Appendix A

Air Quality Technical Analysis

Joint Federal Project (JFP) at Folsom Dam, Upstream and Downstream (for Cumulative Conformity Purposes)

Air Quality Technical Report

Sacramento, CA

October 2012

U.S. Army Corps of Engineers, Sacramento District

U.S. Army Corps of Engineers
Sacramento District

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Acronyms

1990 CAAA	1990 Clean Air Act Amendments
AB	assembly bill
AQMD	air quality management district
APCD	air pollution control district
ATCM	airborne toxic control measures
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CCAA	California Clean Air Act
CEQ	White House Council on Environmental Quality
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_{2e}	carbon dioxide equivalent
Corps	United States Army Corps of Engineers
DPM	diesel particulate matter
E.O.	executive order
GHG	greenhouse gas emissions
GWP	global warming potential
HAP	hazardous air pollutant
HFC	hydrofluorocarbon
HFE	hydrofluorinated ether
hp	horsepower
JFP	Joint Federal Project
LACMTA	Los Angeles County Metropolitan Transportation Authority
lbs/day	pounds per day
$\mu g/m^3$	micrograms per cubic meter
MIAD	Mormon Island Auxiliary Dam
mph	miles per hour
MPO	Metropolitan Planning Organization
MY	model year
N/A	not applicable
N_2O	nitrous oxide

NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NF_3	nitrogen trifluoride
NOA	naturally occurring asbestos
NOx	nitrogen oxides
NO_2	nitrogen dioxide
O_3	ozone
OEHHA	Office of Environmental Health Hazard Assessment
Pb	lead
PFC	perfluorocarbon
PM	particulate matter
PM10	particulate matter smaller than or equal to 10 microns in diameter
PM2.5	particulate matter smaller than or equal to 2.5 microns in diameter
PMF	probable maximum flood
ppm	parts per million
ROG	reactive organic gases
SCS	sustainable communities strategies
SF_6	sulfur hexafluoride
SIP	State Implementation Plan
SMAQMD	Sacramento Metropolitan Air Quality Management District
SO_2	sulfur dioxide
SVAB	Sacramento Valley Air Basin
TAC	toxic air contaminant
tons/yr	tons per year
ULSD	ultra-low sulfur diesel
USBR	United States Bureau of Reclamation
USEPA	United States Environmental Protection Agency

Tables

Executive Summary

The final phase of the Folsom Modification project, known as the Joint Federal Project (JFP) at Folsom Dam Upstream, is the completion of the approach channel and spur dike. There are two alternatives that are being considered for this project: (1) approach channel excavation with cutoff wall (known henceforth as Alternative 2), and (2) approach channel excavation with cofferdam (known henceforth as Alternative 3).

URS Corporation/ Brown and Caldwell Joint Venture has been contracted by the Sacramento District, U.S. Army Corps of Engineers (Corps), to perform an air quality impact analysis for the Approach Channel portion of the JFP. This technical report explains relevant air regulations and quantifies air emissions that would be expected during the construction of the Project alternatives. The analysis:

- Describes the affected environment and identifies sensitive receptors,
- Lists the air quality attainment status for criteria pollutants,
- Describes the methodology and calculations used to estimate air emissions,
- Explains the construction schedule, excavation equipment, and level of effort associated with each alternative,
- Estimates project specific and cumulative air quality impacts, and
- Identifies mitigation measures to reduce the severity of air impacts.

This report analyzes federal and state criteria pollutants, Toxic Air Contaminants (TACs), and greenhouse gases (GHGs). Criteria pollutants and TACs are identified by the federal Clean Air Act (CAA) and California Clean Air Act (CCAA). The TACs relevant to this project are diesel particulate matter (DPM) and naturally occurring asbestos (NOA).

The JFP at Folsom Dam Upstream project would temporarily increase both criteria pollutants and TACs from construction. Sources of pollutants include heavy equipment, on-site pickup trucks, on-site and off-site haul trucks, off-site worker vehicle trips, and earth disturbance activities (stockpiling, cut and fill, blasting) that create fugitive dust.

Although there are residences and a church located within 1,000 feet of the construction area, they would not be exposed to substantial DPM emissions because of the limited construction activities in the vicinity. Although no NOA has been found on-site, fugitive dust mitigation measures will be implemented to reduce NOA impacts.

With proposed mitigation, NO_x emissions would be below the *de minimis* thresholds in all years for Alternative 2, and NOx emissions would be below the *de minimis* thresholds in all years for Alternative 3. The estimated mitigated emission inventories are presented below in Table ES-1.

Table ES-1. JFP Folsom Dam Upstream: Mitigated Annual Criteria Pollutant Emission Summary

Activity	Pollutant (tons per year [tons/yr])					
	ROG	**NO_x**	**CO**	**PM10**	**PM2.5**	**SO_2**
Alternative 2						
2013 Total	1	7	4	29	5	<1
2014 Total	<1	4	3	17	2	<1
2015 Total	<1	5	4	7	1	<1
2016 Total	1	14	11	19	2	<1
2017 Total	1	15	12	28	3	<1
General Conformity *de minimis* Levels	**25**	**25**	**100**	**100**	**100**	**N/A**
Alternative 3						
2013 Total	1	9	5	34	5	<1
2014 Total	<1	4	3	12	2	<1
2015 Total	1	5	4	4	1	<1
2016 Total	<1	4	3	20	3	<1
2017 Total	2	20	16	29	4	<1
General Conformity *de minimis* Levels	**25**	**25**	**100**	**100**	**N/A**	**N/A**

Notes:

1. For NEPA purposes, emission calculations are estimated using the OFFROAD2011 and EMFAC2007 models (based on USEPA guidance).
2. Emissions rates might not add up due to rounding.

Acronyms:

CO carbon monoxide
NO_x nitrogen oxide
N/A not applicable
PM10 particulate matter smaller than or equal to 10 microns in diameter
PM2.5 particulate matter smaller than or equal to 2.5 microns in diameter
SO_2 sulfur dioxide
ROG reactive organic gases

The JFP at Folsom Dam, Upstream project construction period (2013-2017) would overlap for multiple construction months with the JFP at Folsom Dam, Downstream project (2010-2017). The USEPA had directed the Corps to complete a quantitative cumulative analysis for the JFP Folsom Dam Upstream and Downstream projects, and compare these emissions to the General Conformity *de minimis* thresholds. The combined Downstream and Upstream project NO_x emissions would exceed the *de minimis* thresholds in 2016 and 2017 for Alternative 2, and the NO_x emissions would exceed the *de minimis* thresholds in 2017 only for Alternative 3. The estimated mitigated emission inventories for the JFP Upstream and Downstream project during overlapping years are presented below in Table ES-2. Values which exceed *de minimis* thresholds are highlighted.

Table ES-2. JFP Folsom Dam Upstream and Downstream: Mitigated Annual Criteria Pollutant Emission Summary

	Pollutant (tons/yr)						
Activity	**ROG**	**NO_x**	**CO**	**PM10**	**PM2.5**	**SO_2**	**CO_2**
Alternative 2							
2013 Total	2	22	12	31	6	<1	10,388
2014 Total	2	24	15	24	4	<1	27,145
2015 Total	2	20	14	13	3	<1	26,427
2016 Total	2	28	19	24	4	<1	26,808
2017 Total	2	25	18	29	4	<1	7,388
General Conformity *de minimis* Levels	**25**	**25**	**100**	**100**	**100**	**N/A**	**N/A**
Alternative 3							
2013 Total	2	24	14	37	7	<1	8,611
2014 Total	2	24	15	19	4	<1	27,994
2015 Total	2	20	14	11	3	<1	27,141
2016 Total	2	17	12	24	4	<1	25,023
2017 Total	3	29	21	29	4	<1	9,275
General Conformity *de minimis* Levels	**25**	**25**	**100**	**100**	**100**	**N/A**	**N/A**

Notes:
1. For NEPA purposes, emission calculations are estimated using OFFROAD2011 and EMFAC2007 models.
2. Emissions rates might not add up due to rounding.

Acronyms:
CO carbon monoxide
NO_x nitrogen oxide
N/A not applicable
PM10 particulate matter smaller than or equal to 10 microns in diameter
PM2.5 particulate matter smaller than or equal to 2.5 microns in diameter
ROG reactive organic gases
SO_2 sulfur dioxide

Nitrogen oxide (NO_x) emissions that exceed 85 pounds per day (lbs/day) after incorporation of mitigation measures would be subject to a mitigation fee by the Sacramento Metropolitan Air Quality Management District (SMAQMD). SMAQMD uses that fee to fund NO_x reductions from existing sources of NO_x. The maximum NO_x emissions for Alternative 2 (92 lbs/day in 2016 and 98 lbs/day in 2017) and Alternative 3

(121 lbs/day) could exceed the 85 lbs/day threshold. Therefore NO_x mitigation fees could apply to the project. However, it is difficult to determine the worst-case daily NO_x emissions due to potential changes in equipment type, timing, and use. Project contractors and the Corps will need to maintain accurate equipment use records to determine the level of mitigation fees that must be paid to SMAQMD to mitigate the project.

1.0 SETTINGS/ AFFECTED ENVIRONMENT

1.1 Background

The final phase of the Folsom Modification project, known as the Joint Federal Project (JFP) at Folsom Dam Upstream, is the completion of the approach channel and spur dike. There are two action alternatives that are being considered for this project in addition to the No Action Project Alternative (Alternative A): (1) approach channel excavation with cutoff wall (known henceforth as Alternative 2), and (2) approach channel excavation with cofferdam (known henceforth as Alternative 3).

The project is subject to the U.S. Environmental Protection Agency (USEPA) General Conformity regulations because of the involvement of a federal agency - the Corps. General Conformity regulations implement Section 176(c) of the Clean Air Act which prohibits federal agencies from taking actions that may cause or contribute to violations of the National Ambient Air Quality Standards (NAAQS). The project is also subject to the Sacramento Metropolitan Air Quality Management District (SMAQMD) CEQA thresholds and mitigation requirements.

1.2 Purpose and Scope

The URS Corporation/ Brown and Caldwell Joint Venture has been contracted by the Sacramento District, Corps, to perform an air quality impact analysis for the approach channel portion of the JFP at Folsom Dam. The scope of work includes producing a technical report detailing relevant air regulations, and quantifying air quality environmental impacts during the construction of the alternatives. This analysis:

- Describes the affected environment and identifies sensitive receptors,
- Lists the air quality attainment status for criteria pollutants,
- Describes the methodology and calculations used to estimate air emissions,
- Explains the construction schedule, excavation equipment, and level of effort associated with each alternative ,
- Estimates project specific and cumulative air quality impacts, and
- Identifies mitigation measures to reduce the severity of air impacts.

1.3 Project Description

The following sub-sections describe the project alternatives, along with relevant details of some construction techniques.

1.3.1 Alternative 2: Approach Channel Excavation with Cutoff Wall

Key components of Alternative 2 are the cutoff wall, approach channel, spur dike, transload facility, concrete batch plant and staging areas. The following sub-sections describe each of these components in greater detail.

Cutoff Wall

The proposed cutoff wall would be located adjacent to Folsom Lake southeast of the Left Wing Dam and east of the Auxiliary Spillway chute excavation. The cutoff wall would provide seepage control to the spillway excavation between the rock plug and the Control Structure. The cutoff wall would consist of a reinforced concrete secant pile wall installed across the width of the future approach channel. The total length of the wall would be approximately 1,000 feet. The wall would be socketed into the underlying highly weathered granitic rock.

Approach Channel

The approach channel for the auxiliary spillway extends approximately 1,100 feet upstream of the concrete control structure. The approach channel converges as it approaches the control structure. The approach channel excavation includes excavation of rock material within the envelope of the approach channel, shaping and scaling of the channel surfaces, excavation of any rock trap recesses in the floor of the channel, placement of the approach slab, armoring of any side slopes susceptible to erosion. Excavation would occur both in-the-dry and in-the-wet.

Excavation of the rock plug would begin between the control structure and the cutoff wall to install the concrete slab and approach channel walls. The remaining rock plug excavation would be timed to follow the dropping lake level; top-down excavation of the rock plug would be performed following the lake level down to elevation 425.34 feet or less. As lake levels rise, excavation of the rock plug would be performed in-the-wet. To achieve the flood risk reduction benefits of the spillway earlier in the project life, a notch would be cut through the reduced rock plug down to elevation 350. The notch would be wide enough to pass a 200-year flood event. The in-the-wet excavation would continue to widen the channel in phases, until a width that passes the probable maximum flood (PMF) is reached.

Spur Dike

A spur dike is an embankment designed to direct water into an opening; in this case the opening would be the approach channel. The proposed elliptical-shaped spur dike would be located directly to the northwest of the approach channel. The core of the spur dike would be constructed of a decomposed quartz diorite core, commonly known as decomposed granite. This would be followed by a compacted random rock fill followed by a stone riprap cap. Material for the spur dike construction would come from the excavation of the approach channel excavation, or Mormon Island Auxiliary Dam (MIAD).

Transload Facility

A trans-load facility would be needed for mobilization/demobilization of marine equipment (e.g., sectional barges and heavy cranes), dredge spoil off-loading from barges to trucks, marine equipment fuel and explosives transfer to support barges, equipment maintenance, and marine crew deployment. The proposed trans-load facility would be comprised of a ramp, crane and crane pad, and a fuel transfer station. The trans-load facility would be located adjacent to Dike 7. The trans-load facility is temporary and would be removed after the completion of the approach channel project in 2017. Ramp material would be removed with excavators and hauled for disposal at MIAD.

Concrete Batch Plant and Staging Areas

The construction of the approach channel and cutoff wall would require large quantities of temperature controlled concrete. This would necessitate the use of a contractor-provided, on-site concrete batch plant and deliveries of large quantities of concrete aggregate, concrete sand, and cement. The batch plant would be powered by electricity from overhead Sacramento Municipal Utility District lines. One batch plant will be used for the duration of the project.

1.3.2 Alternative 3: Approach Channel Excavation with Cofferdam

Key components of Alternative 3 are the cofferdam, approach channel, spur dike, transload facility, concrete batch plant and staging areas. The following sub-sections describe each of these components in greater detail.

Cofferdam

The cofferdam consists of a series of 84-foot diameter circular sheet pile cells constructed using 85-foot-long flat sheet piles. The location of the cofferdam is based on a trade-off between cofferdam size and the amount of in-the-wet excavation. To prepare the foundation for the cofferdam, soft materials would be dredged until the decomposed granite is reached. Once the foundation is set, the cofferdam would be constructed. The construction of the cells requires sheet piles to be installed using a template. The template consists of two to three horizontally mounted ring wales provide support for the vertical flat sheets. The sheet piles are installed using a vibratory hammer, working progressively around the ring. Once erected, the cells would be filled with well-graded crushed rock. The same plan dimension is maintained throughout the cofferdam, allowing for one sheet pile installation template to be utilized for construction of all of the circular cells. A layer of riprap would be placed along the upstream toe of the cells for scour protection. The cells are founded directly on the decomposed granite.

After the cofferdam is installed, the downstream area would be dewatered. Timing would be coordinated with the completion of the control structure. When the control structure is operational the rock plug would be excavated and the approach channel slab and walls would be installed. Once the approach channel is excavated to final grade the cofferdam would be removed.

Approach Channel

Under Alternative 3, the excavation of the approach channel and the installation of the concrete slab and walls would be constructed as described in Section 1.3.1 for Alternative 2.

Spur Dike

Under Alternative 3, a spur dike would be constructed as described in Section 1.3.1 for Alternative 2.

Transload Facility

Under Alternative 3, a trans-load facility would be constructed as described in Section 1.3.1 for Alternative 2.

Concrete Batch Plant and Staging Areas

Under Alternative 3, a batch plant would be constructed and operated as described in Section 1.3.1 for Alternative 2.

1.4 Regulatory Settings

Air quality management and protection responsibilities exist in federal, state, and local levels of government. The primary statutes that establish ambient air quality standards and establish regulatory authorities to enforce regulations designed to attain those standards are the federal Clean Air Act (CAA) and California Clean Air Act (CCAA).

The enforcement of federal and state air statutes and regulations is complex and the various agencies have different, but interrelated responsibilities. The USEPA is responsible for establishing the NAAQS, setting minimum New Source Review permitting and Operating Permit requirements for stationary sources; establishing New Source Performance Standards, National Emission Standards for Hazardous Pollutants and the Acid Deposition Control program; and administering regional air quality initiatives. The California Air Resources Board's (CARB's) role includes development, implementation, and enforcement of California's motor vehicle pollution control program, administration of the state's air pollution research program, adoption and updating, as necessary, of California Ambient Air Quality Standards (CAAQS), review of local air pollution control district (APCD) activities, and coordination of the development of the State Implementation Plan (SIP) for achievement of the NAAQS. Local APCDs are responsible for implementing federal and state regulations at the local level, permitting stationary sources of air pollution, and developing the local elements of the SIP. Emissions from indirect sources, such as automobile traffic associated with development projects, are addressed through the APCD's air quality plans, which are each air quality district's contribution to the SIP.

1.4.1 Federal Regulations

The following sections summarize the key federal regulations related to air quality and greenhouse gases (GHGs).

Clean Air Act

As required by the Federal CAA, the USEPA has established and continues to update the NAAQS for specific "criteria" air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), inhalable particulate matter (PM10), fine particulate matter (PM2.5), and lead (Pb). The NAAQS for these pollutants are listed in Table 1-1 and represent the levels of air quality deemed necessary by USEPA to protect the public health and welfare with an adequate margin of safety.

General Conformity Rule and de minimis levels

Pursuant to CAA Section 176(c) requirements, USEPA promulgated the General Conformity Rule, which applies to most federal actions, including the Folsom JFP project.

The General Conformity Rule is used to determine if federal actions meet the requirements of the CAA and the applicable SIP by ensuring that pollutant emissions related to the action do not:

- Cause or contribute to new violations of a NAAQS.
- Increase the frequency or severity of any existing violation of a NAAQS.
- Delay timely attainment of a NAAQS or interim emission reduction.

A conformity determination under the General Conformity Rule is required if the federal agency determines: the action will occur in a nonattainment or maintenance area; that one or more specific exemptions do not apply to the action; the action is not included in the federal agency's "presumed to conform" list; the emissions from the proposed action are not within the approved emissions budget for an applicable facility; and the total direct and indirect emissions of a pollutant (or its precursors), are at or above the *de minimis* levels established in the General Conformity regulations.

Table 1-1. State and Federal Ambient Air Quality Standards

Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [1]		National Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)	1 Hour	0.09 ppm (180 $\mu g/m^3$)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 $\mu g/m^3$)		0.075 ppm (147 $\mu g/m^3$)		
Respirable Particulate Matter (PM10)	24 Hour	50 $\mu g/m^3$	Gravimetric or Beta Attenuation	150 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 $\mu g/m^3$		—		
Fine Particulate Matter (PM2.5)	24 Hour	—	—	35 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 $\mu g/m^3$	Gravimetric or Beta Attenuation	15 $\mu g/m^3$		
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[8]	1 Hour	0.18 ppm (339 $\mu g/m^3$)	Gas Phase Chemiluminescence	100 ppb (188 $\mu g/m^3$)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m3)		53 ppb (100 $\mu g/m^3$)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[9]	1 Hour	0.25 ppm (655 $\mu g/m^3$)	Ultraviolet Fluorescence	75 ppb (196 $\mu g/m^3$)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 $\mu g/m^3$)	
	24 Hour	0.04 ppm (105 $\mu g/m^3$)		0.14 ppm (for certain areas)[9]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[9]	—	
Lead[10,11]	30 Day Average	1.5 $\mu g/m^3$	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 $\mu g/m^3$ (for certain areas)[11]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 $\mu g/m^3$		
Visibility Reducing Particles[12]	8 Hour	See footnote 12	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 $\mu g/m^3$	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 $\mu g/m^3$)	Ultraviolet Fluorescence			
Vinyl Chloride[10]	24 Hour	0.01 ppm (26 $\mu g/m^3$)	Gas Chromatography			

See footnotes on next page ...

For more information please call ARB-PIO at (916) 322-2990 California Air Resources Board (2/7/12)

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.

8. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national standards are in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national standards to the California standards the units can be converted from ppb to ppm. In this case, the national standards of 53 ppb and 100 ppb are identical to 0.053 ppm and 0.100 ppm, respectively.

9. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

   Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

10. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

11. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

12. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

For more information please call ARB-PIO at (916) 322-2990 **California Air Resources Board (2/7/12)**

Source: CARB 2010a

An action will be determined to conform to the applicable SIP if the action meets the requirements of 40 Code of Federal Regulations (CFR) 93.158(c). In addition, federal activities may not cause or contribute to new violations of air quality standards, exacerbate existing violations, or interfere with timely attainment or required interim emissions reductions toward attainment.

Federal GHG Regulations

Laws and regulations, as well as plans and policies, address global climate change issues. This section summarizes key federal regulations relevant to the project.

In *Massachusetts v. U.S. Environmental Protection Agency, et al*., 549 U.S. 497 (2007), the United States Supreme Court ruled that GHG fits within the CAA's definition of a pollutant, and that the USEPA has the authority to regulate GHG.

On October 5, 2009, President Obama signed Executive Order (E.O.) 13514; *Federal Leadership in Environmental, Energy, and Economic Performance,* E.O. 13514 requires Federal agencies to set a 2020 greenhouse gas emissions reduction target within 90 days; increase energy efficiency; reduce fleet petroleum consumption; conserve water; reduce waste; support sustainable communities; and leverage federal purchasing power to promote environmentally-responsible products and technologies.

