Water Agency (PCWA), which is also the dam owner. The PCWA has sufficient public funds to contribute its estimated cost share requirements for costs incurred to date, plus the cost for design and construction. It is noted that PCWA will only be responsible for cost sharing their portion of L.L. Anderson Dam spillway enlargement.

## **5.7 Project Cooperation Agreement**

### **5.7.1 Folsom Dam Raise**

The non-Federal sponsor for the Folsom Dam Raise is expected to be the California Department of Water Resources, acting on behalf of the Reclamation Board. The structural flood control model PCA will be used as the basis for the agreement. The PCA for the Folsom Dam Raise will include L.L. Anderson Dam modifications. A separate PCA is typically done for ecosystem restoration. Cost recovery of non-Federal dam safety costs will be determined and accomplished by Reclamation. All dam safety costs will initially be funded by the Federal Government, using Corps appropriations.

### **5.7.2 L.L. Anderson Dam**

The non-Federal signatory to the L.L. Anderson Dam PCA will be PCWA. The structural flood control model PCA will be modified to accommodate the fact that PCWA will be contributing a fixed amount to the project cost and that PCWA will be responsible for cost recovery. The Corps expects that a local PCA between PCWA and SAFCA will be necessary to allow SAFCA to send cost recovery funding to PCWA for forwarding to the U.S. Treasury.

### **5.7.3 Folsom Bridge**

Should the final report recommend construction of a permanent bridge, the Corps would enter into a PCA with the City of Folsom, non-Federal sponsor for the bridge, for construction. Once funds are appropriated and the City of Folsom provides the cash contribution, lands, easements, rights-of-way, relocations, and disposal areas, as well as assurances, the Federal Government would construct the project. Specific items of local cooperation are identified in Chapter 6 (Recommendations). The City of Folsom plans to enter into local cooperation agreements with SAFCA and the State of California for the flood damage reduction non-Federal share.

The City of Folsom will be responsible for supplying the non-Federal flood damage reduction cost (temporary bridge cost) and the balance of the bridge cost after flood damage reduction and the Federal contribution. The non-Federal flood damage reduction share is \$9.5 million. This will be provided to the Corps using flood damage reduction rules, including providing before construction a cash contribution equaling 5 percent of the construction cost of the temporary bridge, \$1.4 million. The non-Federal share of the permanent bridge is \$17.5 million. \$12.1 million of this amount represents the cost of LERRD's that the City will provide. The \$5.4 million balance will be cash provided to the Corps upon

request to help finance construction. The non-Federal sponsor will also be responsible for all unanticipated bridge costs in excess of the current bridge cost estimate of \$104.1 million.

## 5.8 Project Element Schedules

The following are updated schedules for the various elements of the Folsom Dam Raise. Level of schedule detail reflects the current level of current team efforts for that respective element.

### Folsom Dam Raise

Folsom Dam:	
Design/Plans and Specs:	Oct 2004 to Feb 2011
Construction:	Aug 2011 to Apr 2017

### Dikes and Mormon Island Auxiliary Dam:

Design/Plans and Specs:	May 2005 to Mar 2008
Construction:	Jun 2008 to Oct 2010

### Ecosystem Restoration

Design/Plans and Specs:	June 2005 to Apr 2010
Construction and Establishment:	July 2008 to Apr 2014

### L.L. Anderson Dam

Design Plans & Specs	Aug 2008 to Jan 2010
Construction	Apr 2010 to Oct 2012

### Folsom Bridge

#### PADD and SEIS

Early draft completion	05 Sep 2005 to 13 Feb 2006
Independent technical review	13 Feb to 24 Mar 2006
Complete draft document	27 Mar to 19 Apr 2006
Public review	06 May to 19 Jun 2006
Incorporate review comments	20 Jun to 27 Jul 2006
Headquarters review	25 Jul to 24 Aug 2006
Incorporate comments	25 Aug to 07 Sep 2006
Final PADD/SEIS	16 Sep to 15 Oct 2006
ROD signed	13 Dec 2006

#### Project Cooperation Agreement

Project cash flow summary to City	15 Mar 2006
City provides Letter of Intent to sign the PCA	22 Mar 2006
City provides financial plan	17 Apr 2006
Easements for bridge defined	18 Jan 2006