On December 7, 2009, the Final Endangerment and Cause or Contribute Findings for Greenhouse Gases (endangerment finding), under Section 202(a) of the CAA went into effect. The endangerment finding states that current and projected concentrations of the six key well-mixed GHGs in the atmosphere [carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and other fluorinated gases including nitrogen trifluoride (NF_3) and hydrofluorinated ethers (HFEs)]) threaten the public health and welfare of current and future generations. Furthermore, it states that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution which threatens public health and welfare (USEPA, 2012a).

Under the endangerment finding, USEPA is developing vehicle emission standards under the CAA. USEPA and the Department of Transportation's National Highway Traffic Safety Administration have issued a joint proposal to establish a national program that includes standards that will reduce GHG emissions and improve fuel economy for light-duty vehicles in model years (MYs) 2012 through 2016. This proposal marks the first GHG standards proposed by the USEPA under the CAA as a result of the endangerment and cause or contribute findings (USEPA, 2012b).

On February 18, 2010, the White House Council on Environmental Quality (CEQ) released draft guidance regarding the consideration of GHG in National Environmental Policy Act (NEPA) documents for federal actions. The draft guidelines include a presumptive threshold of 25,000 metric tons of carbon dioxide equivalent (CO_{2e}) emissions from a proposed action to trigger a quantitative analysis. CEQ has not established when GHG emissions are “significant” for NEPA purposes; rather, it poses the question to the public (CEQ 2010).

1.4.2 State Regulations

Key state regulations related to air quality and GHGs are summarized below.

California Clean Air Act

The CCAA establishes an air quality management process that generally parallels the federal process. The CCAA, however, focuses on attainment of the CAAQS that, for certain pollutants and averaging periods, are more stringent than the comparable NAAQS. The CAAQS are included in Table 1-1.

The CCAA requires that air quality management districts (AQMDs) and APCDs prepare a clean air plan if the district violates the CAAQS for CO, SO_2, NO_2, or O_3. The plan must include strategies for attaining the CAAQS for each non-attainment pollutant. These plans are required to be updated triennially. The region’s SIPs, which apply to the NAAQS, are described below in Section 1.6.4.

The CCAA requires that the CAAQS be met as expeditiously as practicable, but does not set precise attainment deadlines. Instead, the act established increasingly stringent requirements for areas that will require more time to achieve the standards. The air quality attainment plan requirements established by the CCAA are based on the severity of air pollution problems caused by locally generated emissions. Upwind APCDs are required to establish and implement emission control programs commensurate with the extent of pollutant transport to downwind districts.

Air pollution problems in Sacramento County are primarily the result of locally-generated emissions. However, Sacramento’s air pollution occasionally includes contributions from the San Francisco Bay Area and the San Joaquin Valley. In addition, Sacramento County has been identified as a source of ozone precursor emissions that occasionally contribute to air quality problems in the San Joaquin Valley Air Basin and the Sacramento Valley Air Basin (SVAB). Consequently, the air quality planning for Sacramento County must not only correct local air pollution problems, but must also reduce the area’s effect on downwind air basins.

California GHG Regulations

California is a substantial contributor of global GHGs as it is the second largest contributor in the U.S. and the sixteenth largest in the world (CEC, 2006). From 1990 to 2003, California’s gross state product grew 83 percent while GHG emissions grew 12 percent. While California has a high amount of GHG emissions, it has low emissions per capita. The major source of GHG in California is transportation, contributing 41 percent of the State’s total GHG emissions (CEC, 2006). Electricity generation is the second largest generator, contributing 22 percent of the State’s GHG emissions. Emissions from fuel use in the commercial and residential sectors in California decreased 9.7 percent over the 1990 to 2004 period (CEC, 2006).

California has taken proactive steps, briefly described in the following sections, to address the issues associated with GHG emissions and climate change. A summary of the major California GHG regulations are presented below.

Table 1-2. Summary of Relevant California GHG Regulations

Bill, Year	**Description**
Assembly Bill (AB) 4420, 1988,	Directed California Energy Commission, in consultation with the CARB and other agencies, to "study and report…on how global warming trends may affect California's energy supply and demand, economy, environment, agriculture, and water supplies.
AB 1493, 2002	Requires CARB to develop and implement regulations to reduce automobile and light-truck GHG emissions. These stricter emissions standards apply to automobiles and light trucks beginning with the 2009 MY. Although litigation was filed challenging these regulations and EPA initially denied California's related request for a waiver, the waiver request has now been granted.
Executive Order (E.O.) S-3-05, 2005	The goal of E.O. S-3-05 is to reduce California's GHG emissions to (1) year 2000 levels by 2010, (2) 1990 levels by 2020, and (3) 80% below the 1990 levels by 2050.
AB 32, 2006 California Global Warming Solutions Act of 2006	Sets overall GHG emissions reduction goals and mandates that CARB create a plan that includes market mechanisms and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." 1. Requires statewide GHG emissions be reduced to 1990 levels by 2020 (The 1990 CO_{2e} level is 427 million metric tonnes of CO_{2e} (CARB, 2012a)). 2. Directs CARB to develop and implement regulations to reduce statewide emissions from stationary sources. 3. Specifies that regulations adopted in response to AB 1493 be used to address GHG emissions from vehicles 4. Requires CARB adopt a quantified cap on GHG emissions representing 1990 emissions levels 5. Includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.
E.O. S-01-07, 2007	Requires the carbon intensity of California's transportation fuels is to be reduced by at least 10% by 2020.
Senate Bill 375, 2008	Requires CARB to develop regional reduction targets for GHG emissions, and prompts the creation of regional plans to reduce emissions from passenger vehicle use throughout the state.
Source: CARB, 2012a, CARB, 2012b, CARB, 2012c, Office of the Governor, 2007	

California Environmental Quality Act GHG Amendments

California Environmental Quality Act (CEQA) and the CEQA Guidelines require that state and local agencies identify the significant environmental impacts of their actions, including potential significant air quality and climate change impacts, and to avoid or mitigate those impacts, when feasible. The CEQA amendments of December 30, 2009, specifically require lead agencies to address GHG emissions in determining the significance of environmental effects caused by a project, and to consider feasible means to mitigate the significant effects of GHG emission (California Natural Resources Agency, 2012).

Provisions of the CEQA amendments relevant to the Project include the following (Office of Planning and Research 2009):

- A lead agency may consider the following when assessing the significance of impacts from GHG emissions:
  (1) The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting;
  (2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project;
  (3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.
- When an agency makes a statement of overriding considerations, the agency may consider adverse environmental effects in the context of regionwide or statewide environmental benefits.
- Lead agencies shall consider feasible means of mitigating greenhouse gas emissions that may include, but not be limited to:
  (1) Measures in an existing plan or mitigation program for the reduction of emissions that are required as part of the lead agency's decision;
  (2) Reductions in emissions resulting from a project through implementation of project features, project design, or other measures;
  (3) Offsite measures, including offsets;
  (4) Measures that sequester GHGs;
  (5) In the case of the adoption of a plan, such as a general plan, long-range development plan, or GHG reduction plan, mitigation may include the identification of specific measures that may be implemented on a project-by-project basis. Mitigation may also include the incorporation of specific measures or policies found in an adopted ordinance or regulation that reduces the cumulative effect of emissions.

Asbestos Control Measures

CARB has adopted two airborne toxic control measures (ATCM) for controlling naturally occurring asbestos (NOA): the Asbestos ATCM for Surfacing Applications and the Asbestos ATCM for Construction, Grading, Quarrying, and Surface Mining Operations. CARB and local air districts have been delegated authority by the USEPA to enforce the Federal National Emission Standards for Hazardous Air Pollutants regulations for asbestos.

1.4.3 Local Regulations

Relevant local air quality and GHG regulations are detailed below.

Sacramento Metropolitan Air Quality Management District

SMAQMD is responsible for implementing federal and state regulations at the local level, permitting stationary sources of air pollution, and developing the local elements of the SIP. Emissions from indirect sources, such as automobile traffic associated with development projects, are addressed through the APCD's air quality plans, which are each air quality district's contribution to the SIP. In addition to permitting and rule compliance, air quality management at the local level is also accomplished through AQMD/APCD imposition of mitigation measures on project environmental impact reports and mitigated negative declarations developed by project proponents under CEQA. Specific to project construction emissions, CEQA requires mitigation of air quality impacts that exceed certain significance thresholds set by the local AQMD/APCD. The SMAQMD's CEQA significance thresholds, which would be applicable to the project, are described below.

SMAQMD GHG Requirements

The SMAQMD has not developed screening levels for GHG emissions from projects in Sacramento County.

To assess whether the incremental quantity of GHG emissions generated by a project is cumulatively considerable, a context for comparison must first be established. SMAQMD recommends that thresholds of significance for GHG emissions should be related to AB 32's GHG reduction goals (Table 1-2, SMAQMD, 2011).

1.5 Pollutants and Health Effects

Three categories of air quality pollutants of relevance to this Project are discussed in this section. Criteria pollutants have established national standards; toxic air contaminants (TACs) are defined by the state of California but do not have ambient air quality standards because often no safe levels have been determined; and GHGs are defined as gases that trap heat within the atmosphere.

1.5.1 Criteria Pollutants

Pollutants that have established national standards are referred to as *criteria pollutants*. For these pollutants, federal and state ambient air quality standards have been established to protect public health and welfare. Criteria pollutants include CO, NO_2, O_3, PM10, PM2.5, and SO_2. Ozone is a secondary pollutant that is not emitted directly to the atmosphere. Instead, it forms by the reaction of two ozone precursors – reactive organic gases and nitrogen oxides – in the presence of sunlight and high temperatures. The sources of these pollutants, their effects on human health and the nation's welfare, and annual emission to the atmosphere vary considerably.

The following table (Table 1-3) provides a general description (including potential health effects) of the criteria pollutants that could be emitted from the Project.

Table 1-3. Criteria Pollutants Health Effects

Pollutant	Characteristics	Health Effects
CO	Odorless, colorless gas that is highly toxic. Formed by the incomplete combustion of fuels.	Impairment of oxygen transport in the bloodstream. Aggravation of cardiovascular disease Fatigue, headache, dizziness, death.
NO_2	Reddish-brown gas formed during combustion.	Increased risk of acute and chronic respiratory disease.
O_3	A highly reactive photochemical pollutant crated by the action of sunshine on ozone precursors (reactive organic gases (ROGs) and oxides of nitrogen.)	Eye irritation Respiratory function impairment
PM10 and PM2.5	Small particles that measure 10 microns or less are termed PM10 (fine particles less than 2.5 microns are PM2.5). Solid and liquid particles of dust, soot, aerosols, smoke, ash, and pollen and other matter that are small enough to remain suspended in the air for a long period.	Aggravation of chronic disease and heart/lung disease symptoms.
SO_2	Colorless gas with a pungent odor.	Increased risk of acute and chronic respiratory disease.

1.5.2 Toxic Air Contaminants (TACs)

A TAC is defined by California law as an air pollutant that “may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health.” USEPA uses the term *hazardous air pollutant* (HAP) in a similar sense. Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA), whereby Congress mandated that USEPA regulate 188 air toxics, also known as HAPs. TACs can be emitted from stationary and mobile sources.

Ten TACs have been identified through ambient air quality data as posing the greatest health risk in California. Direct exposure to these pollutants has been shown to cause cancer, birth defects, damage to brain and nervous system and respiratory disorders.

TACs do not have ambient air quality standards because often no safe levels of TACs have been determined. Instead, TAC impacts are evaluated by calculating the health risks associated with a given exposure. The requirements of the Air Toxic “Hot Spots” Information and Assessment Act apply to facilities that use, produce, or emit toxic chemicals. Facilities that are subject to the toxic emission inventory requirements of the Act must prepare and submit toxic emission inventory plans and reports, and periodically update those reports.

The TACs of concern for this project are diesel particulate matter (DPM) and NOA.

Diesel Particulate Matter

DPM is emitted from both mobile and stationary sources. In California, on-road, diesel-fueled engines contribute approximately 24 percent of the statewide total, with an additional 71 percent attributed to other mobile sources such as construction and mining equipment, agricultural equipment, and transport refrigeration units. Stationary sources contribute about 5 percent of total DPM.

In California, diesel exhaust particles have been identified as a carcinogen (California OEHHA and the American Lung Association, 2005). Diesel exhaust and many individual substances contained in it (including arsenic, benzene, formaldehyde, and nickel) have the potential to contribute to mutations in cells that can lead to cancer. Long-term exposure to diesel exhaust particles poses the highest cancer risk of any toxic air contaminant evaluated by the California Office of Environmental Health Hazard Assessment (OEHHA). CARB estimates that about 70 percent of the cancer risk that the average Californian faces from breathing toxic air pollutants stems from diesel exhaust particles.

Exposure to diesel exhaust can have immediate health effects. Diesel exhaust can irritate the eyes, nose, throat, and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. In studies with human volunteers, diesel exhaust particles made people with allergies more susceptible to the materials to which they are allergic, such as dust and pollen. Exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks.

Diesel engines are a major source of fine-particle pollution. The elderly and people with emphysema, asthma, and chronic heart and lung disease are especially sensitive to fine-particle pollution. Numerous studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks, and premature deaths among those suffering from respiratory problems. Because children's lungs and respiratory systems are still developing, they are more susceptible than healthy adults to fine particles. Exposure to fine particles is associated with increased frequency of childhood illnesses and can also reduce lung function in children.

Naturally Occurring Asbestos

NOA was identified as a TAC in 1986 by CARB. NOA is located in many parts of California and is commonly associated with ultramafic rocks, according to the California Department of Geology's special publication titled "Guidelines for Geologic Investigations of Naturally Occurring Asbestos in California." The project area has been identified as within an area where the local geology supports the formation of NOA.

Asbestos is a term used for several types of naturally fibrous minerals that are a human health hazard when airborne. The most common type of asbestos is chrysolite, but other types such as termolite and actinolite are also found in California. Serpentinite may contain chrysotile asbestos. Ultramafic Rock, a rock closely related to serpentinite, may also contain asbestos minerals. All types of asbestos are hazardous and may cause lung disease and cancer.

For individuals living in areas of NOA, there are many potential pathways for airborne exposure. Exposures to soil dust containing asbestos can occur under a variety of scenarios, including children playing in the dirt; dust raised from unpaved roads and driveways covered with crushed serpentine; grading and earth disturbance associated with construction activity; quarrying; gardening; and other human activities (SMAQMD, 2011).

1.5.3 Greenhouse Gases

Gases that trap heat in the atmosphere, which are often referred to as GHGs, are necessary to life, because they keep the planet's surface warmer than it otherwise would be. This is referred to as the Greenhouse Effect. As concentrations of greenhouse gases increase, however, the Earth's temperature increases. According to National Oceanic and Atmospheric Administration (NOAA) and National Aeronautics and Space Administration (NASA) data, the Earth's average surface temperature has increased by 1.2ºF to 1.4ºF in the last 100 years (NOAA, 2007; NASA, 2007). Eleven of the last 12 years rank among the 12 warmest years on record (since 1850), with the warmest 2 years being 1998 and 2005. Most of the warming in recent decades is very likely the result of human activities. Other aspects of the climate are also changing, such as rainfall patterns, snow and ice cover, and sea level.

Some GHGs, such as CO_2, occur naturally and are emitted to the atmosphere through both natural processes and human activities. Other GHGs (e.g., fluorinated gases) are created and emitted solely through human activities. Each GHG traps a different amount of heat. In order to compare emissions of different GHGs, a weighting factor called a Global Warming Potential (GWP) is used, in which a single metric ton (1,000 kilograms) of CO_2 is taken as the standard. Emissions are expressed in terms of

CO_{2e}. Therefore, the GWP of CO_2 is 1; the GWP of CH_4 is 21; and the GWP of N_2O is 310. These three GHGs would be applicable to the project and potentially emitted during project construction activities, as detailed in Section 3.1.6 below. The principal GHGs that enter the atmosphere because of human activities are described below.

CO_2. Carbon dioxide enters the atmosphere via the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement). CO_2 is also removed from the atmosphere (or “sequestered”) when it is absorbed by plants as part of the biological carbon cycle.

CH_4. Methane is emitted during the production and transport of coal, natural gas, and oil. CH_4 emissions also result from livestock and other agricultural practices and from the decay of organic waste in municipal solid waste landfills.

N_2O. Nitrous oxide is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.

Fluorinated Gases. HFCs, PFCs, and SF_6 are synthetic, powerful GHGs that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for ozone-depleting substances (e.g., chlorofluorocarbons [CFCs], hydrochlorofluorocarbons [HCFCs], and halons). These gases are typically emitted in smaller quantities, but because they are potent GHGs, they are sometimes referred to as High GWP gases.

The proposed project alternatives would be expected to emit CO_2, CH_4, and N_2O but are not expected to result in the emission of fluorinated gases.

1.6 Existing Conditions

1.6.1 Meteorology and Climate

The project area is located at the southern end of the Sacramento Valley, which has a Mediterranean climate, characterized by hot dry summers and mild rainy winters. During the year the temperature may range from 20 to 115 degrees Fahrenheit with summer highs usually in the 90s and winter lows occasionally below freezing. Average annual rainfall is about 20 inches with snowfall being very rare. The prevailing winds are moderate in strength and vary from moist breezes from the south to dry land flows from the north.

The mountains surrounding the Sacramento Valley create a barrier to airflow, which can trap air pollutants in the valley when meteorological conditions are right and a temperature inversion exists. The highest frequency of air stagnation occurs in the autumn and early winter when large high-pressure cells lie over the valley. The lack of surface wind during these periods and the reduced vertical flow caused by less surface heating reduces the influx of outside air and allows air pollutants to become concentrated in the air. The surface concentrations of pollutants are highest when these conditions are combined with smoke from agricultural burning or when temperature inversions trap cool air, fog and pollutants near the ground.

The ozone season (May through October) in the Sacramento Valley is characterized by stagnant morning air or light winds with the Delta sea breeze arriving in the afternoon out of the southwest. Usually the evening breeze transports the airborne pollutants to the north out of the Sacramento Valley. During about half of the days from July to September, however, a phenomenon called the “Schultz Eddy” prevents this from occurring. Instead of allowing for the prevailing wind patterns to move north carrying the pollutants out of the valley, the Schultz Eddy causes the wind pattern and pollutants to circle back southward. This phenomenon’s effect exacerbates the pollution levels in the area and increases the likelihood of violating the federal and state air quality standards (SMAQMD 2011).

1.6.2 **Existing Air Quality**

This existing air quality section includes a discussion of the existing emissions inventory for Sacramento County and California, criteria pollutant data collected at a local monitoring station, and sensitive receptors. Existing air quality values described in the emissions inventory and monitoring data sections provide a background against which project values are measured. Only criteria air pollutants and GHGs are shown, as no numeric standards exist for TACs.

Emissions Inventory

Table 1-4 shows Sacramento County’s 2010 emissions inventory. There are two main categories of emission sources in any area: stationary and mobile. On-road motor vehicles are the major source of reactive organic gases (ROGs), CO, and nitrogen oxides (NO_x) emissions in Sacramento County. Other (off-road) mobile vehicles and equipment contribute substantially to ROG, CO, and NO_x emissions. Motor vehicles and other mobile sources are the largest contributors to the County’s SO_2 emissions. Fugitive dust, primarily from construction sites, paved and unpaved roadways, and farming operations, is the major source of PM10 and PM2.5. Residential fuel combustion also substantially contributes to PM2.5 emissions. Criteria pollutant sources are summarized in Table 1-4.

Table 1-4. Sacramento County 2010 Emissions Inventories

Source Type	Category	Average Emission in Tons Per Day (tons/day)[1]					
		ROG	CO	NO_x	SO_2	PM10	PM2.5
Stationary	Fuel Combustion	0.3	3.8	3.6	0.1	0.4	0.4
Stationary	Waste Disposal	0.3	0.0	0.0	0.0	0.0	0.0
Stationary	Cleaning and Surface Coatings	4.1	-	-	-	-	-
Stationary	Petroleum Production and Marketing	2.5	0.0	0.0	-	-	-
Stationary	Industrial Processes	0.9	0.3	0.2	0.1	1.1	0.5
Area-wide	Solvent Evaporation	13.5	-	-	-	0.0	0.0
Area-wide	Miscellaneous Processes	4.1	40.8	3.1	0.1	40.1	10.3
Mobile	On-Road Motor Vehicles	20.1	181.8	39.1	0.2	2.0	1.4
Mobile	Other Mobile Sources	12.1	85.5	23.5	0.2	1.4	1.3
	Total	58.0	312.2	69.6	0.6	45.1	13.9

Source: CARB 2009
1. Totals may differ slightly than the sum of the individual pollutant sources due to rounding.

Table 1-5 shows Sacramento County's 2008 GHG emissions, and Table 1-6 shows California's GHG emissions. Transportation was the largest GHG emission source for both Sacramento County and California. Residential, commercial and industrial sources were the two other largest GHG sources in Sacramento County. Additional major statewide GHG emission sources were electric power and industries.

Table 1-5. Sacramento County 2005 GHG Emissions Inventory

Source Category	Annual Estimate of CO_2 equivalent (CO_{2e}) (million metric tons/yr)
Residential	2.44
Commercial and Industrial	2.23
Industrial Specific	0.041
On-Road Transportation	6.73
Off-Road Vehicle Use	0.58
Waste	0.74
Wastewater Treatment	0.13
Water-Related	0.064
Agriculture	0.20
High Global Warming Potential (GWP)	0.57
Sacramento International Airport	0.20
Total Emissions	**13.9**
Source: County of Sacramento, 2009.	

Table 1-6. California 2008 GHG Emissions Inventory

Source Category	Annual Estimate of CO_2 equivalent (CO_{2e}) (million metric tons/yr)
Transportation	174.99
Electric Power	116.35
Commercial and Residential	43.13
Industrial	92.66
Recycling and Waste	6.71
High GWP	15.65
Agriculture	28.06
Forestry	0.19
Total Gross Emissions	**477.74**
Source: CARB 2010b	

Monitoring Data – Criteria Pollutants

Air quality data from the Del Paso monitoring station near the area of analysis is summarized in Table 1-7. The Del Paso monitoring station is located approximately 11 miles from the project site. It was selected to best represent the regional conditions of the area of analysis because all relevant criteria pollutants (CO, O_3, NO_2, PM10, PM2.5, and SO_2) are sampled there.

Monitored CO levels have been trending down over the last several years. The downward trend is primarily a result of the use of oxygenated gasoline during the winter CO season. During 2008-2010, both the 1-hour and 8-hour maximum CO concentrations were less than 4 parts per million (ppm). The 8-hour CO CAAQS and NAAQS were last exceeded in the early 1990s. The area has attained the standards since then, and Sacramento County was re-designated a maintenance area for the CO NAAQS in March 1998 (USEPA, 2012c).

The 1-hour O_3 CAAQS had been exceeded up to 17 times each year at the individual monitoring station shown on Table 1-7. The recorded 8-hour O_3 concentrations exceeded the NAAQS up to 18 times in 2008 and exceeded the CAAQS up to 32 times in 2009. Substantial year-to-year variations in monitored O_3 levels are common. However, no clear trend in O_3 levels is demonstrated by monitoring results from the 1990s through 2010.

Monitored NO_2 and SO_2 concentrations varied minimally year-to-year during the three year monitoring period and did not exceed the applicable CAAQS and/or NAAQS (Table 1-7).

The 24-hour and annual PM10 and annual PM2.5 CAAQS were exceeded during the monitoring period. Additionally, during this monitoring period, the NAAQS PM10 was not exceeded and the NAAQS PM2.5 was exceeded, as shown in Table 1-7.

Table 1-7. Summary of Pollutant Monitoring Data in Sacramento Del Paso Manor Monitoring Station

Criteria Air Pollutant	Yearly Monitoring Data			
	2008	**2009**	**2010**	**2011**
CO Highest 1-Hour concentration (ppm)[1] Days above CAAQS Days above NAAQS	3 0 0	3 0 0	2 0 0	3 0 0
CO Highest 8-Hour concentration (ppm) Days above CAAQS Days above NAAQS	2.5 0 0	3 0 0	2 0 0	2 0 0

Criteria Air Pollutant	Yearly Monitoring Data			
	2008	2009	2010	2011
O_3 – 1 Hour Highest concentration (ppm)[2] Days above CAAQS Days above NAAQS	 0.113 17 0	 0.122 14 0	 0.105 6 0	 0.11 1 0
O_3 – 8 Hour Highest concentration (ppm) Days above CAAQS Days above NAAQS	 0.097 23 18	 0.102 32 15	 0.102 7 5	 0.097 9 3
NO_2 – 1 Hour Highest concentration (ppm) Days above CAAQS Days above NAAQS	 0.058 0 0	 0.049 0 0	 0.052 0 0	 0.047 9 0
PM10 Highest 24-hour concentration ($\mu g/m^3$) Arithmetic mean ($\mu g/m^3$) Days above CAAQS Days above NAAQS	 72.0 23.2 12.1 0	 48.0 18.7 0 0	 44.0 16.3 0 0	 66.0 20.7 12.2 0
PM2.5 Highest 24-hour concentration ($\mu g/m^3$) Arithmetic mean ($\mu g/m^3$) Days above NAAQS	 93.1 18.9 24.1	 71.7 15.4 8.9	 41.6 8.7 0	 62.2 10.4 9.5
SO_2 Highest 24-hour concentration (ppm) Days above CAAQS	 0.002 0	 0.002 0	 0.001 0	 0.001 0

Source: CARB 2012d, USEPA 2012d

Notes:

1. Carbon monoxide concentration is based on average of two recorded maximum values.
2. Highest concentration and arithmetic mean for all pollutants, except carbon monoxide, displayed from the State and Federal Monitoring Data.

Acronyms

$\mu g/m^3$ microgram per cubic meter
CO carbon monoxide
NO_2 nitrogen dioxide
O_3 ozone
PM10 particulate matter smaller than or equal to 10 microns in diameter
PM2.5 particulate matter smaller than or equal to 2.5 microns in diameter
ppm parts per million
SO_2 sulfur dioxide

Sensitive Receptors

Some locations are considered more sensitive to adverse effects from air pollution than others. These locations are termed sensitive receptors. For CEQA purposes, a sensitive receptor is generically defined as a location where human populations, especially children, seniors, and sick persons are found, and there is reasonable expectation of continuous human exposure according to the averaging period for the ambient air quality standard (e.g., 24-hour, 8-hour, and 1-hour). These typically include residences, hospitals, and schools. Locations of sensitive receptors may or may not correspond with the location of the maximum offsite concentration. The air quality analysis evaluates impacts at the worst-case location, typically adjacent to the source of emissions, regardless of the presence of a sensitive receptor.

1.6.3 Attainment Status

Sacramento County, in which the Folsom Dam is located, is designated as a “severe” non-attainment for the O_3 NAAQS and as nonattainment for the PM10 and PM2.5 NAAQS. The county is a designated maintenance area for the CO NAAQS. Since the project is located in a nonattainment area for ozone, the project’s emissions of ozone precursors (ROG and NO_x) must be compared to the federal conformity thresholds to determine whether the project is subject to conformity. Similarly, since Sacramento County is nonattainment for PM10 and PM2.5, and maintenance for CO, the project’s emissions of these pollutants must also be compared to the federal conformity thresholds.

Table 1-8. Federal and State Attainment Status

Pollutant	State Status	Federal Status
O_3	Non-Attainment, serious for 1 hour and 8 hour average	Non-attainment, severe (1-hour and 1997 8-hour standards) (1)
PM10	Non-attainment, 24 hour standard and Annual mean	Non-attainment (2), moderate
PM2.5	Non-attainment, annual standard	Non-attainment
CO	Attainment	Maintenance Area (3)
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment

Sources: SMAQMD 2012a, CARB 2012e; USEPA 2012e.

Notes:

1. The USEPA is in the process of implementing and finalizing new attainment area designations based on the 2008 O_3 NAAQS. The USEPA’s initial Sacramento County area designation, as of December 2011, is nonattainment for this standard.
2. Air quality meets Federal PM10 Standards. The USEPA is in the process of reviewing the CARB’s request, on behalf of SMAQMD, to formally designate the area as in attainment.
3. As of September 27, 2010, all carbon monoxide nonattainment areas within Sacramento County have been redesignated to maintenance areas.

Acronyms

CO carbon monoxide
NO_2 nitrogen dioxide
O_3 ozone

Pollutant	State Status	Federal Status
PM10 particulate matter smaller than or equal to 10 microns in diameter PM2.5 particulate matter smaller than or equal to 2.5 microns in diameter/ SO_2 sulfur dioxide		

1.6.4 State Implementation Plans

Counties or regions that are designated as federal non-attainment areas for one or more criteria air pollutants must prepare a plan that demonstrates how the area will achieve attainment of the standards by the federally mandated deadlines. In addition, those areas that have been redesignated as attainment will have maintenance plans that demonstrate how the area will maintain the standard. These regional plans, prepared by local air districts, go into the SIP, which is compiled by the CARB and eventually approved by USEPA. These regional plans are themselves sometimes referred to as SIPs. SIPs are not single documents; rather, they are a compilation of new and previously submitted plans, programs (such as monitoring, modeling, permitting, etc.), district rules, state regulations and federal controls. SIPs are not required for NO_2 and SO_2 in Sacramento County because the county is in attainment for these pollutants. The Sacramento County maintenance plans and/or SIPs for the other criteria pollutants are described below.

Ozone: The USEPA has designated Sacramento County as being in nonattainment of the 2008 8-hour ozone NAAQS of 0.075 ppm (SMAQMD 2012b). An attainment plan for the 2008 standard has not yet been prepared. In the past, ozone attainment plans were prepared to address nonattainment of the 1-hour ozone NAAQS and the 1997 8-hour ozone NAAQS.

Carbon monoxide: On November 30, 2005, USEPA published in the Federal Register (70 FR 71776) its direct final rule approving ten CO Maintenance Plans in California, including the Sacramento Urbanized Area CO Maintenance Plan. This plan provides the CO budgets for the next 10 years that will demonstrate continued attainment of the CO NAAQS.

PM10: The Sacramento County area is currently designated as non-attainment for the PM10 NAAQS, although the area has not measured any violations of the PM10 NAAQS in more than ten years. To formally change the PM10 area designation to attainment, on December 7, 2010, the CARB submitted the *PM10 Implementation/Maintenance Plan and Re-Designation Request for Sacramento County* to the USEPA. The USEPA is still in the process of reviewing the plan and attainment redesignation request. (SMAQMD, 2012a).

PM2.5: On October 8, 2009, the USEPA signed the final PM2.5 nonattainment designations for the Sacramento area. The designations became effective on December 14, 2009. In May 2012, CARB requested that the USEPA find that the SVAB is in attainment for the 2006 24-hour PM2.5 NAAQS and suspend the attainment demonstration and elements (i.e., attainment plan preparation) associated with reaching attainment (CARB 2012f). SMAQMD is preparing a redesignation request and maintenance plan for submission in early 2013. (Anderson, 2012, SMAQMD 2012c).

2.0 ANALYSIS METHODOLOGY

2.1 Significance Criteria

This section discusses how significance criteria are determined for both CEQA and NEPA, which would both be applicable to the project, and then presents the criteria for both federal and state levels. Significance criteria take into account each of the thresholds or measurements discussed below.

2.1.1 General Conformity *De Minimis* Thresholds

The General Conformity *de minimis* levels are based on the non-attainment classification of the air basin. The project is located in the SVAB, which is an ozone nonattainment area, classified as severe. The SVAB is also designated as nonattainment for PM10 and PM2.5, and a maintenance area for CO. The General Conformity *de minimis* levels for this project are shown below (Table 2-1). These thresholds were applied to the project's estimated emissions and used to determine NEPA impact significance as detailed in the NEPA significance criteria section below.

Table 2-1. General Conformity *De Minimis* Thresholds

Pollutant	Federal Attainment Status	Threshold Values (tons/yr)[1]
Ozone precursor (NO_x)	Nonattainment: Severe	25
Ozone precursor (ROGs)	Nonattainment: Severe	25
CO	Maintenance	100
SO_2	Attainment	N/A
PM2.5	Nonattainment	100
PM10	Nonattainment: Moderate	100
Pb	No designation	N/A

Source: USEPA 2011a

Notes:

1. Thresholds from 40 CFR Parts 51 and 93.

Acronyms:

CO carbon monoxide
N/A not applicable
NO_x nitrogen oxides
Pb lead
PM10 particulate matter smaller than or equal to 10 microns in diameter
PM2.5 particulate matter smaller than or equal to 2.5 microns in diameter
ROG reactive organic gases
SO_2 sulfur dioxide

2.1.2 Sacramento Metropolitan Air Quality Management District Thresholds

SMAQMD has published CEQA significance thresholds for projects that would release criteria pollutants, TACs, and/or objectionable odors. SMAQMD has also published general guidance, but no thresholds, for GHGs. Applicable significance criteria are presented in the following sections. Because project impacts are limited to construction, not operations, only SMAQMD's construction related thresholds are presented.

Mass Emission Thresholds

Table 2-2 shows SMAQMD's construction specific NO_x significance threshold. If the project construction emissions exceed the CEQA NO_x threshold, the project applicant must pay mitigation fees of $17,080 per ton of NO_x to offset any excess emissions.

Table 2-2. Sacramento Metropolitan AQMD Daily Mass Emissions Thresholds for NO_x from Construction Emissions

Project Type	NO_x (lbs/day)
Short-term Effects (Construction)	85
Source: SMAQMD, 2011	

Ambient Concentration Thresholds

For construction projects disturbing more than 15 acres per day, PM10 CAAQS are applied as thresholds except for areas with existing or projected nonattainment designations for the PM10 CAAQS. Due to the SVAB's nonattainment designation, SMAQMD has determined that a project's emissions in the SVAB would be significant and considered substantial contributors if they equal or exceed 5 percent of the PM10 CAAQS. A project would have a substantial PM10 contribution if it increases ambient concentrations by 2.5 $\mu g/m^3$ or more over 24 hours or by 1 $\mu g/m^3$ or more over a year. For construction projects disturbing more than 15 acres per day, dispersion modeling is required by SMAQMD to determine whether the project's emissions would exceed the PM10 CAAQS or the substantial PM10 CAAQS thresholds. For projects disturbing 15 or fewer acres per day, dispersion modeling is not required. Instead, the project must implement all Basic Construction Emission Control Practices. If all such measures are incorporated, project impacts are considered less than significant.

SMAQMD has also designated the CAAQS as construction thresholds for PM2.5, CO, and SO_2. SMAQMD has not designated a construction threshold for ROG. The CAAQS threshold for PM2.5 is 0.6 $\mu g/m^3$. The CO CAAQS 8-hour substantial threshold is 500 $\mu g/m^3$ and the 1-hour substantial threshold is 1,150 $\mu g/m^3$. The 24-hour and 1-hour SO_2 CAAQS substantial thresholds are, respectively, 5.25 and 32.75 $\mu g/m^3$. Because PM2.5 is a subset of PM10, SMAQMD assumes that construction projects that do not generate concentrations of PM10 that exceed the concentration-based threshold of significance would also be considered less than significant for PM2.5 impacts. For other criteria pollutants, NO_x, SO_2, and CO, SMAQMD requires that the proximity of a project to sensitive receptors and the duration of emissions be used to determine whether concentrations need to be estimated (SMAQMD, 2011). For the proposed project, the location of the project's emission sources in relation to sensitive receptors does not warrant estimates of criteria pollutant concentrations.

GHG Thresholds

GHG emissions have the potential to adversely affect the environment because they contribute, on a cumulative basis, to global climate change. Although the SMAQMD has not established thresholds of significance for GHG emissions, the SMAQMD does provide methodologies for GHG emission analysis and mitigation in their CEQA guidelines (SMAQMD, 2011). The SMAQMD recommends that project applicants consider thresholds of significance for GHG emissions that are related to AB 32's GHG reduction goals as described in Table 1-2 above.

Offensive Odors

Specific significance thresholds are not available for offensive odors; however, a project would be considered to have significant adverse air quality impacts if it has the potential to create objectionable odors affecting a substantial number of people. In addition, the SMAQMD Rule 402 prohibits any person or source from emitting air contaminants that cause detriment, nuisance, or annoyance to a considerable number of persons or the public (SMAQMD, 2011). The project is analyzed based on the SMAQMD recommendations that significance determinations be made on a case-by-case basis and consider parameters such as recommended odor screening distances, or odor complaint history.

Toxic Air Contaminants

Diesel Particulate Matter

The SMAQMD has not established a quantitative threshold of significance for construction-related TAC emissions. Therefore, the SMAQMD recommends that project applicants address this issue on a case-by-case basis, taking into consideration the specific construction-related characteristics of each project and the project's proximity to off-site receptors (SMAQMD, 2011). Consequently, this analysis evaluates DPM based on the quantity of emissions and the distance to nearby receptors.

Naturally Occurring Asbestos

Significance criteria for NOA are determined by whether or not a project involves earth moving activities within "areas moderately likely to contain NOA as documented within the report *The Relative Likelihood for the Presence of Naturally Occurring Asbestos in Eastern Sacramento County, California.*(California Geological Survey, 2006).

If a project would be located in an area at least moderately likely to contain NOA, then the impact shall be considered potentially significant (SMAQMD, 2011).

2.1.3 NEPA Significance Determinations

The criteria discussed below were applied in the EIR/EIS Air Quality chapter to determine NEPA significance conclusions but are not applied in this technical report:

- No effect: there are no measurable pollutant emissions;
- Negligible: If the project pollutant emissions are below the corresponding general conformity thresholds, and are expected to cause pollutant emissions that do not exceed other applicable emissions, air quality, or health risk thresholds (i.e., SMAQMD thresholds);
- Moderate air quality effects: pollutant emissions below corresponding general conformity thresholds, but having the potential to exceed other applicable emissions, air quality, or health risk thresholds; and
- Substantial effects: pollutant emissions that are greater than the corresponding general conformity threshold, or having the potential to exceed other applicable emissions, air quality, or health risk thresholds.

2.1.4 CEQA Significance Determinations

The criteria discussed below were applied in the EIR/EIS Air Quality chapter to determine CEQA significance conclusions but are not applied in this technical report:

- No effect: there are no measurable pollutant emissions;
- Less than significant: If the project pollutant emissions are below the appropriate SMAQMD CEQA significance thresholds;
- Less than significant with mitigation: pollutant emissions below appropriate SMAQMD CEQA significance thresholds, after mitigation; and
- Significant and unavoidable effects: pollutant emissions are greater than the appropriate SMAQMD CEQA significance thresholds even with implementation of mitigation.

2.2 Methodology and Assumptions

The methods for evaluating impacts are intended to satisfy the federal and state requirements, including NEPA, CEQA, and general conformity. In general, the construction emissions were estimated from several emission models and spreadsheet calculations, depending on the source type and data availability. Models used include the CARB Emission Factor (EMFAC2007/ EMFAC2011)[1] models (onroad vehicle emission factor model), and the CARB OFFROAD2011 model. Daily and total project

[1] The EMFAC2011 model has been adopted by SMAQMD for CEQA purposes, but this model has yet to be accepted by the USEPA for the General Conformity determinations. Based on a conversation with Karen Huss and Dawn Richmond of USEPA Region 9, we estimated emissions using the EMFAC2007 model versions for NEPA purposes (Huss, 2011, personal communication) and the EMFAC2011 model updates for CEQA purposes (Huss, 2011, personal communication).

emissions were estimated from appropriate emission factors from the models or USEPA AP-42 guidance, the type of equipment being operated, the level of equipment activity, and the associated construction schedules.

2.2.1 Criteria Pollutant and GHG Emission Calculations

The following section describes the methodology used to estimate criteria pollutant and GHG emissions from each construction activity associated with upstream activities. Cumulative emissions associated with upstream plus downstream activities are described in Section 5.0. A variety of Corps-provided documents or personal communications were used to calculate the upstream project emissions as summarized in Table 2-3. Sources of emission factors used in the calculations are detailed in the following sections.

Table 2-3. Summary of Data Sources and Uses

Source	Information Used
Corps, 2011a.	• Construction equipment lists for Alternatives B and C. • Schedule used to assume equal on-site haul truck activity in various years (Alternative 2: 2013, 2014, and 2016; Alternative 3: 2013, 2016, and 2017)
Corps, 2011b.	• Number of workers by construction activity and total days worked for both alternatives (2013-2017).
Corps, 2011c.	• Annual tonnage of rock processed at rock crushing facility
Corps, 2011d and Corps, 2011e.	• Concrete batch plant assumptions regarding schedule and the aggregate and concrete placement quantities.
Corps, 2011f.	• Quantities of materials (aggregate or dredged) required for spur dike, transload facility, ramp construction for off-site haul truck calculations. • Haul truck distances to MIAD and Jamestown, CA • Ratio of aggregate quantity needed for production of specific concrete quantity • Truck trips in 2017 to remove ramp for transload facility
Wisniewski, J., 2012.	• Blasting material truck trips (February 2014 to August 2017) • Blasting input parameters
Sandburg, N., 2012a.	• Updated concrete quantities moved from and produced at concrete batch plant during construction years 2014 -2016 • Distance to concrete batch plant • Updated schedule for concrete batch plant activities
Corps, 2009a.	• Fastest wind speed at site
Corps, 2009b.	• Amount of excavated material

Corps, 2010.	• Haul truck distances to aggregate material origin and for miscellaneous purposes. • For the JFP at Folsom Dam, Downstream Project: Haul truck assumptions and emission factors, assumptions for worker commute travel, aggregate material storage piles assumptions for concrete batch plants, assumptions for stockpile wind erosion emissions, and assumptions for heavy diesel truck travel.
Note: All data sources apply to the JFP at Folsom Dam, Upstream Project unless otherwise noted.	

The upstream emissions analysis includes the following activities:

- On-site construction off-road equipment, such as excavators, backhoes, bulldozers and scrapers, will be used for site preparation, construction and removal of the transload facility, excavation of the approach channel, construction of the spur dike, and installation of the concrete cutoff wall or installation and removal of the cofferdam
- Marine equipment will be used for placement and removal of the cofferdam, in-the-wet excavation and blasting, dredging, placement of silt curtains, and other on-water support services.
- On-site pickup and haul trucks will be used for general construction support and for hauling materials from excavated areas to staging or disposal areas, to the spurdike from excavation or staging areas, from the transload facility to disposal areas, or for cofferdam fill material to disposal areas.
- Off-site haul trucks. Aggregate will be trucked from off-site for construction of the transload facility and for concrete production. In addition, blasting materials will be stored off site and trucked in only on the day when they will be used onsite. In addition, haul trucks will be used to transport material from the concrete batch plant to the construction area.
- Off-site worker vehicles will be used for daily worker commutes.
- Fugitive dust sources will include in-the-dry blasting for the approach channel, stockpile handling, wind erosion of stockpiles, paved roads, unpaved roads, in-the-dry excavation for approach channel, operation of the rock crusher, and operation of the concrete batch plant. Stockpiles would be used for materials or fill associated with excavation of the approach channel, and the aggregate for the concrete batch plant. An unpaved road would be created onsite to support all construction activities. Use of paved roads would support off-site haul truck activities and construction worker commutes. The rock crusher would be used for the concrete batch operations. The concrete batch plant would support concrete production for construction activities.