Congress identifies \$30M funding	23 Nov 2005
HQ review of Final PCA	03 Apr to 28 Jul 2006
HQ recommends PCA approval to ASA (CW)	29 Jul to 02 Aug 2006
ASA (CW) review and approval of the PCA	03 Aug to 01 Sep 2006
PCA submitted to City for signature	07 to 13 Dec 2006
City signs PCA	14 Dec 2006
<b>Design Schedule</b>	
Geotechnical investigations	11 Apr 2005 to 15 Feb 2006
30% design	5 May to 17 Oct 2005
30% design review and VE	19 Oct to 22 Nov 2005
60% design	12 Dec 2005 to 24 Feb 2006
60% design review	27 Feb to 21 Mar 2006
Final design	28 Feb to 13 Jun 2006
Final design review	14 Jun to 26 Jul 2006
Final comment resolution	27 Jul to 07 Sep 2006
Design complete	7 Sep 2006
 City Contract Actions to Relocate ARWEC & SMUD Power Lines	 Mar 2006 to Mar 2007
 <b>Request for Proposals and Award</b>	
Advertise for construction	16 Oct 2006
Solicitation period	16 Oct to 20 Dec 2006
Evaluate proposals and award	21 Dec 2006 to 19 Feb 2007
Award contract	20 Feb 2007
Notice to Proceed	05 Mar 2007
 Construction—22 months	 05 Mar 2007 to 22 Dec 2008
Open to Traffic	22 Dec 2008

## **5.9 Coordination with Reclamation during Construction**

The Corps will perform the plan formulation, engineering, design, and construction management of the Folsom Bridge Project. However, since Reclamation operates the dam, it will require close coordination between the two agencies during site investigation and construction. The Corps will set up a construction field office at Folsom Dam. This will not only allow the Corps to work closely with the contractor, but it will also allow the Corps to work closely with the Reclamation personnel operating the dam. In addition, the contract documents will require that all activities by the contractor be coordinated with the Reclamation dam operators.

Reclamation is responsible for security at the Folsom Dam facility and will provide security information for the Corps to incorporate into the design and construction phases of the project. Absent Reclamation security criteria for the

roadway design that encroaches on Reclamation property, the Corps shall apply Department of Defense (DOD) anti-terrorism threat protection criteria where applicable in the roadway and bridge design.

Reclamation will provide a construction liaison and may provide other construction personnel that have unique capabilities. The Corps field representatives shall work closely with Reclamation and CDCR to verify that all site access requirements are addressed and notifications are complete before Corps employees or contractors access Reclamation and CDCR properties.

**American River Watershed Project, California  
Folsom Dam Raise,  
Folsom Bridge  
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**CHAPTER 6.0**

**CONCLUSIONS AND RECOMMENDATION**

**6.1 Conclusions**

The following conclusions are based on the results and new information discussed in this PADD:

- Folsom Bridge
  - A permanent bridge is needed to provide for current and future regional transportation needs.
  - A permanent bridge can be built to satisfy Homeland Security standards.
  - A permanent bridge can provide increased recreational opportunities to the region.
  - A permanent bridge alignment must be near enough to the existing Folsom Dam Road to mitigate for temporary adverse effects to transportation due to construction of the Folsom Dam Raise Project.
  - Each of the alternatives considered includes measures to mitigate adverse effects to environmental resources.
  - The City of Folsom has indicated support for serving as the non-Federal partner in implementing the tentatively recommended plan.
  - The tentatively recommended plan is Alternative 3.
  - The Corps will cost share with the City of Folsom using flood damage reduction rules for the temporary bridge increment. Thus, the Federal share is 65 percent or \$27.6 million, and the non-Federal share is 35 percent, or \$19.3 million. All costs above the temporary bridge costs are the responsibility of the non-Federal bridge sponsor, the City of Folsom. However, the Energy and Water Development Act of 2004 authorized \$30 million of Federal funding for the permanent bridge. The Energy and Water Development Act of 2006 stipulated that the \$30 million is not subject to cost sharing. To allow for cost increases to the bridge, the act also stipulates that the \$30 million may be increased based on PL 99-662 Section 902 cost limitation. This limit is calculated as \$39.4 million. Thus for the permanent portion of the bridge cost the Federal government will provide the first \$39.4 million (October 2005 price levels), and the \$7.5 million (October 2005 price levels) balance will be paid for by the City of Folsom. Included with the City's cost are \$8.1 million for LERRDS.

## **6.2 Federal and Non-Federal Responsibilities**

### **6.2.1 Federal Responsibilities**

Following completion of the final PADD/SEIS/SEIR, the Corps will prepare detailed plans and designs, including plans and specifications. After completion of the plans and specifications, the Corps will construct the project after funds are appropriated and non-Federal interests provide the lands, easements, rights-of-way, relocations, and disposal areas, and agrees to provide the items of non-Federal cooperation. This statement is not intended to imply the Government's commitment to construction of the project prior to authorization and appropriation of funds by the Congress.