On-site construction off-road equipment

Off-road construction equipment exhaust emissions were estimated using the OFFROAD2011 model for construction years 2013-2017. The emission factors were based on equipment horsepower rating. The exhaust emissions were calculated from the emission factor, the number of pieces of equipment, the engine duty, and the operating schedule. Activity data for construction equipment was provided by the project's engineers (Corps, 2011a).

On-site construction marine equipment

Marine exhaust emissions were estimated using the emission factors from the California Air Resources Board's Harbor Craft model (CARB, 2012g). The Harbor Craft model's emission factors are listed as a function of year and horsepower range.

The exhaust emissions were calculated from the emission factor, load factor the number of pieces of equipment, the engine duty, and the operating schedule. Activity data for construction equipment was provided by the project's engineers (Corps, 2011a).

On-site pickup trucks

On-site pickup truck exhaust emissions were estimated using the EMFAC2007/EMFAC2011 models for light duty trucks in Sacramento County. The emission factors were based on a speed of 10 miles per hour (mph).

On-site pickup truck information was provided by the project engineers (Corps, 2011a), and is summarized in Table 2-4 below.

Table 2-4. On-site pickup truck trips

Activity	No. of Trucks	2013 (Miles)	2014 (Miles)	2015 (Miles)	2016 (Miles)	2017 (Miles)
Alternative 2						
Mobilization for Approach Walls (Roads , Crane Pads) (3 months) (Mid 2015)						
Pickup's standard F-150 (gas)	5	-	-	15,000	-	-
Pickup's Ford 150 4X4 (gas)	2	-	-	6,000	-	-
Mech trucks	2	-	-	8,400	-	-
Fuel trucks	2	-	-	8,400	-	-
Pipe Fitters Truck	1	-	-	840	-	-
Electric - Line Man Truck	1	-	-	1,120	-	-
Flatbed trucks	2	-	-	7,200	-	-
Intake Approach Walls & Slab (13 months) (September 2015-March 2017)						
Pickup's Ford 150 4X4 (gas)	1	-	-	3,975	3,975	3,975
Site Restoration/Teardown (1 Month) (July-August 2014)						
Pickup Trucks	6	-	43,200	-	-	-
Shop Trucks	2	-	19,200	-	-	-

Activity	No. of Trucks	2013 (Miles)	2014 (Miles)	2015 (Miles)	2016 (Miles)	2017 (Miles)
Site Restoration Work (4 Months) (2017)						
Pickup's standard F-150 (gas)	1	-	-	-	-	4,800
Site Restoration Work (4 Months) (2017)						
Flatbed trucks	1	-	-	-	-	1,080
Totals		**0**	**62,400**	**50,935**	**3,975**	**9,855**
Alternative 3						
Intake Approach Walls & Slab (13 months) (September 2015-March 2017)						
Pickup's Ford 150 4X4 (gas)	1	-	-	11,925	-	-
Intake Approach Walls & Slab (13 months) (September 2015-March 2017)						
Pickup's Ford 150 4X4 (gas)	1	-	-	3,975	3,975	3,975
Site Restoration/Teardown (1 Month) (July - August 2014)						
Pickup Trucks	6	-	43,200	-	-	-
Shop Trucks	2	-	19,200	-	-	-
Remove Downstream rock Cofferdam (2 Months) (2017)						
Pickup's Ford 150 4X4 (gas)	1	-	-	-	-	1,800
Site Restoration Work (4 Months) (2017)						
Pickup's standard F-150 (gas)	1	-	-	-	-	4,800
Flatbed trucks	1	-	-	-	-	1,080
Totals		**0**	**62,400**	**15,900**	**3,975**	**11,655**

<u>On-site haul trucks</u>

On-site haul truck exhaust emissions were estimated using the EMFAC2007/ EMFAC2011 models for heavy-heavy duty diesel truck travel in Sacramento County. The emission factors were based on a speed of 10 mph. The on-site haul truck emission estimates generated for this project assume that all excavated material will be transported from the approach channel to the disposal areas at the MIAD or Dike 7, which is a one-way trip distance of 2 miles. This represents the worst case scenario. However, a portion of the excavated material may be transported a shorter distance (from the approach channel to the Dike 8 disposal area).

On-site haul truck information was estimated assuming a truck capacity of 20 cubic yards (cy) and the annual volume of soil materials excavated (URS, 2012). The information is summarized in Table 2-5 below.

Table 2-5. On-site haul truck trips

Activity	No. of trucks	2013 (Miles)	2014 (Miles)	2015 (Miles)	2016 (Miles)	2017 (Miles)
Alternative 2						
Approach Channel Excavation	26,880	35,840	35,840	-	35,840	-

Transload Facility Dredging	900	3,600	-	-	-	-
Spur Dike Construction	19,750	-	-	-	26,333	52,667
Totals		**39,440**	**35,840**	**0**	**62,173**	**52,667**
Alternative 3						
Approach Channel Excavation	26,880	35,840	-	-	35,840	35,840
Transload Facility Dredging	900	3,600	-	-	-	-
Cofferdam Fill Material	14,960	14,960	14,960	-	-	29,920
Spur Dike Construction	19,750	-	-	-	26,333	52,667
Totals		**54,400**	**14,960**	**0**	**62,173**	**118,427**

<u>Off-site haul trucks</u>

Off-site haul truck exhaust emissions were estimated using the EMFAC2007/EMFAC 2011 models for heavy-heavy duty diesel trucks in Sacramento County. The emission factors were based on a speed of 35 mph. Off-site materials would be transported from three locations. Aggregate material would be transported from aggregate facilities, which are a one-way trip distance of 18 miles. Explosive material would be transported from a storage facility in Jamestown, CA, which is a one-way trip distance of 80 miles. Concrete would be transported from the concrete batch plant at the Folsom Prison staging area, which is a one-way trip distance of 0.5 miles.

Off-site haul truck information was estimated assuming a haul truck capacity of 20 cy or 30 tons, a concrete mixer truck capacity of 10 cy and the material volume transported (URS, 2012). The information is summarized in Table 2-6 below.

Table 2-6. Off-site haul truck trips

Activity	No. of trucks	2013 (Miles)	2014 (Miles)	2015 (Miles)	2016 (Miles)	2017 (Miles)
Alternative 2						
Aggregate Material for Concrete Mixing	350	2,288	3,432	3,432	3,432	-
Aggregate Material for Transload Facility	27,000	-	-	-	-	486,000
Concrete from Folsom Prison Staging Area	2,420	440	660	660	660	-
Explosive Material from Jamestown, CA	600	486,000	24,558	26,791	26,791	17,860
Totals		**488,726**	**28,650**	**30,833**	**30,833**	**503,860**
Alternative 3						
Aggregate Material for Concrete Mixing	188	-	2,125	2,318	2,318	-
Aggregate Material for Transload Facility	27,000	486,000	-	-	-	486,000
Concrete from Folsom	1,300	-	409	446	446	-

Prison Staging Area						
Explosive Material from Jamestown, CA	600	-	24,558	26,791	26,791	17,860
Totals		**486,000**	**27,091**	**29,554**	**29,554**	**503,860**

Off-site worker vehicle

Worker commute exhaust emissions were estimated using the EMFAC2007/EMFAC2011 models for light duty automobiles and light duty trucks in Sacramento County. The emission factors were based on a speed of 65 mph. URBEMIS estimated that the average commute distance traveled within Sacramento County is 15 miles for a one-way trip. Workers were assumed to take 3.02 one-way trips to incorporate lunch trips as well as the trip to and from home. These commute distances and trip rates were based on the value and data from URBEMIS for General Light Industry.

The number of worker vehicles was provided by the project engineers (Corps, 2011b). The information is summarized in Table 2-7 below.

Table 2-7. Worker Commute Trips

Activity	No. of Workers	2013 (Miles)	2014 (Miles)	2015 (Miles)	2016 (Miles)	2017 (Miles)
Alternative 2						
Transload Facility Workers	27	-	42,401	113,069	113,069	113,069
Approach Channel Workers	39	-	70,668	169,603	141,336	169,603
Total			**113,069**	**282,672**	**254,405**	**282,672**
Alternative 3						
Transload Facility Workers	41	84,802	70,668	113,069	113,069	169,603
Approach Channel Workers	43	-	98,935	169,603	169,603	169,603
Totals		**84,802**	**169,603**	**282,672**	**282,672**	**339,206**

2.2.2 Fugitive Dust Emission Calculations

The following section provides the methodology used to estimate fugitive dust emissions from unpaved and paved roads, and various construction activities.

Unpaved road entrained road dust

Unpaved road entrained fugitive dust emissions were estimated using AP-42 emission factors (USEPA, 2006a) and the vehicle miles traveled. The emission factor was calculated based on the silt content of the road, the weight of the vehicle, and the number of days per year where precipitation was over 0.01 inches. The silt content of the unpaved roads was obtained from the Folsom Dam Safety EIS calculations (U.S. Bureau of Reclamation [USBR] , 2007). The on-site pickup trucks were assumed to be light duty trucks with an average weight of 2 tons. The on-site haul trucks were assumed to be heavy-heavy duty diesel trucks with an average weight of 23.25 tons. The number of days where precipitation was over 0.01 inches (“wet” days) was obtained from AP-42 Figure 13.2.1-2 (USEPA, 2011a) and was found to be 90 days for the project area.

The total vehicles miles traveled (VMT) for the on-site pickup trucks were calculated using the mileage values from Table 2-4 (see methodology for on-site haul truck exhaust emissions). The total VMT for the on-site haul trucks were calculated using the mileage values from Table 2-5 (see methodology for on-site haul truck exhaust emissions).

Paved road entrained road dust

Paved road entrained fugitive dust emissions were estimated using the AP-42 emission factor (USEPA, 2011a) and the VMT. The emission factor was calculated based on the silt content of the road, the weight of the vehicle, and the number of days where precipitation was over 0.01 inches.

The vehicles were assumed to travel on five different types of paved roads: freeway, arterial (major street/highway), collector road, local road surface and rural road surface. The silt content of these roads and the percentage of vehicle travel on these roads were estimated from the Midwest Research Institute Study (Muleski, 1996)

The off-site haul trucks were assumed to be heavy-heavy duty diesel trucks with an average weight of 23.25 tons. The worker fleet was assumed to be 50% light duty automobiles and 50% light duty trucks, with an average weight of 1.75 tons. The number of days per year where precipitation was over 0.01 inches (“wet” days) was obtained from AP-42 Figure 13.2.1-2 (USEPA, 2011a) and was found to be 90 days for the project area.

The total VMT for the off-site haul trucks were calculated using the mileage values from Table 2-6 (see methodology for off-site haul truck exhaust emissions). The total vehicle miles traveled for worker commute were calculated using the mileage values from Table 2-7 (see methodology for worker commute exhaust emissions).

Cut and fill

Cut and fill emissions were estimated using the low detail emission factors from the URBEMIS2007 model for excavation fugitive dust. The URBEMIS2007 emission factor allows the calculation of fugitive dust emissions based on the maximum material daily volume disturbed. The total material volume disturbed was assumed to be 304,500 cubic yards (cy) for Alternative 2 and 355,600 cy for Alternative 3 (URS, 2009). Material for Alternatives B and C will be excavated over 1 year.

Stockpile handling

Stockpile handling emissions for early excavated material storage piles were estimated using AP-42 emission factors (USEPA, 2006b) and the amount of material handled. The emission factor was based on the mean wind speed and material moisture content. The mean wind speed and material moisture content values were obtained from the SMAQMD Guide to Air Quality Assessment in Sacramento County (SMAQMD, 2004). The density and the volume of the storage pile were used to estimate the amount of material being handled. The volume of material stockpiled and handled is presented in Table 2-8.

Table 2-8. Stockpile Volume

Activity	2013 (cy)	2014 (cy)	2015 (cy)	2016 (cy)	2017 (cy)
Aggregate Volume	5,243	5,243	1,095	3,284	821
Excavation Volume	304,500	-	-	133,700	-
Total	**309,743**	**5,243**	**1,095**	**136,984**	**821**
Aggregate Volume	-	-	1,095	3,284	821
Excavation Volume	355,600	-	-	92,100	-
Total	**355,600**	**0**	**1,095**	**95,384**	**821**

Stockpile wind erosion

Stockpile wind erosion emissions were estimated using the AP-42 emission factor (USEPA, 2006c) and the surface area exposed to wind. The emission factor was based on the fastest mile wind speed (miles/hour) and the number of disturbances to the storage pile. The fastest mile wind speed (miles/hour) and the average wind direction were obtained a 1985 wind rose at Sacramento Executive Airport weather station (Corps, 2009a; USBR, 2007). The station is approximately 22 miles southwest of the Folsom project site, and it is representative of wind speeds and directions at the project site. The wind speed threshold velocity (the minimum wind speed required to initiate particle motion) was assumed to be the threshold velocity for coal overburden from AP-42 Table 13.2.5-2 (USEPA, 2006c).

Material will be added to the stockpile every day during construction activities. Therefore the number of disturbances to the storage pile was assumed to be 312, which is the maximum number of days for stockpiling. Each stockpile is assumed to have an average depth of 10 meters. The total stockpile surface area in square meters (m^2) exposed to wind erosion is calculated from the stockpile volumes in Table 2-8, and is presented in Table 2-9.

Table 2-9. Wind Erosion Stockpile Surface Area

Activity	2013 (m^2)	2014 (m^2)	2015 (m^2)	2016 (m^2)	2017 (m^2)
Aggregate Volume	401	401	84	251	63
Excavation Volume	23,281	-	-	10,222	-

Total	**23,682**	**401**	**84**	**10,473**	**63**
Aggregate Volume	-	-	84	251	63
Excavation Volume	27,188	-	-	7,042	-
Totals	**27,188**	**0**	**84**	**7,293**	**63**

Blasting

Blasting emissions were estimated using the methodology in the Blue Rock Quarry Draft Environmental Impact Report (Sonoma County, 2005) based on a blasting emission factor and number of blasts per year. The calculation of the blasting emission factors depended on the blast area, blast depth and moisture content.

The blast information was provided by project engineers at the Corps. The blast area was estimated to be 1,550 m^2, the blast depth was estimated to be 20 feet, and the material moisture content was estimated to 2% for both alternatives (Wisniewski, 2012). The Corps estimated that the total number of blasts for Alternative 2 was 200 blasts, while the total number of blasts for Alternative 3 was 280 blasts.

Rock crushing facility

Rock crushing emissions were estimated using the AP-42 emission factors (USEPA, 2004) and the annual production of the one rock crushing facility. Information about the annual production of the rock crushing facility was provided by the project engineers (Corps, 2011c). It was estimated that 70,000 tons of rock would be processed at the facility annually for both alternatives.

Concrete batch plant

Concrete batch plant emissions were estimated using the AP-42 emission factors (USEPA, 2006c) and the amount of concrete processed at the one batch plant. The amount of concrete processed at the plant was provided by the Corps (Corps, 2011d; Wisniewski, 2012). The amount of concrete required for Alternative 2 was estimated to be 24,200 cy. The amount of concrete required for Alternative 3 was estimated to be 13,000 cy.

2.2.3 Greenhouse Emission Calculations

The three most common GHG pollutants are CO_2, CH_4, and N_2O. Emissions for individual GHG pollutants were estimated, and then converted to CO_2e using the GWP listed in Section 1.5.3.

On-site construction off-road equipment

The CO_2 and CH_4 emissions were estimated using the OFFROAD2011 model for construction years 2013-2017; similar to the method used to estimate exhaust criteria pollutant emissions. Emission factors for N_2O were not available in the model. These emissions are expected to be negligible and therefore were not estimated.

On-site construction marine equipment

The CO_2 emissions were estimated using the emission factors from the California Air Resources Board's Harbor Craft model (CARB, 2012f).

On-site pickup trucks

The CO_2, CH_4 and N_2O emissions were estimated using the EMFAC2007 model for light duty trucks in Sacramento County; similar to the method used to estimate exhaust criteria pollutant emissions. The CO_2 emissions were estimated using the EMFAC2011 model for light duty trucks in Sacramento County. This model does not provide emission factors for CH_4 and N_2O, so The Climate Registry (TCR) emissions factors were used for emission calculations (TCR, 2012).

On-site haul trucks

The CO_2, CH_4 and N_2O emissions were estimated using the EMFAC2007 model for heavy-heavy duty trucks in Sacramento County; similar to the method used to estimate exhaust criteria pollutant emissions. The CO_2 emissions were estimated using the EMFAC2011 model for heavy-heavy duty trucks in Sacramento County. This model does not provide emission factors for CH_4 and N_2O, so TCR emissions factors were used for emission calculations (TCR, 2012).

Off-site haul trucks

The CO_2, CH_4 and N_2O emissions were estimated using the EMFAC2007 model for heavy-heavy duty trucks in Sacramento County; similar to the method used to estimate exhaust criteria pollutant emissions. The CO_2 emissions were estimated using the EMFAC2011 model for heavy-heavy duty trucks in Sacramento County. This model does not provide emission factors for CH_4 and N_2O, so TCR emissions factors were used for emission calculations (TCR, 2012).

Off-site worker vehicle

The CO_2, CH_4 and N_2O emissions were estimated using the EMFAC2007 model for light duty automobiles and light duty trucks in in Sacramento County; similar to the method used to estimate exhaust criteria pollutant emissions. The CO_2 emissions were estimated using the EMFAC2011 model for light duty automobiles and light duty trucks in in Sacramento County. This model does not provide emission factors for CH_4 and N_2O, so TCR emissions factors were used for emission calculations (TCR, 2012).

Indirect greenhouse gas

According to the SMAQMD CEQA guidance, indirect GHG emissions should be estimated from utility providers associated with the project's electricity demands (SMAMQD, 2011). Electrification of the rock crushing facility and concrete batch plant is a mitigation measure (discussed in 4.0). However the methodology to estimate indirect GHG emissions is presented below.

Electricity for rock crushing facility

The rock crushing plant will be electric (Sandburg, 2012b), which would result in indirect GHG emissions. According to the life cycle analysis for a rock crusher (Landfield and Karra, 2000), the power consumption of the rock crusher, normalized to the functional unit of 1,000 short tons of crushed rock, was 650 kilowatt-hour (kWh). Based on these metric, the electricity usage emission factor was estimated to be 0.65 kWh per ton of crushed rock. The Sacramento Municipal Utility District (SMUD) CO_2 emission factor was found to be 0.268 tons of CO_2 per megawatt-hour (MWh) (SMUD, 2010).

Rock crushing facility GHG emissions were estimated using the electricity usage and CO_2 emission factors; the amount of rock processed annually was estimated to be 70,000 tons for both alternatives.

Electricity for concrete batch plant

The manufacture of concrete requires large amounts of energy; the electrification of this process results in substantial indirect GHG emissions. Studies have shown that CO_2 emissions generated by typical normal strength concrete mixes were found to range between 0.29 and 0.32 metric tons of CO_2 equivalent per cubic meter of concrete (Flowers and Sanjayan, 2007). In order to be conservative, this study assumed 0.32 metric tons (320 kilograms) of CO_2 would be created per cubic meter of concrete produced.

Concrete batch plant operations GHG emissions were estimated using the emissions from these studies (Flowers and Sanjayan, 2007) and the amount of concrete processed. The amount of concrete required for Alternative 2 was estimated to be 24,200 cy. The amount of concrete required for Alternative 3 was estimated to be 13,000 cy.

2.2.4 Air Dispersion Modeling

During typical construction projects the majority of particulate matter emissions (i.e., PM10 and PM2.5) are generated in the form of fugitive dust during ground disturbance activities. PM emissions are also generated in the form of equipment exhaust and reentrained road dust from vehicle travel on paved and unpaved surfaces.

The SMAQMD recommends that PM10 emissions be addressed as a localized pollutant. Thus, the SMAQMD considers PM10 emissions to be a significant impact at the project level if they would exceed the SMAQMD's concentration-based threshold of significance at an off-site receptor location. Because PM2.5 is a subset of PM10, the SMAQMD assumes that construction projects that do not generate concentrations of PM10 that exceed the District's concentration-based threshold of significance would also be considered less-than-significant for PM2.5 impacts (SMAQMD, 2011).

The SMAQMD recommends that lead agencies model the PM10 emission concentrations generated by construction activity for all projects except those that implement all Basic Construction Emission Control Practices, and where the maximum daily disturbed area would not exceed 15 acres (based on 25% of the total project area if the exact maximum daily disturbed area is not known at the time of the analysis).The total JFP Phase 4 Folsom Dam project area is approximately 56 acres; therefore the maximum daily disturbed area is 14 acres. Since the maximum daily disturbed area is less than the SMAQMD threshold, and the project will implement all Basic Construction Emission Control Practices (see Section 4.0), no modeling would be required.

3.0 IMPACTS ANALYSIS

Using the methodologies described in Section 2.2, the impacts of the proposed project were evaluated and are discussed in the following sections.

3.1 Construction Impacts

3.1.1 Exhaust Emissions

Emissions of criteria pollutants would occur during construction activities at the proposed site. These construction activities include off-road equipment, marine equipment, on-site pickup trucks, on-site haul trucks, off-site haul rucks, and off-site worker vehicles.