### **6.2.2 Non-Federal Responsibilities**

Current Federal law requires non-Federal participation in the financing of projects. In accordance with the Water Resources Development Act of 1986 and 1996 and other requirements, City of Folsom as the non-Federal sponsor would, prior to implementation, agree to perform the following:

Provide at least 35 percent, but no more than 50 percent of total project costs allocated to structural flood control, as further specified below:

- (1) Provide, during the first year of construction, any additional funds needed to cover the non-Federal share of design costs;
- (2) Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal areas, and perform or assure the performance of all relocations determined by the Government to be necessary for the construction, operation, and maintenance of the project;
- (3) Provide or pay to the Government the cost of providing all retaining dikes, waste weirs, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation, and maintenance of the project; and
- (4) Provide, during construction, a cash contribution equal to 5 percent of total project costs allocated to structural flood damage reduction, and at least 35 percent of total project costs allocated to structural flood control.

Give the Government a right to enter, at reasonable times and in a reasonable manner, upon land which the local sponsor owns or controls, for access to the project for the purpose of inspection, and, if necessary, for the purpose of Operation, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R) and completing the project.

For so long as the project remains authorized, operate, maintain, repair, replace, and rehabilitate the completed project, or functional portion of the project, at no cost to

the Government, in accordance with applicable Federal and State laws and any specific directions prescribed by the Government.

Assume responsibility for OMRR&R for the project or completed functional portions of the project, including mitigation features without cost to the Government, in a manner compatible with the project's authorized purpose and in accordance with applicable Federal and State laws and specific directions prescribed by the Government in the OMRR&R manual and any subsequent amendments thereto.

Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, and Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, which provides that the Secretary of the Army shall not commence the construction of any water resources project or separable element thereof, until the non-Federal sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element.

Hold and save the Government free from all damages arising from the construction and OMRR&R of the project and any project-related betterments, except for damages due to the fault or negligence of the Government or the Government's contractors.

Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project to the extent and in such detail as will properly reflect total project costs.

Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act, as amended (CERCLA), 42 U.S.C. 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way necessary for the construction, operation, and maintenance of the project; except that the non-Federal sponsor shall not perform such investigations on lands, easements, or rights-of-way that the Government determines to be subject to the navigation servitude without prior specific written direction by the Government.

Assume complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Government determines necessary for the construction, operation, or maintenance of the project.

Agree that, as between the Federal Government and the non-Federal sponsor, the non-Federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability, and, to the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA.

Prescribe and enforce regulations to prevent obstruction of or encroachment on the project that would reduce the level of protection it affords or that would hinder operation or maintenance of the project.

Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR part 24, in acquiring lands, easements, and rights-of-way, and performing relocations for construction, operation, and maintenance of the project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act.

Comply with all applicable Federal and State laws and regulations, including, but not limited to: Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d) and Department of Defense Directive 5500.11 issued pursuant thereto; Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army"; Section 402 of the Water Resources Development Act of 1986, as amended (33 U.S.C. 701b-12), requiring non-Federal preparation and implementation of flood plain management plans; and all applicable Federal labor standards requirements including, but not limited to, 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (revising, codifying, and enacting without substantive change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a *et seq.*), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 *et seq.*) and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c)).

Provide the non-Federal cost share of that portion of the costs of archeological data recovery activities associated with historic preservation, that are in excess of 1 percent of the total amount authorized to be appropriated for the project, in accordance with the cost-sharing provisions of the agreement.

To not use Federal funds to meet the non-Federal sponsor's share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds is authorized.

Agree that any part of the project identified as approved for proposed advanced work or credit under Section 104 of Public Law 99-662 must be compatible with the recommended flood control project, and that any credit granted shall not relieve the non-Federal sponsor of its requirement to pay, in cash, 5 percent of total project costs allocated to structural flood control.

### **6.3 Project Cooperation Agreement**

Federal and non-Federal obligations and requirements will be defined in a PMP and a Project Cooperation Agreement (PCA) will be signed prior to initiation of construction. The non-Federal funds will not need to be provided until after Congress appropriates construction funds and a PCA is signed. This is not to imply the

Government's commitment to construction of the project prior to authorization and appropriation of funds by the Congress. Payment of the funds will be made at intervals during construction.

Prior to the onset of construction, the Corps and the non-Federal sponsors will execute a project cooperation agreement. This contract will define responsibilities of the non-Federal project sponsor for project construction and operation. Details on the specifics of the cost-sharing percentages and cost distribution are outlined in Chapter 5 and detailed in Appendix D: Cost Distribution.

#### **6.4 Tentative Recommendation**

After giving careful consideration to the environmental, social, and economic effects and engineering feasibility of the alternative plans, I recommend that the tentatively recommended plan (Alternative 3) be implemented in accordance with H.R. 2754, as a Federal project, with such modifications thereof as in the discretion of the Commander, U.S. Army Corps of Engineers, may be advisable be authorized for implementation as a Federal project, subject to cost sharing, financing, and other requirements of the Water Resources Development Act of 1986. I further recommend that this report be approved as the basis for preparation of plans and specifications for construction of this project.