In cases where emission factors were only provided for PM10, a ratio is used to estimate emissions for PM2.5. Table 3-1 summarizes the unmitigated construction exhaust emissions by activity for Alternatives 2 and 3 in years 2013-2017 for NEPA purposes. Table 3-2 summarizes the unmitigated construction exhaust emissions by activity for Alternative 2 and Alternative 3 in years 2013-2017 for CEQA purposes.

Table 3-1. Unmitigated Total Construction Exhaust Emission Summary for NEPA

Activity	Pollutant (tons)					
	ROG	NO_x	CO	PM10	PM2.5 [1]	SO_2
Alternative 2						
On-site construction off-road	4	68	37	3	3	<1
On-site construction marine	4	36	15	1	1	<1
On-site pickup trucks	<1	<1	<1	<1	<1	<1
On-site haul trucks	1	3	1	<1	<1	<1
Off-site haul trucks	1	9	3	<1	<1	<1
Off-site worker vehicles	<1	<1	2	<1	<1	<1
TOTAL	**10**	**116**	**58**	**4**	**4**	**<1**
Alternative 3						
On-site construction off-road	4	53	29	2	2	<1
On-site construction marine	3	24	10	1	1	<1
On-site pickup trucks	<1	<1	<1	<1	<1	<1
On-site haul trucks	1	4	2	<1	<1	<1
Off-site haul trucks	1	9	3	<1	<1	<1

Activity	Pollutant (tons)					
	ROG	NO_x	CO	PM10	PM2.5 [1]	SO_2
Off-site worker vehicles	<1	<1	2	<1	<1	<1
TOTAL	**9**	**90**	**46**	**3**	**3**	**<1**

Notes:

1. The OFFROAD2011 model does not provide emission factors for PM2.5 from on-site construction off-road road equipment. Therefore emissions for PM2.5 were based on the CEIDARS 0.92 PM10/PM2.5 conversion ratio (SCAQMD, 2006).
2. EMFAC2007 was used to estimate on-road emission factors for NEPA purposes.
3. Emission rates might not add up due to rounding

Acronyms:

CO carbon monoxide
NO_x nitrogen oxide
PM10 particulate matter smaller than or equal to 10 microns in diameter
PM2.5 particulate matter smaller than or equal to 2.5 microns in diameter
ROG reactive organic gases
SO_2 sulfur dioxide

Table 3-2. Unmitigated Total Construction Exhaust Emission Summary for CEQA

Activity	Pollutant (lbs/yr)					
	ROG	NO_x	CO	PM10	PM2.5	SO_2
Alternative 2						
2013 Total	2,662	43,112	18,587	196,609	41,067	39
2014 Total	1,766	19,538	10,327	189,769	35,790	16
2015 Total	2,047	23,557	13,656	80,441	24,959	14
2016 Total	5,872	68,643	33,438	211,945	39,501	21
2017 Total	6,486	83,009	38,423	204,606	24,741	9
Total (lbs)	18,833	237,859	114,431	883,370	166,058	99
Daily Emissions (lbs/day)	12	152	73	566	106	<1
Alternative 3						
2013 Total	3,414	50,698	21,113	235,951	40,974	46
2014 Total	1,237	13,760	7,623	124,802	24,510	16
2015 Total	1,773	18,667	10,797	41,193	16,307	20

Activity	Pollutant (lbs/yr)					
	ROG	NO_x	CO	PM10	PM2.5	SO_2
2016 Total	1,229	13,765	7,666	202,583	32,272	12
2017 Total	8,000	98,793	46,223	206,790	25,741	108
Total (lbs)	15,653	195,683	93,422	811,319	139,804	202
Daily Emissions (lbs/day)	10	125	60	520	90	<1
Note: Total emissions (lbs) were divided by the total number of days in the construction period (1,560) to estimate the daily emissions (lbs/day).						

3.1.2 Fugitive Dust Emissions

Fugitive dust emissions would occur during construction activities at the proposed site. These construction activities include unpaved and paved entrained road dust, cut and fill, stockpiling, blasting of rock, rock crushing, and concrete batch plant operations.

In cases where emission factors were only provided for PM10, a ratio is used to estimate emissions for PM2.5. Table 3-3 summarizes the unmitigated construction exhaust emissions for both Alternative 2 and Alternative 3 in years 2013-2017 for NEPA and CEQA purposes.

Table 3-3. Unmitigated Construction Fugitive Dust Emission Summary for NEPA and CEQA

	Pollutant (tons)	
Activity	**PM10**	**PM2.5[1]**
Alternative 2		
Unpaved road entrained road dust	331	33
Paved road entrained road dust	23	3
Cut and fill	18	4
Stockpile handling	<1	<1
Stockpile wind erosion	2	<1
Blasting	8	2
Rock crushing	3	1
Concrete batch plant	53	35
TOTAL	**437**	**79**
Alternative 3		

Activity	Pollutant (tons) PM10	PM2.5[1]
Unpaved road entrained road dust	307	31
Paved road entrained road dust	23	3
Cut and fill	21	4
Stockpile handling	<1	<1
Stockpile wind erosion	2	<1
Blasting	11	3
Rock crushing	3	1
Concrete batch plant	35	24
TOTAL	**402**	**67**

Notes:

1. The methodology for cut and fill, blasting, rock crushing and the concrete batch plant does not provide emission factors for PM2.5. Therefore emissions for PM2.5 were based on the CIEDARS PM10/PM2.5 conversion ratio (SCAQMD, 2006). The PM10/PM2.5 conversion ratio for cut and fill is 0.208, for blasting is 0.3, for rock crushing is 0.3, and for the concrete batch plant is 0.674.
2. Emission rates might not add up due to rounding.

Acronyms:

PM10 particulate matter smaller than or equal to 10 microns in diameter
PM2.5 particulate matter smaller than or equal to 2.5 microns in diameter

3.1.3 Comparison to General Conformity *de minimis* thresholds

Table 3-4 summarizes total annual emissions for ROG, NO_x, CO, SO_2, PM10, and PM2.5 from all the activities described above.

In Table 3-4, Alternative 2 and 3 emissions are compared to both the General Conformity *de minimis* thresholds for determination of significance of impacts. Based on Table 3-4, Alternative 2 unmitigated NO_x emissions would exceed the *de minimis* thresholds in 2016-2017, and unmitigated PM10 emissions would exceed the *de minimis* thresholds in 2016-2017. In all years of the construction period, ROG, CO, and PM2.5 emissions would not exceed the *de minimis* thresholds. Based on Table 3-4, Alternative 3 unmitigated NO_x emissions would exceed the *de minimis* thresholds in 2017, and unmitigated PM10 emissions would exceed the *de minimis* thresholds in 2013 and 2016-2017. Mitigation measures and mitigated emissions compared to the *de minimis* levels are discussed in Section 4.0 below.

Table 3-4. JFP Folsom Dam Upstream: Unmitigated Criteria Pollutant Emission Summary for NEPA

	Pollutant (tons/yr)					
	ROG	NO_x	CO	PM10	PM2.5	SO_2
Alternative 2						
2013 Total	2	21	10	98	21	<1
2014 Total	1	9	5	95	18	<1
2015 Total	1	12	7	40	12	<1
2016 Total	3	34	17	106	20	<1
2017 Total	3	40	20	102	12	<1
General Conformity *de minimis* Levels	**25**	**25**	**100**	**100**	**100**	**N/A**
Alternative 3						
2013 Total	2	24	11	118	21	<1
2014 Total	1	7	4	62	12	<1
2015 Total	1	9	5	21	8	<1
2016 Total	1	6	4	101	16	<1
2017 Total	4	48	24	104	13	<1
General Conformity *de minimis* Levels	**25**	**25**	**100**	**100**	**100**	**N/A**

Notes:
1. For NEPA purposes, emission calculations are estimated using OFFROAD2011 and EMFAC2007 models.
2. Emissions rates might not add up due to rounding.

Acronyms:
CO carbon monoxide
NO_x nitrogen oxide
N/A not applicable
PM10 particulate matter smaller than or equal to 10 microns in diameter
PM2.5 particulate matter smaller than or equal to 2.5 microns in diameter
ROG reactive organic gases
SO_2 sulfur dioxide

3.1.4 Sacramento Metropolitan Air Quality Management NO_x Threshold

According to the SMAQMD CEQA guidance, construction-generated NO_x emissions shall be evaluated for significance under CEQA on a daily mass emission basis of 85 pounds per day because NO_x is an ozone precursor, which is a pollutant of regional concern (SMAQMD, 2011, SMAQMD 2012d). The unmitigated average daily NO_x emissions from the JFP Folsom Dam Upstream would be 152 pounds per day for Alternative 2, and 125 pounds per for Alternative 3. Both alternatives exceed the

SMAQMD NO_x CEQA threshold. Mitigation measures and mitigated emissions compared to the SMAQMD NO_x threshold are discussed in Section 4.0 below.

3.1.5 Sacramento Metropolitan Air Quality Management PM10 Threshold

As described above, because the project's maximum daily disturbed area is less than 15 acres, there is no applicable SMAQMD threshold for PM10 emissions and the PM10 CAAQS would not be applicable to the project. However, the project would be required to comply with SMAQMD's Basic Construction Emission Control Practices. Mitigation measures are discussed in Section 4.0 below.

Greenhouse Gas Emissions

GHG emissions would be emitted from the project due to fuel combustion, as well as indirect emissions from the electricity used to operate the rock crusher and concrete batch plant. GHG emissions generated from construction of the project would be short-term. However, because the time that CO_2 remains in the atmosphere cannot be definitively quantified due to the wide range of time scales in which carbon reservoirs exchange CO_2 with the atmosphere, there is no single value for the half-life of CO_2 in the atmosphere (IPCC, 1997). Therefore, the duration that CO_2 emissions from a short-term project would remain in the atmosphere is unknown.

The SMAQMD currently does not have any significance thresholds for GHG emissions, though they recommend that GHG emissions consider the AB 32's GHG reduction goals. Table 3-5 summarizes Alternative 2 and 3 total annual emissions for GHGs from all the activities described above. Mitigation measures are discussed in Section 4.0 below.

Table 3-5. Unmitigated GHG Emission Summary for CEQA and NEPA

Year	CO_2e (metric tons/year)
Alternative 2	
2013 Total	5,507
2014 Total	4,006
2015 Total	4,261
2016 Total	6,350
2017 Total	5,118
Alternative 3	
2013 Total	3,078
2014 Total	2,760
2015 Total	2,905
2016 Total	2,755
2017 Total	6,082

3.2 Offensive Odors

The JFP Folsom Dam Upstream project is not expected to have any short- or long-term impacts associated with offensive odors. The SMAQMD recommends that significance determinations be made on a case-by-case basis and consider parameters such as the Recommended Odor Screening Distances, or odor complaint history. SMAQMD's odor screening distances have been developed for stationary odor sources. SMAQMD has not developed any specific odor screening distances for construction activities. However, because ultra-low sulfur diesel fuel is now required in California, the potential for diesel-related odor effects from construction equipment and trucks is minimal. These odors would be temporary in nature and would not cause an odor nuisance.

3.3 Toxic Air Contaminants

3.3.1 Diesel Particulate Matter

DPM would be emitted from on-site off-road heavy construction equipment, on-site pickup trucks, on-site haul trucks and off-site haul trucks. DPM is considered a carcinogen and the project would expose nearby receptors to these emissions during the construction period.

SMAQMD has not established a quantitative threshold of significance for construction-related TAC emissions, but direct project applicants to consider project proximity to off-site receptors. Sensitive receptors such as residences and a nearby church, the Folsom Point Church of Christ, are located within 1,000 feet of the construction area. Therefore these sensitive receptors could be potentially exposed to the DPM cancer risk from the project.

However, health risks associated with exposure to carcinogenic substances are typically measured over 70 years of exposure. Since the proposed project is a short-term construction project lasting only five years, the potential human exposure to DPM from this alternative would be short-term. In addition, all off-site receptors are located near the staging areas, where the only construction activities would involve the on-site pickup trucks and on-site haul trucks. In the worst-case scenario, they will be exposed to daily DPM mass emissions (using PM10 emissions as a substitute for DPM emissions) of 2 pounds per hour for Alternative 2, and 3 pounds per hour for Alternative 3. The nearby sensitive receptors could potentially be impacted by DPM emissions.

Proposed mitigation measures for MY 2010 haul trucks would reduce the daily DPM mass emissions to <1 pounds per hour for Alternative 2, and 1 pound per hour for Alternative 3 (see 4.0). Therefore, these sensitive receptors would be exposed to a limited and less than significant DPM cancer risk from the project.

3.3.2 Naturally Occurring Asbestos

The Folsom Dam area has been identified as an area where the local geology supports the formation of NOA, within ultramafic rock specifically. According to the SMAQMD CEQA guidance, a site investigation should be performed to determine whether and where NOA is present in the soil and rock on the project site and areas that would be disturbed by the project (SMAQMD 2011). A previous investigation of the project area's geology, including soil testing efforts, indicated that the project area overlies granitic rock except for the MIAD area, which overlies metamorphic rock (ultramafic rocks) (USBR 2009). The granitic material would not be expected to contain any NOA materials (LeFevre, 2012). Although no NOA has been discovered in the MIAD area (Corps, 2010; LeFevre, 2012.), ultramafic rock near this area could include NOA and pose a risk to construction workers or sensitive receptors. However, the JFP Folsom Upstream Project's implementation of mitigation measures to reduce PM10 emissions and comply with CARB's Section 93105, Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining (Asbestos ATCM) (CARB 2001), as discussed in Section 4.0 below, would reduce the potential for workers or sensitive receptors to be exposed to airborne NOA. These impacts would be expected to be less than significant with mitigation.

4.0 MITIGATION MEASURES

Unmitigated NO_x and PM10 emissions from the construction of the JFP Folsom Dam, Upstream project would exceed applicable CEQA and NEPA significance criteria. Therefore, the Corps will implement the following mitigation measures to reduce the potential air quality effects of the project.

4.1 Mitigation Measure AQ-1: Basic Construction Emissions Control Practices

The SMAQMD requires construction projects to implement basic construction emission control practices to control fugitive dust and diesel exhaust emissions (SMAQMD, 2011). These measures are required by the SMAQMD, and therefore would not be considered mitigation measures. The Corps would comply with the following control measures for the JFP Folsom Dam, Upstream project:[2]:

1) Water all exposed surfaces twice daily. Exposed surfaces include but are not limited to: soil piles, graded areas, unpaved parking areas, staging areas, and access roads.

2) Cover or maintain at least two feet of free board space on haul trucks transporting soil, sand, or other loose material on the site. Any haul trucks that would travel along freeways or major roadways should be covered.

3) Use wet power vacuum street sweepers to remove any visible trackout mud or dirt from adjacent public roads at least once a day. Use of dry power sweeping is prohibited.

4) Limit vehicle speeds on unpaved roads to 15 miles per hour (mph).

5) All roadways, driveways, sidewalks, or parking lots to be paved should be completed as soon as possible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.

6) Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes [required by California Code of Regulations, Title 13, sections 2449(d)(3) and 2485]. Provide clear signage that posts this requirement for workers at the site entrances.

7) Maintain all construction equipment in proper working condition according to the manufacturer's specifications. The equipment must be checked by a certified mechanic and determined to be running in proper condition before it is operated.

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[2] The project would not require dispersion modeling because of compliance with these control measure and limiting the maximum daily disturbed area to 14 acres, which is less than the SMAQMD 15-acre threshold.

4.2 Mitigation Measure AQ-2: Construction Area Particulate Matter Mitigation Measures

If the project's construction contractor determines that the construction activities would actively disturb more than 15 acres per day, then the contractor would be required to conduct PM10 and PM2.5 dust modeling. If that modeling shows violations of SMAQMD's PM10 substantial CAAQS significance thresholds or the PM2.5 CAAQS thresholds, then the contractor would be required to implement sufficient mitigation to eliminate any significant PM10 or PM2.5 impacts.

4.3 Mitigation Measure AQ-3: Fugitive Dust Emission Mitigation Measures

Fugitive dust mitigation will require the use of adequate measures during each construction activity and will include frequent water applications or application of soil additives, control of vehicle access, and vehicle speed restrictions. Mitigated emissions are presented in Table 4-3.

4.3.1 Asbestos Measures

A geologist will monitor the project area for the presence of NOA during all construction activities. If found, the Corps will comply with the CARB's Section 93105, 2002-07-09 Asbestos ATCM for Construction, Grading, Quarrying, and Surface Mining Operations (CARB, 2008). In addition, the Corps will implement the fugitive dust mitigation measures below, which are similar to those required under an Asbestos Dust Control Plan.

4.3.2 Unpaved roads

To mitigate fugitive dust emissions from on-site traffic on unpaved roads, the Corps would implement the following measures:

1. Limit vehicle speeds on unpaved roads to 10 miles per hour, and
2. Water at least every two hours of active construction activities or sufficiently often to keep the area adequately wetted.
3. Remove any visible track-out from a paved public road at any location where vehicles exit the work site; this removal effort shall be accomplished using wet sweeping or a HEPA filter- equipped vacuum device daily.
4. Install one or more of the following track-out prevention measures:
    a. A gravel pad designed using good engineering practices to clean the tires of exiting vehicles,
    b. A tire shaker,
    c. A wheel wash system,

d. Pavement extending for not less than 50 feet from the intersection with the paved public road, or

e. Any other measure(s) as effective as the measures listed above.

Speed limit controls would contribute to 44% emission control efficiency (Western Governors Association, 2004), while watering controls would contribute to 55% emission control efficiency (SCAQMD, 2007)

4.3.3 **Cut and fill**

To mitigate fugitive dust emission from cut and fill activities, the Corps would implement the following measures:

1. Pre-wet the ground to the depth of anticipated cuts, and

2. Suspend any excavation operations when wind speeds are high enough to result in dust emissions across the property line, despite the application of dust mitigation measures.

Watering activities would contribute to 55% emission control efficiency (SCAQMD 2007).

4.3.4 **Stockpile handling and stockpile wind erosion**

To mitigate stockpile handling and stockpile wind erosion fugitive dust emissions, the Corps would keep the active storage pile adequately wetted using wet suppression controls. Wet suppression controls would contribute to 90% emissions control efficiency (Fitz, 2000).

To mitigate fugitive dust emissions from storage piles that would remain inactive for more than seven days, the Corps would implement one or more of the following measures:

1. Wet suppression controls,

2. Establishment and maintenance of surface crusting sufficient to satisfy the surface crusting test identified in the Asbestos ATCM,

3. Apply chemical dust suppressants or chemical stabilizers,

4. Cover with tarp(s) or vegetative cover,

5. Install wind barriers across open areas,

6. Install wind barriers of 50 percent porosity around three sides of the storage pile, and/or

7. Any other measure(s) as effective as the measures listed above.

4.3.5 **Blasting**

To mitigate fugitive dust emissions from in-dry blasting operations, the Corps would apply water every 4 hours within 100 feet of the demolition area. Watering controls would contribute to 36% control efficiency (Western Governors Association, 2004).

4.3.6 **Rock crushing facility**

To mitigate fugitive dust emissions from the rock crushing facility, the Corps would implement wet suppression controls. Wet suppression controls would contribute to 94% control efficiency (USEPA, 2004)

4.3.7 **Concrete batch plant**

To mitigate fugitive dust emissions from the concrete batch plant operations, the Corps would implement one or more of the following measures:

1. Applying water sprays,
2. Setting up enclosures, hoods, curtains, shrouds, movable and telescoping chutes, and/or
3. Installing a central dust collection system.

These measures would contribute to 94% to 99.9% control efficiency (USEPA, 2006d).

4.3.8 **Post-Construction**

To mitigate staging area or haul road emissions, the Corps would, upon completion of the project, accomplish post-construction stabilization of disturbed surfaces using one or more of the following measures:

1. Establishing a vegetative cover,
2. Placing at least 12 inches of non-asbestos-containing material,
3. Paving, and/or
4. Implementing any other measure deemed sufficient to prevent wind speeds of 10 miles per hour or greater from causing visible dust emissions.

4.4 **Mitigation Measure AQ-4: Exhaust Emission Mitigation Measures**

Four categories of mitigation measures are recommended to reduce the total project NO_x and PM10 emissions as discussed in a report presented to the Corps (URS 2011). These mitigation measures were accepted by the Corps (Sandburg, 2012b) and are presented below. Mitigated emissions are presented in Table 4-1 and Table 4-2.

4.4.1 Cleaner Off-Road Equipment

The project will incorporate the Los Angeles County Metropolitan Transportation Authority (LACMTA) Green Construction Policy (LACMTA 2011) requirements for the on-site construction off-road equipment.

The Corps would use Tier 3 off-road equipment for the first two years of construction (2013-2014), and use interim Tier 4 off-road equipment beginning in 2015. This mitigation measure is expected to create a 59% reduction in NO_x emissions, a 62% reduction in ROG emissions, and a 71% reduction in PM10 emissions for Alternative 2. This mitigation measure is expected to create a 62% reduction in NO_x emissions, a 61% reduction in ROG emissions, and a 75% reduction in PM10 emissions for Alternative 3 (see Table 4-1 and Table 4-2).

Mitigated emissions for off-road equipment was estimated using the OFFROAD2011 model, and specifying the model years where Tier 3 or interim Tier 4 engine standards would be met. The model years in which engine standards would be met was obtained from the CARB (CARB 2012h).