The estimated first cost of the tentatively recommended plan is \$104,000,000 and the estimated annual OMRR&R cost is \$226,000 (October 2005 price levels). The Federal portion of the estimated first cost is \$77,100,000 (October 2005 price levels)

The recommendations contained herein reflect the information available at this time and current departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to the Congress as proposals for authorization and implementation funding. However, prior to transmittal to the Congress, the sponsor, the States, interested Federal agencies, and other parties will be advised of any modifications and will be afforded an opportunity to comment further.

Ronald N. Light  
Colonel,  
Corps of Engineers  
District Commander

**American River Watershed Project  
Folsom Dam Raise  
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Folsom Bridge**

**CHAPTER 7.0  
REFERENCES**

Folsom Bridge Plan Formulation Meeting Minutes: August 2004 to February 2005.

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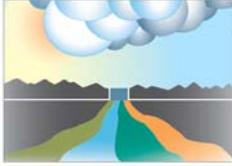
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American River Watershed Project

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**American River Watershed Project**  
Folsom Dam Raise, Folsom Bridge

**Plates**



US Army Corps  
of Engineers

Sacramento District  
South Pacific Region



**LEGEND:**

- - - Existing Utility & Overhead High Voltage
- Existing Water Line
- - - Parcel Line
- Project Study Boundary (Approximately 387 Acres)



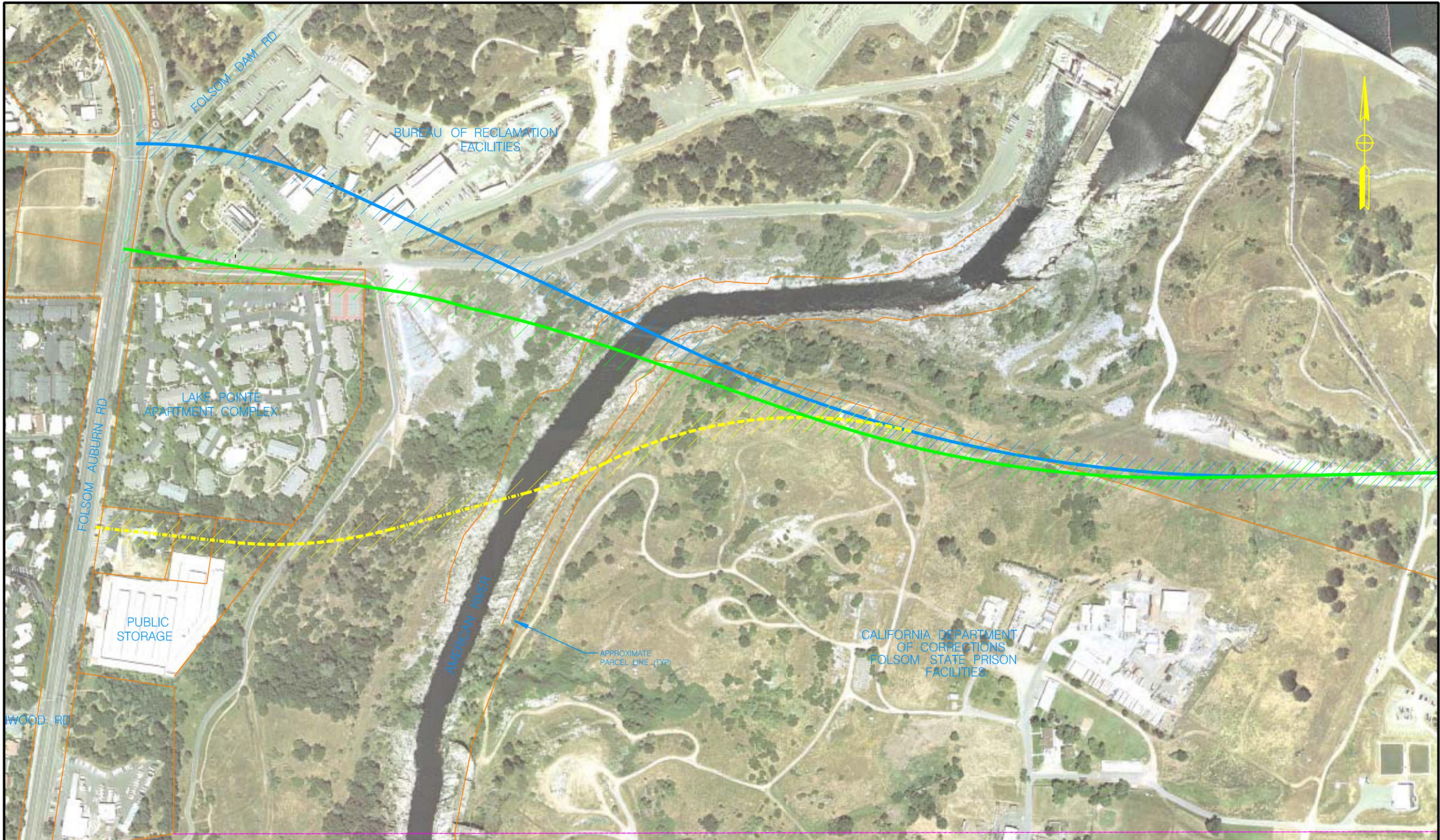
# American River Watershed Project

## Folsom Bridge SEIS/SEIR

Plate No. 1 - Project Study Area

April 2006

Scale 1" = 800'



# American River Watershed Project

## Folsom Bridge SEIS/SEIR

Plate No. 2 - Preliminary Roadway Alignments

April 18, 2006

Scale 1" = 300'

ALTERNATIVE 2 FA FULL INTERSECTION + 4 LANES BRIDGE + 4 LANES ROADWAY + EN FULL INTERSECTION

ALTERNATIVE 3 FA FULL INTERSECTION + 4 LANES BRIDGE + 2 LANES ROADWAY + EN FULL INTERSECTION

**LEGEND:**

- Proposed Roadway, Roadway Improvements & Access Road
- Proposed Bike & Pedestrian Path
- Proposed Sound Wall
- Parcel Line
- Top of Cut Line
- Toe of Fill Line
- Existing Utility & Overhead High Voltage



# American River Watershed Project

## Folsom Bridge SEIS/SEIR

Plate No. 3 - Alternative 2 and Alternative 3

February 10, 2006

Scale 1" = 800'

ALTERNATIVE 4 FA FULL INTERSECTION + 4 LANES BRIDGE + 2 LANES ROADWAY + EN FULL INTERSECTION

ALTERNATIVE 5 FA PARTIAL INTERSECTION + 4 LANES BRIDGE + 2 LANES ROADWAY + EN FULL INTERSECTION

**LEGEND:**

- Proposed Roadway, Roadway Improvements & Access Road
- Proposed Bike & Pedestrian Path
- Proposed Sound Wall
- - - Parcel Line
- Top of Cut Line
- Toe of Fill Line
- Existing Utility & Overhead High Voltage