4.4.2 Marine Engine Standards

The USEPA adopted Tier 3 and Tier 4 standards for newly-built marine engines in 2008. The Tier 3 standards reflect the application of technologies to reduce engine PM and NO_x emission rates. Tier 4 standards reflect application of high-efficiency catalytic after-treatment technology enabled by the availability of ultra-low sulfur diesel (ULSD). These Tier 4 standards would be phased in over time for marine engines beginning in 2014 (USEPA, 2008).

The Corps would use Tier 2 and 3 marine engines standards to reduce marine exhaust emissions. Due to uncertainty as to the availability of Tier 4 marine engines within the required project timeline, mitigation measures did not include use of Tier 4 marine engines. However, should they become available during the appropriate construction periods, use of these engines would further lower project emissions.

This mitigation measure would result in a 56% reduction in NO_x emissions, a 65% reduction in ROG emissions and a 65% reduction in PM10 emissions for Alternative 2. This mitigation measure would result in a 56% reduction in NO_x emissions, a 66% reduction in ROG emissions and a 69% reduction in PM10 emissions for Alternative 3. (see Table 4-1 and Table 4-2).

Mitigated emissions for marine equipment were estimated using the CARB and USEPA marine engine standards and multiplying the standards by the load factors used to estimate the unmitigated emissions.

4.4.3 Haul truck controls

The USEPA adopted emissions standards for MY 2007 and later heavy-duty highway engine, such as haul trucks, in January 2001 (USEPA, 2001). These emission standards were expected to be phased in between 2007 and 2010, with few engines meeting the NO_x requirements until 2010.

Since haul truck NO_x emissions account for approximately 7% of the total construction NO_x emissions, the Corps would implement the use of MY 2010 or newer haul trucks beginning in 2013. This measure would ensure the maximum reduction in NO_x emissions, since these engines are required to meet the USEPA NO_x standards. This mitigation measure would reduce haul truck NO_x emissions by 92%, ROG emissions by 63%, and PM10 emissions by 91% for Alternative 2. This mitigation measure would reduce haul truck NO_x emissions by 99%, ROG emissions by 97%, and PM10 emissions by 99% for Alternative 3 (see Table 4-1 and Table 4-2).

Mitigated emissions for haul trucks were estimated using the EMFAC2007/EMFAC2011 model, employing the same methodology that was described in Section 2.2.1.

4.4.4 Use of Electrical Equipment

Construction equipment powered by electricity, rather than fuel, does not contribute to diesel exhaust emissions. Electrification would result in a small amount of indirect CO_2 emissions due to the operation of the electric grid. Various types of construction equipment may feasibly be run on electricity.

The Corps would electrify the concrete batch plant and the rock crushing facility. This mitigation measure would reduce NO_x emissions, ROG emissions and PM10 emissions from the concrete batch plant and the rock crushing plant by 100% (see Table 4-1 and Table 4-2). These measures would increase indirect GHG emissions, but this increase would be offset by the decrease in GHG emissions from fuel-based operations.

4.4.5 Contractor Requirements

The Corps has committed to ensure that air pollution specifications are incorporated into all construction contracts. Those specifications would require that contractors limit annual emissions to levels that do not exceed the annual estimates shown in Table 4-4 below.

4.5 Mitigation Measure AQ-5: NO_x Mitigation Fee

The Corps will provide payment of the appropriate SMAQMD-required NO_x mitigation fee to offset the project's NO_x emissions when they exceed SMAQMD's threshold of 85 lbs/day.

4.6 Mitigation Measure AQ-6: GHG Emission Reduction Measures

The SMAQMD recommends the following mitigation measures for reducing GHG emissions from construction projects. The use of electric equipment is already listed above and will reduce direct GHG emissions from fuel-based equipment. The Corps will implement the following mitigation measures wherever possible.

1) Improve fuel efficiency from construction equipment:

    a. Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to no more than 3 minutes (5 minute limit is required by the state airborne toxics control measure [Title 13, sections 2449(d)(3) and 2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site.

    b. Maintain all construction equipment in proper working condition according to manufacturer's specifications. The equipment must be checked by a certified mechanic and determined to be running in proper condition before it is operated.

    c. Train equipment operators in proper use of equipment.

    d. Use the proper size of equipment for the job.

    e. Use equipment with new technologies (repowered engines, electric drive trains).

2) Perform on-site material hauling with trucks equipped with on-road engines (if determined to be less emissive than the off-road engines).

3) Use an ARB approved low carbon fuel for construction equipment. (NOx emissions from the use of low carbon fuel must be reviewed and increases mitigated.)

4) Encourage and provide carpools, shuttle vans, transit passes and/or secure bicycle parking for construction worker commutes.

5) Recycle or salvage non-hazardous construction and demolition debris (goal of at least 75% by weight).

6) Use locally sourced or recycled materials for construction materials (goal of at least 20% based on costs for building materials, and based on volume for roadway, parking lot, sidewalk and curb materials). Wood products utilized should be certified through a sustainable forestry program.

7) Produce concrete on-site if determined to be less emissive than transporting ready mix.

8) Use SmartWay certified trucks for deliveries and equipment transport.

9) Develop a plan to efficiently use water for adequate dust control.

4.7 Mitigated Construction Impacts

The estimated mitigated criteria pollutant emission summary is presented in Table 4-1. The estimated mitigated fugitive dust emissions are presented in Table 4-3 and are based on implementation of Mitigation Measures AQ-1, AQ-2, AQ-3, and AQ-4 above. Off-site employee vehicles criteria pollutant emissions could not feasibly be controlled by quantifiable mitigation measures.

Table 4-1. Mitigated Total Construction Exhaust Emission Summary for NEPA

	Pollutant (tons)					
Activity	**ROG**	**NO_x**	**CO**	**PM10**	**PM2.5 [1]**	**SO_2**
Alternative 2						
On-site construction off-road	2	28	16	1	1	<1
On-site construction marine	1	16	15	1	1	<1
On-site pickup trucks	<1	<1	<1	<1	<1	<1
On-site haul trucks	<1	1	<1	<1	<1	<1
Off-site haul trucks	<1	2	1	<1	<1	<1
Off-site worker vehicles	<1	<1	2	<1	<1	<1
TOTAL	**3**	**47**	**34**	**2**	**2**	**<1**
Alternative 3						
On-site construction off-road	1	20	13	1	1	<1
On-site construction marine	1	11	10	<1	<1	<1
On-site pickup trucks	<1	<1	<1	<1	<1	<1
On-site haul trucks	<1	1	1	<1	<1	<1
Off-site haul trucks	1	8	4	1	<1	<1
Off-site worker vehicles	<1	<1	2	<1	<1	<1
TOTAL	**3**	**40**	**30**	**2**	**1**	**<1**

Notes:

1. The OFFROAD2011 model does not provide emission factors for PM2.5 from on-site construction off-road road equipment. Therefore emissions for PM2.5 were based on the CEIDARS 0.92 PM10/PM2.5 conversion ratio (SCAQMD 2006).
2. EMFAC2007 was used to estimate on-road emission factors for NEPA purposes.
3. Emission rates might not add up due to rounding

Acronyms:

CO carbon monoxide
NO_x nitrogen oxide
PM10 particulate matter smaller than or equal to 10 microns in diameter
PM2.5 particulate matter smaller than or equal to 2.5 microns in diameter
ROG reactive organic gases
SO_2 sulfur dioxide

Table 4-2. Mitigated Total Emission Summary for CEQA

Activity	Pollutant (lbs/yr)					
	ROG	**NO_x**	**CO**	**PM10**	**PM2.5**	**SO_2**
Alternative 2						
2013 Total	1,118	14,690	7,350	57,365	9,087	39
2014 Total	821	9,005	6,569	34,399	4,605	16
2015 Total	898	9,962	8,868	13,617	2,441	14
2016 Total	2,318	28,850	22,180	38,612	5,301	21
2017 Total	2,648	30,439	24,785	56,448	7,542	9
Total (lbs)	7,803	92,946	69,752	200,441	28,977	99
Daily Emissions (lbs/day)	5	60	45	128	19	<1
Alternative 3						
2013 Total	2,949	17,261	10,251	67,740	10,353	46
2014 Total	1,196	5,281	5,208	24,071	3,527	16
2015 Total	1,768	6,801	7,404	8,230	1,910	20
2016 Total	1,251	4,273	4,775	38,784	4,913	12
2017 Total	8,101	37,804	31,327	57,674	8,024	108
Total (lbs)	15,266	71,420	58,964	196,499	28,727	202

Activity	Pollutant (lbs/yr)					
	ROG	NO_x	CO	PM10	PM2.5	SO_2
Daily Emissions (lbs/day)	10	46	38	126	18	<1

Notes:

1. The OFFROAD2011 model does not provide emission factors for PM2.5 from on-site construction off-road road equipment. Therefore emissions for PM2.5 were based on the CEIDARS 0.92 PM10/PM2.5 conversion ratio (SCAQMD 2006).
2. EMFAC2011 was used to estimate on-road emission factors for CEQA purposes.
3. Emission rates might not add up due to rounding

Acronyms:

CO carbon monoxide
NO_x nitrogen oxide
PM10 particulate matter smaller than or equal to 10 microns in diameter
PM2.5 particulate matter smaller than or equal to 2.5 microns in diameter
ROG reactive organic gases
SO_2 sulfur dioxide

Table 4-3. Mitigated Total Construction Fugitive Dust Emission Summary for CEQA and NEPA

	Pollutant (tons)	
Activity	PM10	PM2.5[1]
Alternative 2		
Unpaved road entrained road dust	63	6
Paved road entrained road dust	21	3
Cut and fill	8	2
Stockpile handling	<1	<1
Stockpile wind erosion	<1	<1
Blasting	5	<1
Rock crushing	<1	<1
Concrete batch plant	1	1
TOTAL	**99**	**12**
Alternative 3		
Unpaved road entrained road dust	58	6
Paved road entrained road dust	21	3
Cut and fill	9	2

Stockpile handling	<1	<1
Stockpile wind erosion	<1	<1
Blasting	7	2
Rock crushing	<1	<1
Concrete batch plant	1	<1
TOTAL	**97**	**14**

Notes:
1. The methodology for cut and fill, blasting, rock crushing and the concrete batch plant does not provide emission factors for PM2.5. Therefore emissions for PM2.5 were based on the CIEDARS PM10/PM2.5 conversion ratio (SCAQMD 2006). The PM10/PM2.5 conversion ratio for cut and fill is 0.208, for blasting is 0.3, for rock crushing is 0.3, and for the concrete batch plant is 0.674.
2. Emission rates might not add up due to rounding.

Acronyms:
PM10 particulate matter smaller than or equal to 10 microns in diameter
PM2.5 particulate matter smaller than or equal to 2.5 microns in diameter

4.7.1 Comparison to General Conformity *de minimis* thresholds

Table 4-4 summarizes total annual Upstream Project emissions for ROG, NO_x, CO, SO_2, PM10, and PM2.5 from Mitigation Measures AQ-1, AQ-2, AQ-3, and AQ-4 described above.

Mitigated emissions in Table 4-4 are compared to both the General Conformity *de minimis* thresholds for determination of significance of impacts. Based on Table 4-4, with proposed mitigation, NO_x emissions would be below the *de minimis* thresholds in all years for Alternative 2, and NO_x emissions would be below the *de minimis* thresholds in all years for Alternative 3. All other mitigated criteria pollutant emissions would also be below the *de minimis* thresholds.

Table 4-4. JFP Folsom Dam Upstream: Mitigated Criteria Pollutant Emission Summary for NEPA

	Pollutant (tons/yr)					
Activity	**ROG**	**NO_x**	**CO**	**PM10**	**PM2.5**	**SO_2**
Alternative 2						
2013 Total	1	7	4	29	5	1
2014 Total	<1	4	3	17	2	<1
2015 Total	<1	5	4	7	1	<1
2016 Total	1	14	11	19	2	1
2017 Total	1	15	12	28	3	1
General Conformity *de minimis* Levels	**25**	**25**	**100**	**100**	**100**	**N/A**
Alternative 3						

2013 Total	1	9	5	34	5	1
2014 Total	<1	4	3	12	2	<1
2015 Total	1	5	4	4	1	1
2016 Total	<1	4	3	20	3	<1
2017 Total	2	20	16	29	4	2
General Conformity *de minimis* Levels	**25**	**25**	**100**	**100**	**100**	**N/A**

Notes:

1. For NEPA purposes, emission calculations are estimated using OFFROAD2011 and EMFAC2007 models.
2. Emissions rates might not add up due to rounding.

Acronyms:

CO carbon monoxide
NO_x nitrogen oxide
N/A not applicable
PM10 particulate matter smaller than or equal to 10 microns in diameter
PM2.5 particulate matter smaller than or equal to 2.5 microns in diameter
ROG reactive organic gases
SO_2 sulfur dioxide

4.7.2 Sacramento Metropolitan Air Quality Management NO_x Threshold

As discussed above, NO_x emissions that exceed 85 pounds per day after incorporation of mitigation measures would be subject to a mitigation implementation fee used to control other emission sources in the proposed action region. Implementation of mitigation measures in Section 4.2 above would reduce NO_x emissions from the project but maximum daily emissions could potentially exceed the SMAQMD threshold. The maximum NO_x emissions for Alternative 2 (92 lbs/day in 2016 and 98 lbs/day in 2017) and Alternative 3 (121 lbs/day) could exceed the 85 lbs/day threshold. Therefore NO_x mitigation fees (Mitigation Measure AQ-5) could apply to the project. However, it is difficult to determine the worst-case daily NO_x emissions due to potential changes in equipment type, timing, and use. Project contractors and the Corps will need to maintain accurate equipment use records to determine the level of mitigation fees that must be paid to SMAQMD to mitigate the project.

4.7.3 Sacramento Metropolitan Air Quality Management PM10 Threshold

There is no applicable SMAQMD threshold for PM10 emissions for the project. However, the SMAQMD requires construction projects to implement basic construction emission control practices to control fugitive dust and diesel exhaust emissions (SMAQMD, 2011). The project would implement Mitigation Measures AQ-1, AQ-2, AQ-3, and AQ-4 described above.

4.7.4 **Greenhouse Gas Emissions**

The SMAQMD currently does not have any significance thresholds for GHG emissions, though they recommend that GHG emissions consider the AB 32's GHG reduction goals. The project would implement Mitigation Measure AQ-6 described above to reduce GHG emissions. This mitigation measure would increase the energy efficiency of the construction project, which is in line with the AB 32's requirement that GHG emissions in 2020 be no greater than 1990 emissions.

The JFP Folsom Dam Upstream project is not designed to reduce future carbon emissions, for instance, by incorporating hydropower facilities. The spillway approach channel is required for seismic and flood safety, rather than for carbon reduction strategies. However, by providing increased seismic safety and decreased risk of catastrophic flooding with associated loss of infrastructure, this project is expected to prevent the extra production of carbon which would be associated with demolition, repair, and reconstruction of flood-induced infrastructure losses.

5.0 CUMULATIVE IMPACTS

This section presents the cumulative analysis of implementing the JFP at Folsom Dam Upstream project in combination with other past, present, and reasonably foreseeable future projects that may result in environmental impacts

5.1 JFP Folsom Dam, Downstream and Upstream Projects

The JFP at Folsom Dam, Upstream project construction period (2013-2017) would overlap for multiple construction months with the JFP at Folsom Dam, Downstream project (2010-2017). The USEPA had directed the Corps to complete a quantitative cumulative analysis for the JFP Folsom Dam Upstream and Downstream projects, and compare these emissions to the General Conformity *de minimis* thresholds (Sandburg, 2012b).

5.1.1 Methodology

The unmitigated and mitigated emission estimates for construction activities at the JFP at Folsom Dam, Upstream project were estimated in Sections 3.0 and 4.0, respectively. Emission estimates for construction activities at the JFP at Folsom Dam, Downstream project are estimated as described below.

<u>Exhaust Criteria Pollutant Emission Calculations</u>

The on-site construction off-road equipment emission rates were estimated using the OFFROAD2011 model using equipment and activity data for construction equipment provided by the project's engineers (Corps, 2011a). The on-site construction marine equipment were estimated using the emission factors from the California Air Resources Board's Harbor Craft model (CARB, 2012f) and activity data for construction equipment was provided by the project's engineers (Corps, 2011a).

On-site pickup truck exhaust emissions were estimated using OFFROAD2011 and truck trip information from the Final Supplemental Environmental Assessment/Environmental Impact Report Folsom Dam Safety and Flood Damage Reduction Control Structure, Chute, and Stilling Basin Work [known henceforth as Final Supplemental EA/EIR] (Corps, 2010).[3]

On-site and off-site haul truck exhaust emissions were estimated using the EMFAC 2007/EMFAC 2011 models for heavy-heavy duty diesel trucks in Sacramento County. The truck speeds and trip information was obtained from the Final Supplemental EA/EIR (Corps, 2010).

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[3] Exhaust emissions for on-site pickup trucks for the JFP at Folsom Dam, Downstream project were estimated using EMFAC2007/EMFAC2011 because of the SMAQMD recommended GHG mitigation measure (Section 4.5). However, this mitigation measure was not in place for the Final Supplemental Environmental Assessment/Environmental Impact Report Folsom Dam Safety and Flood Damage Reduction Control Structure, Chute, and Stilling Basin Work; therefore the on-site pickup truck exhaust emissions for the JFP at Folsom Dam, Downstream project should be estimated with OFFROAD2011.

Off-site worker vehicle exhaust emissions were estimated using the EMFAC2007/EMFAC2011 models for light duty automobiles and light duty trucks in Sacramento County. The vehicle trip information was obtained from the Final Supplemental EA/EIR (Corps, 2010).

Fugitive Dust Emission Calculations

Unpaved road dust generated by on-site trucks was estimated using the AP-42 emission factors (USEPA, 2006a) and trip information from the Final Supplemental EA/EIR (Corps, 2010).

Paved road entrained road dust for off-site truck and worker vehicles was estimated using the AP-42 emission factor (USEPA, 2011a) and trip information from the Final Supplemental EA/EIR (Corps, 2010).

Cut and fill fugitive dust emissions were estimated using the URBEMIS2007 model emission factors and daily volume disturbed from the Final Supplemental EA/EIR (Corps, 2010).

Stockpile handling fugitive dust emissions were estimated using AP-42 emission factors (USEPA, 2006b) and the amount of material handled from the Final Supplemental EA/EIR (Corps, 2010). Stockpile wind erosion fugitive dust emissions were estimated using the AP-42 emission factor (USEPA, 2006c) and area exposed to wind from the Final Supplemental EA/EIR (Corps, 2010).

On-site blasting fugitive dust emissions were estimated using emission factors and blasting data from the Final Supplemental EA/EIR (Corps, 2010). There will no rock crushing facility, but there will be one concrete batch plant for the JFP at Folsom Dam, Downstream project. Concrete batch plant fugitive dust emissions were estimated using the AP-42 emission factors (USEPA, 2006c) and the amount of concrete processed from the Final Supplemental EA/EIR (Corps, 2010).

Greenhouse Emission Calculations

The on-site construction off-road equipment GHG emission rates were estimated using the OFFROAD2011 model and equipment and activity data for construction equipment was provided by the project's engineers (Corps, 2011a). The on-site construction marine equipment emissions were estimated using the emission factors from the USEPA guidance (USEPA, 2000). Activity data for construction equipment was provided by the project's engineers (Corps, 2011a).

On-site pickup truck GHG emissions were estimated using OFFROAD2011 and truck trip information from the Final Supplemental EA/EIR (Corps, 2010). On-site and off-site haul truck GHG emissions were estimated using the EMFAC 2007/EMFAC 2011 models for heavy-heavy duty diesel trucks using in Sacramento County. The truck speeds and trip information was obtained from the Final Supplemental EA/EIR (Corps, 2010).

Off-site worker vehicle GHG emissions were estimated using the EMFAC2007/EMFAC2011 models for light duty automobiles and light duty trucks in Sacramento County. The vehicle trip information was obtained from the Final Supplemental EA/EIR (Corps, 2010).

The electricity indirect GHG emissions from the concrete batch plant were estimated using the Flower and Sanjayan methodology (Flowers and Sanjayan, 2007) and the amount of concrete produced from the Final Supplemental EA/EIR (Corps, 2010).

Mitigation Measures

Mitigation measures for exhaust emissions at the JFP at Folsom Dam, Downstream project were based on SMAQMD guidance for on-site off-road construction and on-site haul trucks (> 50 horsepower), including owned, leased, and subcontractor vehicles. This mitigation measure would achieve a project wide fleet-average 20 percent reduction in NO_x exhaust emissions and 45 percent reduction in PM10/PM2.5 exhaust emissions (Corps, 2010).

Watering controls for cut and fill activities would reduce PM10/PM2.5 fugitive dust emissions by 55%, while watering controls for unpaved road entrained dust would reduce PM10/PM2.5 fugitive dust emissions by 44% (Corps, 2010).

Watering controls for the stockpile handling would reduce PM10/PM2.5 fugitive dust emissions by 90%, and watering controls for the concrete batch plant would reduce PM10/PM2.5 fugitive dust emissions by 90% due to watering controls. Watering controls for on-site blasting would reduce PM10/PM2.5 fugitive dust emissions by 36% (Corps, 2010).

5.1.2 Comparison to General Conformity *de minimis* thresholds

Table 5-1 summarizes total annual unmitigated emissions for ROG, NO_x, CO, SO_2, PM10, and PM2.5 for the JFP at Folsom Dam, Upstream and Downstream projects.

Emissions in Table 5-1 are compared to both the General Conformity *de minimis* thresholds for determination of significance of impacts. Based on Table 5-1, unmitigated NO_x and PM10 emissions would exceed their respective *de minimis* thresholds in all overlapping years (2013-2017) for Alternative 2. Based on Table 5-1, unmitigated NO_x and PM10 emissions would exceed their respective *de minimis* thresholds in all overlapping years (2013-2017) for Alternative 3, except for NOx in 2016. ROG, PM2.5, and CO unmitigated emissions would be below their respective *de minimis* thresholds in all overlapping years (2013-2017) for both alternatives.

Table 5-1. JFP Folsom Dam Upstream and Downstream: Unmitigated Criteria Pollutant Emission Summary for NEPA

	Pollutant (tons/yr)						
Activity	**ROG**	**NO_x**	**CO**	**PM10**	**PM2.5**	**SO_2**	**CO_2**
Alternative 2							
2013 Total	3	39	18	107	26	<1	10,434
2014 Total	3	33	17	189	77	<1	27,587
2015 Total	2	29	16	134	72	<1	26,869
2016 Total	4	49	25	192	74	<1	27,213
2017 Total	4	52	26	103	13	<1	7,388
General Conformity *de minimis* Levels	**25**	**25**	**100**	**100**	**100**	**N/A**	**N/A**
Alternative 3							
2013 Total	3	42	19	127	26	<1	7,762
2014 Total	3	30	15	157	73	<1	26,220
2015 Total	2	27	15	115	67	<1	25,373
2016 Total	2	22	13	188	70	<1	23,254
2017 Total	5	59	30	104	13	<1	8,462
General Conformity *de minimis* Levels	**25**	**25**	**100**	**100**	**100**	**N/A**	**N/A**

Notes:

1. For NEPA purposes, emission calculations are estimated using OFFROAD2011 and EMFAC2007 models.
2. Emissions rates might not add up due to rounding.

Acronyms:

CO carbon monoxide
NO_x nitrogen oxide
N/A not applicable
PM10 particulate matter smaller than or equal to 10 microns in diameter
PM2.5 particulate matter smaller than or equal to 2.5 microns in diameter
ROG reactive organic gases
SO_2 sulfur dioxide

Table 5-2 summarizes total annual mitigated emissions for ROG, NO_x, CO, SO_2, PM10, and PM2.5 for the JFP at Folsom Dam, Upstream and Downstream projects. Mitigation for the JFP at Folsom Dam, Upstream project is presented in Section 4.0, while mitigation for the JFP at Folsom Dam, Downstream project is presented in Section 5.1.1.

Mitigated emissions in Table 5-2 are compared to the General Conformity *de minimis* thresholds for determination of significance of impacts. Based on Table 5-2, mitigated NO_x would exceed the *de minimis* thresholds in 2016-2017 for Alternative 2. Based on Table 5-2, mitigated NO_x emissions would exceed the *de minimis* thresholds in only the last overlapping year (2017) for Alternative 3. Mitigated ROG, CO, PM2.5, and PM10 emissions would be below their respective *de minimis* thresholds in all overlapping years (2013-2017) for both alternatives.

Table 5-2. JFP Folsom Dam Upstream and Downstream: Mitigated Criteria Pollutant Emission Summary for NEPA

	Pollutant (tons/yr)						
Activity	**ROG**	**NO_x**	**CO**	**PM10**	**PM2.5**	**SO_2**	**CO_2**
Alternative 2							
2013 Total	2	22	12	31	6	<1	10,388
2014 Total	2	24	15	24	4	<1	27,145
2015 Total	2	20	14	13	3	<1	26,427
2016 Total	2	28	19	24	4	<1	26,808
2017 Total	2	25	18	29	4	<1	7,388
General Conformity *de minimis* Levels	**25**	**25**	**100**	**100**	**100**	**N/A**	**N/A**
Alternative 3							
2013 Total	2	24	14	37	7	<1	8,611
2014 Total	2	24	15	19	4	<1	27,994
2015 Total	2	20	14	11	3	<1	27,141
2016 Total	2	17	12	24	4	<1	25,023
2017 Total	3	29	21	29	4	<1	9,275
General Conformity *de minimis* Levels	**25**	**25**	**100**	**100**	**100**	**N/A**	**N/A**

Notes:
For NEPA purposes, emission calculations are estimated using OFFROAD2011 and EMFAC2007 models.
Emissions rates might not add up due to rounding.
Acronyms:
CO carbon monoxide
NO_x nitrogen oxide
N/A not applicable
PM10 particulate matter smaller than or equal to 10 microns in diameter
PM2.5 particulate matter smaller than or equal to 2.5 microns in diameter
ROG reactive organic gases
SO_2 sulfur dioxide

5.2 Other Cumulative Projects

The JFP at Folsom Upstream project could potentially overlap with other ongoing Corps, Reclamation, and City of Folsom projects that are in and around the vicinity of the Folsom Facility, in addition to the JFP at Folsom Dam, Downstream project described above. The cumulative impacts from these concurrent construction activities will be analyzed qualitatively as described below.

5.2.1 Criteria Pollutants

It is expected that the primary impacts from these concurrent projects would be due to construction activities. Construction of these projects would increase emissions of criteria pollutants, including ROG, NO_x, CO, SO_2, PM10, and PM2.5 emissions, from onsite construction activities, including transport of materials.

The JFP at Folsom Dam, Upstream project would be above the NO_x *de minimis* threshold, even with mitigation. However, with mitigation, it would be less than the CEQA significance thresholds levels. Therefore, if these construction projects are implemented concurrently, the combined cumulative effects could be above CEQA thresholds for air quality emissions and would exceed the *de minimis* thresholds.

If this were the case, without consideration of scheduling and sequence of activities, concurrent construction projects within and adjacent to Folsom Reservoir could have adverse cumulative air quality impacts, although these impacts would be temporary. To address these potential cumulative effects, the Corps would coordinate the scheduling and sequence of construction activities with Reclamation, City of Folsom and SMAQMD. For example, should construction activities such as excavation significantly overlap such that SMAQMD thresholds would be exceeded, the agencies could stagger the work in order to comply with the thresholds, reducing the potential for cumulative effects. This coordination could reduce any potential air quality effects to less than significant.

5.2.2 Greenhouse Gases

It is unlikely that any single project by itself could have a significant impact on the environment with respect to GHGs. However, the cumulative effect of human activities has been clearly linked to quantifiable changes in the composition of the atmosphere, which, in turn, have been shown to be the main cause of global climate change (IPCC, 2007).

Therefore, the analysis of the environmental effects of GHG emissions is inherently a cumulative impact issue. While the emissions of one single project will not cause global climate change, GHG emissions from multiple projects throughout the world could result in a cumulative effect with respect to global climate change. With respect to global warming, CO_2 is tracked as a contributor to GHG emissions.

It is expected that the primary impacts from these concurrent projects would be due to construction activities. On an individual basis, these projects would mitigate emissions below significance threshold levels. If these projects are implemented concurrently, the combined cumulative effects could be above reporting requirements for GHG emissions. If this was the case, without consideration for scheduling and sequence of activities, concurrent construction projects within and adjacent to Folsom Dam could have adverse cumulative effects on climate change. To address these potential cumulative effects, the Corps should coordinate the scheduling and sequence of construction activities with Reclamation, the City of Folsom, and SMAQMD. For example, should construction emissions that contribute to climate change (GHG) significantly overlap such that CO_2 emissions increase significantly, the agencies would stagger the work in order to comply with the thresholds, reducing the potential for cumulative effects. This coordination would likely reduce any potential effects to less than significant.

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Appendix B

SMAQMD Conformity Determination Analysis

SACRAMENTO METROPOLITAN
AIR QUALITY
MANAGEMENT DISTRICT

Larry Greene
AIR POLLUTION CONTROL OFFICER

May 18, 2012

Nancy H. Sandburg
Biological Sciences Environmental Manager
U.S. Army Corps of Engineers
1325 J Street
Sacramento, CA 95814

Re: General Conformity Determination - Folsom Dam Joint Federal Project

Dear Ms. Sandburg,

On August 3, 2011, Sacramento Metropolitan Air Quality Management District (District) staff met with representatives from the U.S. Army Corps of Engineers (USACE), the Department of Water Resources, and the California Air Resources Board (CARB) to discuss general conformity determination of the Folsom Dam Joint Federal Project. USACE determined that the Folsom Dam Project would exceed the de minimis threshold for emissions of oxides of nitrogen (NOx), and must make a conformity determination.

The existing General Conformity budgets in the applicable SIP (1994 Sacramento Area Regional Ozone Attainment Plan) for the Sacramento Federal Nonattainment Area (SFNA) do not provide a basis for making a positive conformity determination because the current emissions estimates are higher and the project will cause emissions beyond the time period covered by the 1-hour ozone SIP. However, the criterion under 40 CFR 93.158(a)(5) provides that a State can commit to revising the SIP in such a way as to accommodate a Federal action, and the SIP commitment itself provides the basis for a positive conformity determination.

A conformity analysis evaluation was prepared by the District in cooperation with the CARB and consultation with US EPA Region 9. District staff used the 2009 Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan ("2009 Attainment and RFP Plan" submitted by the State to EPA on April 17, 2009) and the 2011 Sacramento Attainment and RFP Plan (adopted by SMAQMD on November 10, 2011 but not yet submitted by the State to EPA) to show there are excess emission reductions (margin of safety) available to accommodate the Folsom Dam project.

In addition to accommodating the emissions increases, the 2009/2011 SFNA Ozone SIP also fulfills the 5 criteria identified in 40 CFR 93.158(a)(5)(i)(B) for SIP revisions that may be relied upon by Federal agencies to make a positive conformity determination. Each of the criteria is discussed below.

(1) A specific schedule for adoption and submittal of a revision to the SIP which would achieve the needed emission reductions prior to the time emissions from the Federal action would occur;

The 2009 Sacramento Regional 8-Hour Ozone Attainment and RFP Plan was submitted by the State to EPA on April 17, 2009 and the 2011 Sacramento Attainment and RFP Plan was adopted by SMAQMD on November 10, 2011 but not yet submitted by the State to EPA. In a conference call with CARB and EPA Region IX staff on March 12, 2012, Sylvia Oey of CARB acknowledged that CARB is working on providing a technical update to reductions from state strategy measures in the 2009 and 2011 Attainment and RFP plans. CARB has committed to submit the SIP revisions by the end of 2012.

(2) Identification of specific measures for incorporation into the SIP which would result in a level of emissions which, together with all other emissions in the nonattainment or maintenance area, would not exceed any emissions budget specified in the applicable SIP;

This criterion is met through the adoption and submittals of the 2009 Attainment and RFP Plan and the 2011 Plan revision. Additional specific measures are not needed because this project consumes a nominal amount of the excess emission reduction buffer, which provides a margin of safety for achieving attainment, as shown in the 2009 and 2011 Attainment and RFP plans. CARB will ensure that their technical revisions associated with state measures do not consume the excess emission reduction and cause the Folsom Dam Project to exceed the emissions budget. The NOx emissions from the project are less than 0.1% of the nonattainment inventory and will consume less than 2% of the excess reduction buffer. Even if the excess reduction buffer is decreased due to CARB's technical updates, the project will still only consume a nominal amount of the margin of safety. The accompanying analysis provides more detail information addressing this criterion.

(3) A demonstration that all existing applicable SIP requirements are being implemented in the area for the pollutants affected by the Federal action, and that local authority to implement additional requirements has been fully pursued;

Figures 7-1 and 7.2 of the 2011 Attainment and RFP Plan show the reductions that the District and CARB have achieved from adopting and implementing control measures in the previous ozone plans. Tables 7-1A and 7-4 list new reasonable available control measures that are included in the 2011 Attainment and RFP Plan. The existing control measures surpass the amount of emission reductions needed for the reasonable further progress (RFP) targets by a margin that meets the contingency measure requirements. The additional measures in Tables 7-1A and 7-4 are not included in the RFP demonstration and provide an additional safety margin.

CARB is also acting on its current SIP commitments, as demonstrated in the Status Report on the State Strategy for California's 2007 State Implementation Plan (SIP) and Proposed Revision to the SIP Reflecting Implementation of the 2007 State Strategy, submitted to U.S. EPA on August 12, 2009. The status report identified rules adopted by CARB that will provide the needed reductions in nitrogen oxides (NOx) that the state committed to in order to attain the ozone standard in the Sacramento Federal Nonattainment Area in 2018.

(4) A determination that the responsible Federal agencies have required all reasonable mitigation measures associated with their action; and

Since Folsom Dam Modification project will be required to comply with all state and local regulations and will employ additional emission mitigation measures including electrification and use of cleaner construction equipment, trucks and marine vessels to meet California Environmental Quality Act (CEQA) mitigation requirements, it meets the criteria for implementation of all reasonable mitigation measures.

(5) Written documentation including all air quality analyses supporting the conformity determination;

This general conformity evaluation serves to meet the requirement to provide air quality analyses to support conformity determination.

Therefore, the District has concluded the total direct and indirect mitigated emissions from Folsom Dam Joint Federal Project would be accommodated by the SFNA's 2009 Attainment and Reasonable Further Progress Plan and 2011 Plan revision. In addition, 2009/2011 SFNA SIP satisfies the individual criteria in 40 CFR 93.158(a)(5)(i)(B) for SIP revisions that may be relied upon for conformity determinations

If you have any question regarding this document please contact me at (916) 874-4802, or Mr. Charles Anderson, Program Coordinator, Planning and Emission Inventory at (916) 874-4831.

Sincerely,

Larry Greene
Executive Director/Air Pollution Control Officer
Sacramento Metropolitan Air Quality Management District

Attachments: Conformity Determination Evaluation, May 15, 2012

cc

Dawn Richmond, USEPA, Region 9
Jeff Wehling, USEPA, Region 9
John Ungvarsky, USEPA, Region 9
Sylvia Oey, CARB
Scott King, CARB
Brigette Tollstrup, Sacramento Metropolitan AQMD
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777 12th Street, 3rd Floor SACRAMENTO METROPOLITAN Sacramento, CA 95814

AIR QUALITY

MANAGEMENT DISTRICT

CONFORMITY DETERMINATION EVALUATION

DATE: May 15, 2012

ENGINEER: Hao Quinn

PROJECT NAME: JOINT FEDERAL PROJECT AT FOLSOM DAM

LOCATION: FOLSOM DAM, SACRAMENTO COUNTY

PROPOSAL: FOLSOM DAM MODIFICATION: CONSTRUCTION OF AN AUXILIARY SPILLWAY

INTRODUCTION:

The U.S. Army Corps of Engineers (USACE) is the lead agency responsible for the joint federal project (JFP), Folsom Dam Modification, for construction an auxiliary spillway consisting of a control structure, spillway chute, stilling basin, approaching channel, and spur dike. The construction project is for providing dam safety and flood damage reduction at Folsom Dam located downstream from confluence of North and South Forks of the American River near the city of Folsom, California.

All federal projects are subject to the U.S. EPA General Conformity regulations[1]. The purpose of the General Conformity Rule is to ensure that federal activities (1) do not cause or contribute to new violation of National Ambient Air Quality Standards (NAAQS), (2) do not cause additional or worsen existing violations of or contribute to new violations the NAAQS, and (3) delay in attainment of the NAAQSs. The General Conformity de minimis thresholds for the Sacramento Federal Nonattainment Area (SFNA) are: 25 tpy for NOx and 25 tpy for VOC (ozone – severe nonattainment), 100 tpy for PM_{10} (PM_{10} – moderate nonattainment), 100 tpy for $PM_{2.5}$ ($PM_{2.5}$ – nonattainment) and 100 tpy for CO (CO – maintenance)[2].

The Folsom Dam construction project is expected to exceed the General Conformity de minimis threshold for NOx over the life of the project when mitigated. Therefore, the USACE must demonstrate conformity by (1) showing the project will meet all ozone State Implementation Plan (SIP) control requirements[3], and (2) meeting one of following options[4]:

1. Demonstrate that the total direct and indirect emissions are specifically identified and

[1] 40 CFR § 6.303, § 51.853 and § 93.153
[2] 40 CFR § 93.153(b), EPA Website on Status of SIP Requirements, http://www.epa.gov/airquality/urbanair/sipstatus/reports/ca_areabypoll.html
[3] Sacramento Area Regional Ozone Attainment Plan, SMAQMD, November 15, 1994; and Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan, SMAQMD, November 10, 2011
[4] 40 CFR § 93.158(a)

accounted for in the applicable SIP.

2. Demonstrate that the total direct and indirect emissions would not exceed the emissions budgets specified in the applicable SIP.
3. Obtain a written commitment from the State to revise the SIP to include the emissions from the action.
4. Fully offset the total direct and indirect emissions by reducing emissions of the same pollutant or precursor in the same non-attainment or maintenance area.

The option applicable to this project is to obtain a written commitment from the State Governor or the Governor's designee for SIP actions, as described in 40 CFR §93.158(a)(5)(i)(B), to revise the SIP to achieve the needed emission reductions prior to the time emissions from the Federal action would occur, such that total direct and indirect emissions from the action do not exceed the 2011 SIP emissions budgets. This evaluation and verification are conducted on the mitigated project emissions provided by USACE.

PROJECT DESCRIPTION[6]:

USACE is building a control spillway at Folsom Dam on the American River systems. Phase 3 (JFP at Folsom Dam, Downstream) of the project includes construction of a control structure, spillway chute and stilling basin, and has a construction period of 2010 to 2016. Phase 3 overlaps with the final phase, Phase 4 (JFP at Folsom Dam, Upstream), which is expected to take place, from 2013 to 2017. Phase 4 project will include construction of an approach channel, spur dike, and either a temporary cut-off wall (Alternative 2) or a cofferdam (Alternative 3) for approach channel excavation. Construction activities include excavation, blasting, rock processing and concrete batching and the following sources of direct and indirect emissions are expected:

- On-site construction off-road equipment
- On-site marine engine
- On-site and off-site haul truck engine
- Off-site worker vehicle
- On-site and off-site haul truck entrained paved and unpaved road dust
- Off-site worker vehicle trip entrained road dust for trip to and from the site
- On-site excavation
- On-site material storage piles
- On-site in-the-dry blasting
- Rock crushing and concrete batching

[6] Source: Chapter 1 of Air Quality Technical Report, "Joint Federal project (JFP) at Folsom Dam, Upstream", prepared by URS for USACE, May 2012.

Table 1 contains project timeline and operation schedule. It is followed by an aerial photo[7] of the project site.

Table 1. Folsom Dam Modification Project Timeline and Operation Schedule[8]

Activity	Year	Days	Hrs/day
Phase 3 (JFP at Folsom Dam, Downstream)			
Upper Spillway Chute Excavation, trimming, Foundation Clean-up (16 Months) (September 2011-June 2015)	2011-2015	315	10
Upper Spillway Chute Concrete work (16 Months) (September 2011-July 2014)	2011-2014	315	10
Control Structure Concrete Placement and Batch Plant (2013-2014)	2013-2014	240	10
Stepped Spillway Chute Excavation, trimming, Foundation Clean-up (10 Months) (September 2013-February 201	2013-2017	200	10
Spillway Stilling Basin Excavation, trimming, Foundation Clean-up (2 Months) (February 2014-April 2014)	2014	36	10
Downstream Chute Concrete Placement and Batch Plant (2013-2017)	2013-2017	900	8
Spillway Stilling Basin Concrete Work (17 Months) (February 2015-July 2016)	2015-2016	328	10
Stepped Spillway Chute Concrete work (16 Months) (September 2015-March 2017)	2015-2017	315	10
Remove Downstream rock Cofferdam (2 Months) (2017)	2017	36	10
Site Restoration Work (4 Months) (2017)	2017	27	10
Alternative 2 of Phase 4 (JFP at Folsom Dam, Upstream) - Approach Channel Excavation With Cutoff Wall			
Construct Transload Facility (April-June 2013)	2013	405	10
Site Prep/Haul Rd Prep (12 Months) (June 2013-August 2014)	2013-2014	136	10
Common Excavation to waste (3 Months) (September 2013-December 2013)	2013	69	10
Concrete Secant Pile Wall (2013-2016)	2013-2016	917	10
Cutoff Wall Concrete Placement (2013-2016)	2013-2016	187	10
Rock Excavation DRY (2 Months) (2014)	2014	35	12
Site Restoration/Teardown (1 Month) (July-August 2014)	2014	240	10
Mobilization for Approach Walls (Roads, Crane Pads) (3 months) (Mid 2015)	2015	60	10
Intake Approach Walls & Slab (13 months) (September 2015-March 2017)	2015-2017	265	10
Set up Bubble Curtain/operate Bubble Curtain/Silt Curtain (6 Months) (November 2015-December 2015)	2015	125	10
Dredge Common to Rock (4 Months)(December 2015-March 2016)	2015-2016	74	20
Drill and Shoot/Dredge Rock WET (14 Months) (March 2016-January 2017)	2016-2017	276	20
Import Material from Quarry to D1/D2 MIAD (6 months) (September 2016-March 2017)	2016-2017	116	10.43
Haul Road Prep, Spur Dike Stripping (1 month) (September 2016)	2016	7	10.43
Rehandle all imported material to Spur Dike from D1/D2 MIAD, Emb Core and Rock Fill (6 Months) (January 201	2017	110	10.43
Rehandle all imported material to Spur Dike from D1/D2 MIAD, Rip Rap Bedding and Rip Rap (2 Months) (2017)	2017	28	10.43
Foundation Clean Up (2 Months) (February 2017-April 2017)	2017	75	10
Remove Transload Facility (August-October 2017)	2017	405	10
Alternative 3 of Phase 4 (JFP at Folsom Dam, Upstream) - Approach Channel Excavation With Cofferdam			
Construct Transload Facility (April-June 2013)	2013	405	10
Mobilization for Cofferdam (Haul Road) (12 Months) (June 2013-June 2014)	2013-2014	238	10
Construction of Sheet Pile Cells EA (1 Month) (Late 2013-Mid 2014)	2013-2014	26	10
Fill Cells CY's (6 Months) (Late 2013-Mid 2014)	2013-2014	121	10
Common Excavation Below Cofferdam, CY (3 Months) (September 2013)	2013	10	
Common Dredge Work Below Cofferdam, CY (3 Months) (Late 2013)	2013	28	20
Set up Bubble Curtain/operate Bubble Curtain/Silt Curtain (1 Month) (August 2013)	2013	125	24
Dewater Behind Cofferdam (2014)	2014	4	24
Site Restoration/Teardown (1 Month) (July - August 2014)	2014	240	10
Intake Approach Walls & Slab (13 months) (September 2015-March 2017)	2015-2017	265	10
Common Excavation, CY (4 Months) (Late 2015-Mid 2017)	2015-2017	75	10
Rock Excavation DRY (4 Months)	2016	80	12
Haul Road Prep, Spur Dike Stripping (1 month) (September 2016)	2016	8	10.43
Import Material from Quarry to D1/D2 MIAD (6 months) (September 2016-March 2017)	2016-2017	116	10.43
Rehandle all imported material to Spur Dike from D1/D2 MIAD, Emb Core and Rock Fill (6 Months) (January 201	2017	110	10.43
Foundation Clean up SY (2 Months) (February -April 2017)	2017	21	10
Remove cell rubble fill CY (5 Months) (2017)	2017	94	10
Remove sheets, EA (1 Month) (2017)	2017	20	10
Dredge Common to Rock (2 Months)	2017	38	20
Drill and Shoot/Dredge Rock WET (7 Months) (2017)	2017	134	20
Rehandle all imported material to Spur Dike from D1/D2 MIAD, Rip Rap Bedding and Rip Rap (2 Months) (2017)	2017	28	10.43
Remove Transload Facility (August-October 2017)	2017	405	10

[7] Source: Cover page of Air Quality Technical Report, "Joint Federal project (JFP) at Folsom Dam, Upstream", prepared by URS for USACE, May 2012.