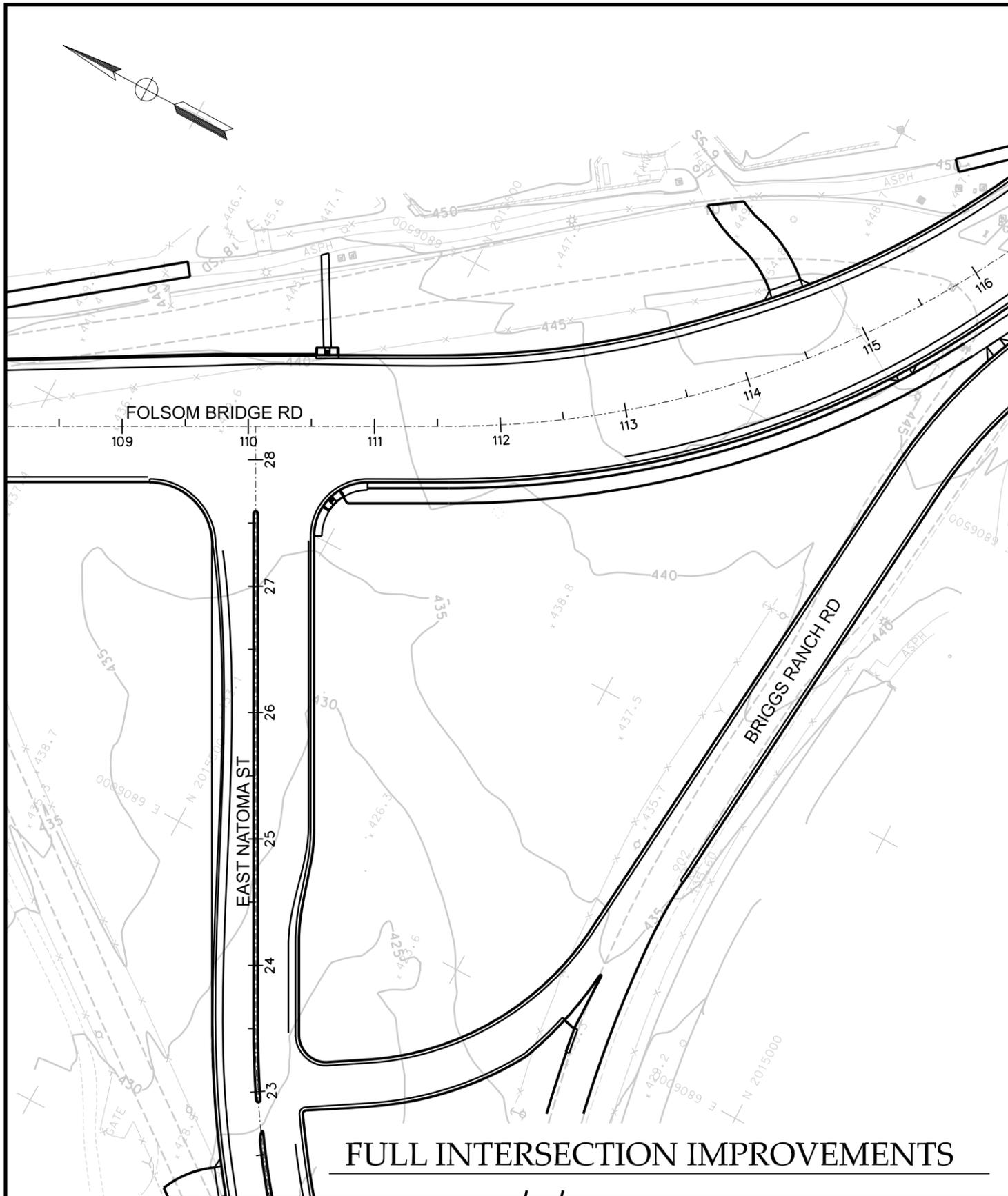
# American River Watershed Project

## Folsom Bridge SEIS/SEIR

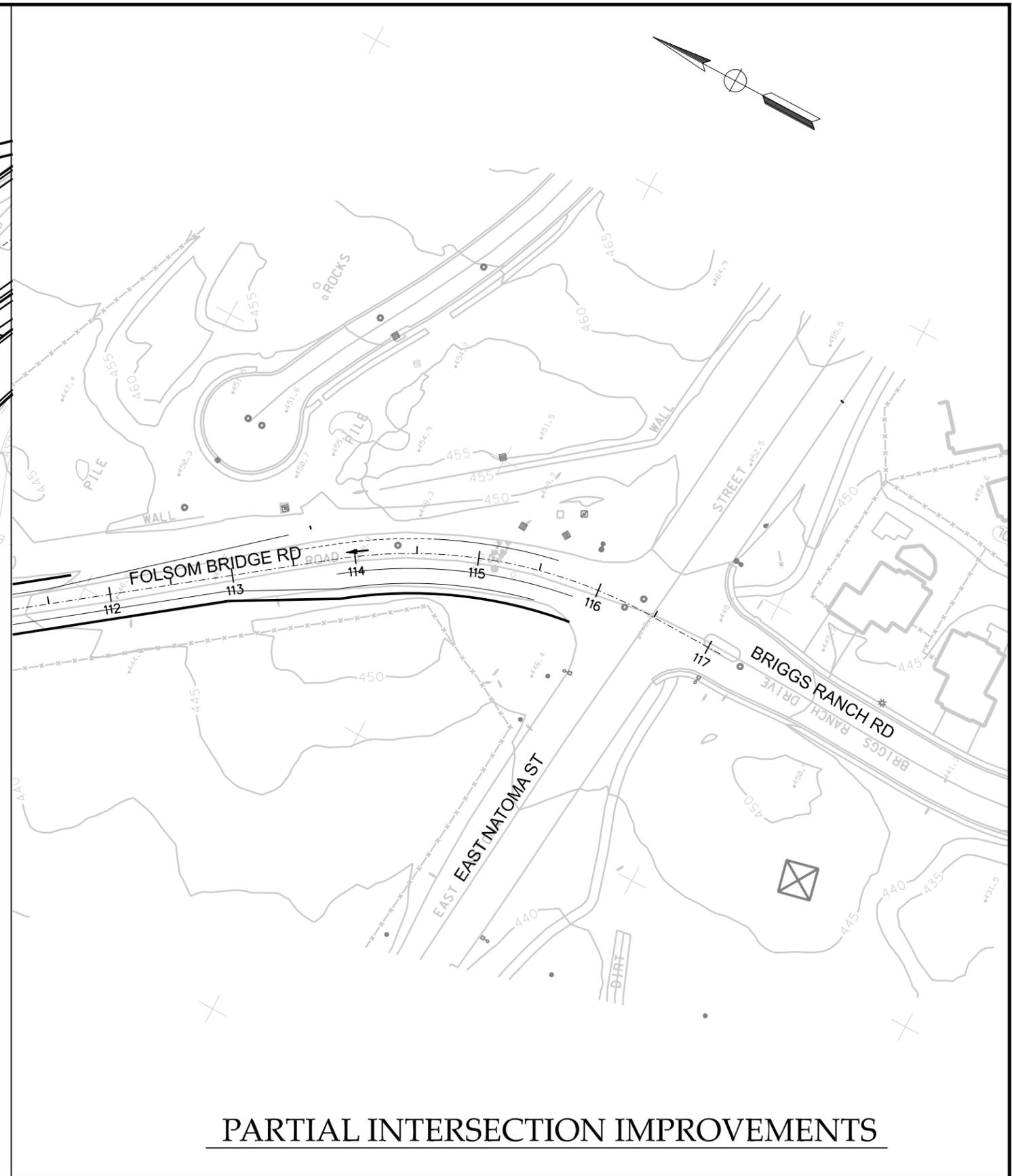
Plate No. 4 - Alternative 4 and Alternative 5

February 10, 2006

Scale 1" = 800'



FULL INTERSECTION IMPROVEMENTS



PARTIAL INTERSECTION IMPROVEMENTS

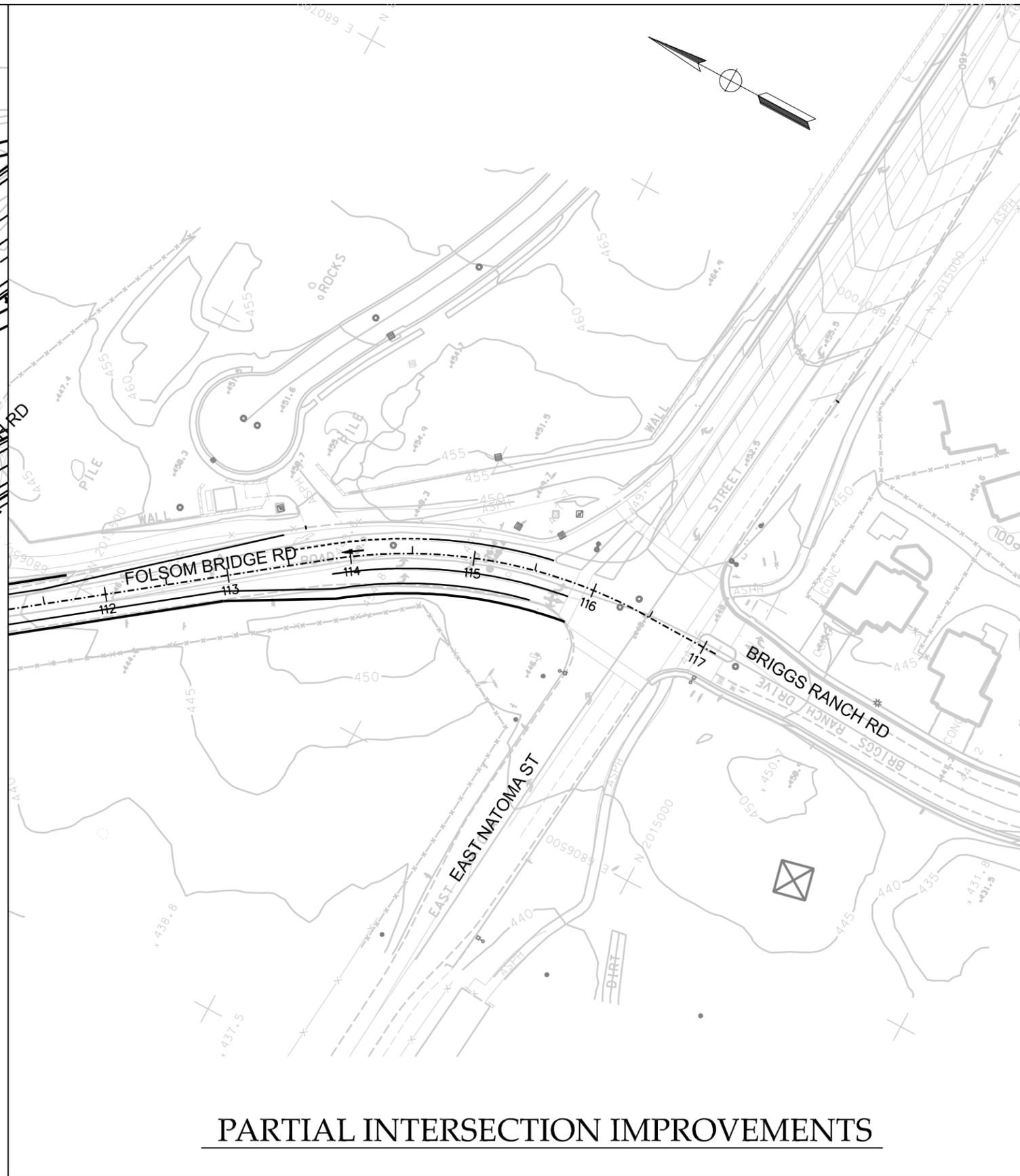
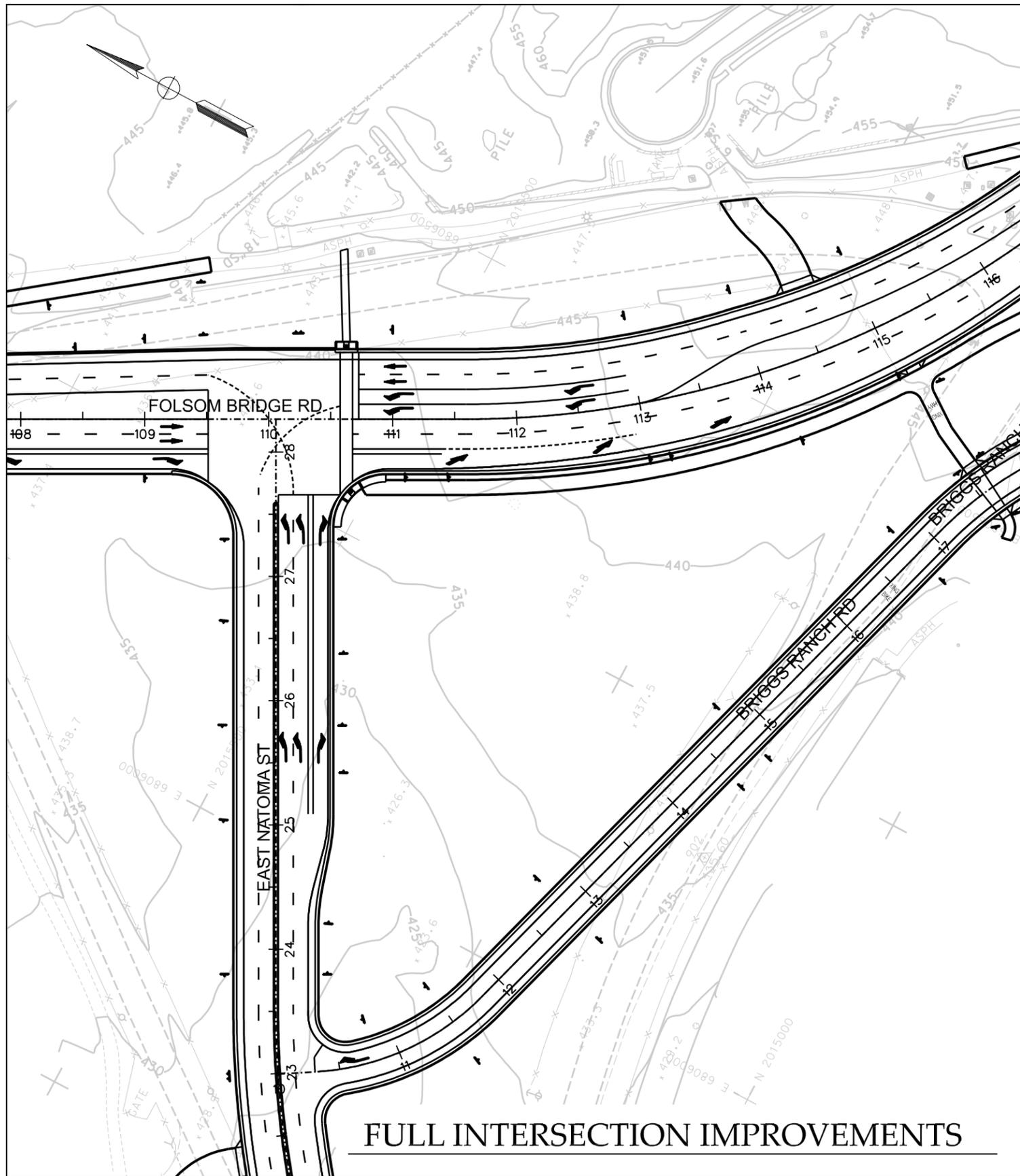


American River Watershed Project  
Folsom Bridge SEIS/SEIR

Plate No. 5 - East Natoma Intersection

April 18, 2006

Scale 1" = 100'



# American River Watershed Project

## Folsom Bridge SEIS/SEIR

Plate No. 6 - East Natoma Intersection

February 10, 2006

Scale 1" = 100'