[8] Source: Emission calculation spreadsheet, Folsom Dam Modifications Calculations AQ Comparison Summary 5_3_12.xlsx.

EMISSION MITIGATION MEASURES[9]:

USACE will utilize mitigation measures to reduce the total project NO_x and $PM_{10}/PM_{2.5}$ emissions. They are:

1. Off-road construction equipment complying with the Los Angeles County Metropolitan Transportation Authority (LACMTA) Green Construction Policy. Use Tier 3 off-road equipment for first two years of construction (2013-2014) and Tier 4 off-road equipment beginning 2015.
2. Marine engines complying with U.S. EPA Tier 2 and Tier 3 engine standards. Use Tier 2 marine engines for the first two years of construction (2013-2014) and Tier 3 marine engines beginning 2015.
3. Use of model year 2010 or newer haul trucks beginning in 2013.
4. Electrification of concrete batch plant and rock crushing plant.
5. Fugitive dust controls which include watering controls on blasting operations, unpaved roads, excavation, wet suppression on stockpiles, and speed control.

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[9] Source: Chapter 4 of Air Quality Technical Report, "Joint Federal project (JFP) at Folsom Dam, Upstream", prepared by URS for USACE, May 2012.

PROJECT EMISSIONS:

U.S. Army Corps of Engineers, through URS Corporation/Brown and Caldwell Joint Venture, has estimated the following project emissions with mitigation measures[11].

Table 2. Folsom JFP Approach Channel Project (Upstream+Downstream) Summary: Emissions After Mitigation (tons/year)

Activity Year	VOC	NOx	CO	PM_{10}	$PM_{2.5}$	SO_2
Alternative 2 (Approach Channel Excavation With Cutoff Wall)						
2013	2	22	12	31	6	<1
2014	2	24	15	24	4	<1
2015	2	20	14	13	3	<1
2016	2	**28**	19	24	4	<1
2017	2	**25**	18	29	4	<1
General Conformity *De Minimis* Levels	25	25	100	100	100	100
Alternative 3 (Approach Channel Excavation With Cofferdam)						
2013	2	24	14	37	7	<1
2014	2	24	15	19	4	<1
2015	2	20	14	11	3	<1
2016	2	17	12	24	4	<1
2017	3	**29**	21	29	4	<1
General Conformity *De Minimis* Levels	25	25	100	100	100	100

Using the aforementioned mitigation measures, all pollutant emissions except NOx would be below the General Conformity annual de minimis threshold during all construction years. Mitigated NOx emissions would be above the de minimis thresholds in 2016 and 2017 for Alternative 2 and 2017 for Alternative 3. Therefore, a conformity determination is required for NOx emissions.

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[11] Source: Table 5-2 of Air Quality Technical Report, "Joint Federal project (JFP) at Folsom Dam, Upstream", prepared by URS for USACE, May 2012.

CONFORMITY DETERMINATION:

Section 176(c) (42 U.S.C. 7506) of the Clean Air Act requires federal agencies to ensure that their actions conform to the applicable SIP for attaining and maintaining the national ambient air quality standards (NAAQS). Conformity with the applicable SIP must be determined for each federal action pollutant that exceeds the de minimis threshold[12]. The applicable SIP (or EPA approved SIP[13]) for SFNA is the 1994 Sacramento 1-Hour Ozone Attainment Demonstration SIP (94SIP). It was approved by EPA, effective February 7, 1997 (62 FR 1150). In July 1997, EPA promulgated an 8-hour standard for ozone[14] to provide greater protection of public health. The 1-hour ozone NAAQS was revoked in 2005 (70 FR 44470) and replaced with an 8-Hour Ozone NAAQS. Subsequently, the 2011 Sacramento Attainment and RFP Plan (2011 Attainment and RFP Plan) was adopted by SMAQMD on November 10, 2011 and is pending submittal by the State to EPA. ARB is committed to submit the SIP revisions by December 2012.

<u>Steps for Determining Applicable Sections in 40 CFR § 93.158 for SFNA Ozone SIP Conformity Determination</u>

1. **68FR32843** (June 2, 2003) states that once 1-hour ozone standard is revoked, the federal project must conform to the 8-hour standard.

> *"Once the 1-hour ozone standard is revoked in whole or in part, Federal agencies will be required to conduct conformity determinations for the 8-hour standard if the project/action is in an area designated nonattainment for that standard. The general conformity regulations specify requirements for actions/projects in areas without an approved SIP. Those requirements would apply to 8-hour ozone nonattainment areas until the SIP is approved by EPA."*

2. However, **73FR1415** (January 8, 2008) states that the 1-hour ozone SIP is considered the applicable SIP until a revised SIP is submitted and approved by EPA. Therefore, conformity determination must be made with respect to the 1-hour ozone SIP under 40 CFR § 93.158(a).

3. Since the project will cause emissions beyond the time period covered by the 1-hour SIP, **40 CFR § 93.162** (Emissions beyond the time period covered by the SIP) is applicable. It allows (a) conformity with the last emission budget in the applicable SIP (94SIP) or (b) submittal of a revised SIP which accommodates the emissions from the Federal action. However, a SIP revision has already been submitted. The 2011 Attainment and RFP Plan was prepared and is pending submittal by ARB to EPA. It demonstrates how the region will attain the federal 1997 8-hour ozone standard and meet reasonable further progress requirements in the Sacramento Nonattainment Area. We will apply **40 CFR § 93.158(a)(5)(i)(B)** to determine whether the project causes emissions to be above the emissions budget in the 2011 Attainment and RFP Plan.

[12] 40 CFR § 93.158(a)
[13] 40 CFR § 93.152
[14] "National Ambient Air Quality Standards for Ozone"(62FR38855, July 18, 1997)

40 CFR § 93.158(a)(5)(i)(B)

(B) The total of direct and indirect emissions from the action (or portion thereof) is determined by the State agency responsible for the applicable SIP to result in a level of emissions which, together with all other emissions in the nonattainment (or maintenance) area, would exceed an emissions budget specified in the applicable SIP and the State Governor or the Governor's designee for SIP actions makes a written commitment to EPA which includes the following:

For the Federal agency to make a positive conformity determination under 40 CFR § 93.158(a)(5)(i)(B), the air district will need to submit a letter to EPA (with a cc to the United States Corps of Engineers) addressing the following 5 elements outlined in this section. Each of the elements is discussed below:

(1) A specific schedule for adoption and submittal of a revision to the SIP which would achieve the needed emission reductions prior to the time emissions from the Federal action would occur;

The 2009 Sacramento Regional 8-Hour Ozone Attainment and RFP Plan was submitted by the State to EPA on April 17, 2009 and the 2011 Sacramento Attainment and RFP Plan was adopted by SMAQMD on November 10, 2011 but not yet submitted by the State to EPA. In a conference call with CARB and EPA Region IX staff on March 12, 2012, Sylvia Oey of CARB acknowledged that CARB is working on providing a technical update to reductions from state strategy measures in the 2009 and 2011 Attainment and RFP plans. CARB has committed to submit the SIP revisions by the end of 2012.

(2) Identification of specific measures for incorporation into the SIP which would result in a level of emissions which, together with all other emissions in the nonattainment or maintenance area, would not exceed any emissions budget specified in the applicable SIP;

This criterion is met through the adoption and submittals of the 2009 Attainment and RFP Plan and the 2011 Plan revision. Additional specific measures are not needed because this project consumes a nominal amount of the excess emission reduction buffer, which provides a margin of safety for achieving attainment, as shown in the 2009 and 2011 Attainment and RFP plans. CARB will ensure that their technical revisions associated with state measures do not consume the excess emission reduction and cause the Folsom Dam Project to exceed the emissions budget. The NOx emissions from the project are less than 0.1% of the nonattainment inventory and will consume less than 2% of the excess reduction buffer. Even if the excess reduction buffer is decreased due to CARB's technical updates, the project will still only consume a nominal amount of the margin of safety.

Chapter 7 of the 2011 Attainment and RFP Plan contains new and amended control measures and strategies for meeting the requirement to demonstrate reasonable further progress and attainment of the 1997 8-hour ozone NAAQS. The plan contains control measures with excess emission reductions beyond emission reduction target for attainment, such that the emissions from the Folsom Dam Modification project, together with all other emissions in the nonattainment or maintenance area, would not exceed the emissions budget.

Conformity With 2011 Attainment and RFP Plan Emissions Budget

The highest annual project NOx emission level after mitigation at 29 tons/year occurs in 2017 under Alternative 3. This is equal to an average day of 0.08 ton/day (29 tons/yr / 365 days/yr = 0.08 ton/day), and is less than 0.1% of total SFNA NOx emissions.

Table 8-1[15], Summary of Attainment Demonstration for 8-Hour Ozone NAAQS 2018 "Severe" Classification Scenario, of the 2011 Attainment and RFP Plan shows attainment by 2018 with an additional 3.8% NO_x emission reduction beyond the emission reduction target. This excess NOx emission reduction is 4 tpd NOx (104 tpy * 3.8% = 4 tpd). It provides a margin of safety for achieving attainment target (Emissions Budgets) of 91 tpd NOx (104 tpy *(100%-12.5%) = 91 tpd).

Since the amount of highest average daily project NOx at 0.08 tpd[16] (29 tons/yr / 365 day/yr = 0.08 ton/day) is about 2% of the 4 tpd NOx (0.08 tpd/4 tpd * 100% = 2%) reduction buffer, additional emissions from Folsom Dam Modification will not cause the region to exceed the 2011 SIP emissions budget.

In addition, the recent U.S. economic downturn, beginning in 2008, has not been accounted in the ozone SIP plan. The economic downturn has caused significant reductions in construction activities as noted in the loss of employment and housing starts. In Sacramento County, employment in the construction industry has decreased by 48% (a loss of 21,882 employees) from 2005 to 2010[17]. New single-family home permits issued in Sacramento County have decreased by 81% from 2006 to 2010[18]. Since the impacts of the economic downturn are not yet included in the SIP planning inventory, the forecasted attainment year inventory is overestimated.

California Air Resources Board (CARB) conducted a comprehensive review of the construction inventory as a result of a 2009 study by Rob Harley at UC Berkeley which determined that the off-road equipment inventory is overestimated by more than a factor of three based on a fuel-based method.[19] As a result, CARB has recently made significant updates to the off-road emission inventory to reflect the reduced activities due to recession, and more accurate lower population, hours of use, load factor and growth forecasts. The revised (or more realistic) emissions are substantially lower (about 1/3) than the off-road equipment inventory in the 2011 SIP. ARB anticipates submitting the revised inventory and attainment demonstration by December 2012 and will ensure that the conclusion presented here remains valid.

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[15] Table 8-1,"*Summary of Attainment Demonstration for 8-Hour Ozone NAAQS 2018 "Severe" Classification Scenario*", Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan, SMAQMD, November 10, 2011.

[16] The 49 tpy is highest annual emission after mitigation and it occurs in 2017, see emission data under Project Emissions.

[17] Bureau of Labor Statistics, accessed January 2012, http://www.bls.gov/cew/data.htm

[18] Construction Industry Research Board, 2006, 2010 (cited by California Building Industry Association), http://www.cbia.org/go/cbia/newsroom/housing-statistics/housing-starts/

[19] CARB webpage, http://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles; http://www.arb.ca.gov/regact/2010/offroadlsi10/offroadappd.pdf

(3) A demonstration that all existing applicable SIP requirements are being implemented in the area for the pollutants affected by the Federal action, and that local authority to implement additional requirements has been fully pursued;

Figures 7-1 and 7.2 of the 2011 Attainment and RFP Plan show the reductions that the District and CARB have achieved from adopting and implementing control measures in the previous ozone plans. Tables 7-1A and 7-4 (presented below) of the 2011 Attainment and RFP Plan list new reasonable available control measures that are included in the plan. The existing control measures surpass the amount of emission reductions needed for the reasonable further progress (RFP) targets by a margin that meets the contingency measure requirements. The additional measures in Tables 7-1A and 7-4 are not included in the RFP demonstration and provide an additional safety margin.

Table 7-1A
Adopted New State and Federal SIP Measures
Expected 2018 Emission Reductions
Sacramento Nonattainment Area

New SIP Measures Adopted by End of 2008	NOx (tpd)	VOC (tpd)
Passenger Vehicles	**--**	**1.1**
Modifications to Reformulated Gasoline	--	1.1
Heavy-Duty Trucks	**9.5**	**0.8**
Cleaner In-Use Heavy-Duty Trucks	9.5	0.8
Goods Movement Sources	**2.1**	**0.1**
Accelerated Intro. of Cleaner Line-Haul Locomotives	1.9	0.1
Clean Up Existing Harbor Craft	0.2	0.0
Off-Road Equipment	**1.9**	**0.4**
Cleaner In-Use Off-Road Equipment (over 25hp)	1.9	0.4
Other Off-Road Sources	**--**	**0.4**
Emission Standards for Recreational Boats and Vehicles	--	0.4
Areawide Sources	**--**	**0.3**
Consumer Products	--	0.3
Emission Reductions from Adopted New Measures	**13**	**3**

Locomotives measure relies on U.S. EPA rulemaking.
Includes motor vehicle inventory from SACOG FEB 2008 submittal.
Updated emission reductions from adopted measures provided by CARB (Lynn Terry e-mail 10-21-08).

Table 7-4
Summary of New Regional and Local Proposed Control Measures
Sacramento Nonattainment Area

Control Measure Name	2018 Emission Reductions (TPD)	
	VOC	NO_x
Regional Non-regulatory Measures		
Regional Mobile Incentive Program – On-road	<0.1	0.9
Regional Mobile Incentive Program – Off-road	<0.1	<0.1
Spare The Air Program	<0.1	<0.1
SACOG Transportation Control Measures	--	--
Urban Forest Development Program	0 - 0.2	--
Total Regional Non-regulatory Measures	**0.1**	**0.9**
Local Regulatory Measures		
Architectural Coating	1.5	--
Automotive Refinishing	0.2	--
Degreasing/Solvent Cleaning	1.4	--
Graphic Arts	na	--
Miscellaneous Metal Parts and Products	<0.1	--
Natural Gas Production and Processing	0.1	--
Boilers, Steam Generator, and Process Heaters	--	0.2
IC Engines	--	<0.1
Large Water Heaters and Small Boilers	--	0.9
Total Local Regulatory Measures	**3.2**	**1.2**
Total Reductions*	**3.4**	**2.2**

Notes: Numbers are truncated to one decimal place. na = not available
*Total reductions are summed from untruncated values. See summary table in Appendix C – Proposed Control Measures.

CARB is also acting on its current SIP commitments, as demonstrated in the Status Report on the State Strategy for California's 2007 State Implementation Plan (SIP) and Proposed Revision to the SIP Reflecting Implementation of the 2007 State Strategy, submitted to U.S. EPA on August 12, 2009. The status report identified rules adopted by CARB that will provide the needed reductions in nitrogen oxides (NOx) that the state committed to in order to attain the ozone standard in the Sacramento Federal Nonattainment Area in 2018.

(4) A determination that the responsible Federal agencies have required all reasonable mitigation measures associated with their action; and

Since Folsom Dam Modification project will be required to comply with all state and local regulations and will employ additional emission mitigation measures including electrification and use of cleaner construction equipment, trucks and marine vessels to meet California Environmental Quality Act (CEQA) mitigation requirements, it meets the criteria for implementation of all reasonable mitigation measures.

(5) Written documentation including all air quality analyses supporting the conformity determination;

This general conformity evaluation serves to meet the requirement to provide air quality analyses to support conformity determination.

CONCLUSION:

A positive conformity determination can be made for the mitigated emissions from the Folsom Dam Modification project. This finding is based on:

- Folsom Dam Modification project will be required to comply with all state and local regulations, thus it will meet all SIP control requirements. Folsom project will employ additional emission mitigation measures including electrification and use of cleaner construction equipment, trucks and marine vessels.

- The 2011 Attainment and RFP Plan provides 4 tpd NOx in margin of safety for achieving NOx emission attainment target; the emissions increase from Folsom Dam Modification project (maximum emissions of 0.08 tpd NOx) is a nominal portion (2%) of the margin of safety provided; therefore, this margin of safety ensures the project will not cause the nonattainment area to exceed the 2011 Attainment and RFP emissions budget.

- ARB has committed to submit SIP revisions by December 2012 and will ensure that ARB's technical revisions associated with state measures do not consume the excess emissions allocated to the Folsom Dam Project.

RECOMMENDATIONS:

This evaluation recommends that U.S. Army Corps of Engineers makes a positive general conformity determination for Folsom Dam Modification project with emission mitigation. The district will submit a commitment letter to EPA to show that, in addition to accommodating the emissions increase from the Folsom Dam Modification project, the 2011 Attainment and RFP Plan also satisfies the 5 elements identified in 40CFR93.158(a)(5)(i)(B) for SIP revisions.

REVIEWED BY: ____________________ **DATE:** May 16, 2012

APPROVED BY: ____________________ **DATE:** 5/21/12

Appendix C

Water Quality Technical Analysis

Joint Federal Project (JFP) at Folsom Dam, Approach Channel Excavation

Folsom, California

Draft Water Quality and Bioaccumulation Technical Memorandum

February 2012

US Army Corps of Engineers Sacramento District

U.S. Army Corps of Engineers
Sacramento District

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Appendix C

Water Quality and Bioaccumulation Technical Memorandum

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List of Abbreviations and Acronyms

Basin Plan	CVRWQCB Water Quality Control Plan for the Sacramento River and San Joaquin River Basins
BMP	Best Management Practice
CASQA	California Stormwater Quality Association
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulation
CFS	Cubic feet per second
Corps	U.S. Army Corps of Engineers
CTR	California Toxics Rule
CVP	Central Valley Project
CVRWQCB	Central Valley Regional Water Quality Control Board
Construction General Permit	State General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order No. 2010-0014-DWQ
CWA	Clean Water Act
cy	Cubic yards
DO	Dissolved Oxygen
ERL	Effect Range-Low
ERM	Effect Range-Median
MCL	Maximum Contaminant Level
MIAD	Mormon Island Auxiliary Dam
MPN	Most Probable Number
MSL	Mean Sea Level
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
PEC	Probable Effect Concentration
OAL	Office of Administrative Law

List of Abbreviations and Acronyms (Con't)

Reclamation	United States Bureau of Reclamation
RWQCB	Regional Water Quality Control Board
SQG	Sediment Quality Guideline
SWAMP	Surface Water Ambient Monitoring Program
SDWA	Safe Drinking Water Act
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
SWTR	Surface Water Treatment Rule
TEC	Threshold Effect Concentration
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TSS	Total Suspended Solids
USEPA	United States Environmental Protection Agency

Executive Summary

The final phase of the Folsom Modification project, known as the Joint Federal Project (JFP) at Folsom Dam Upstream, is the completion of the approach channel and spur dike. There are two action alternatives that are being considered for this project: (1) approach channel excavation with cutoff wall (known henceforth as Alternative 2), and (2) approach channel excavation with cofferdam (known henceforth as Alternative 3).

URS Corporation/Brown and Caldwell Joint Venture has been contracted by the Sacramento District, U.S. Army Corps of Engineers (Corps), to perform a water quality and mercury bioaccumulation impact analysis for the Approach Channel portion of the JFP. This technical report explains relevant water quality regulations and quantifies/qualifies water quality and mercury bioaccumulation impacts that would be expected during the construction of the Project alternatives. The analysis:

- Describes the affected environment and identifies sensitive receptors and pathways for water quality impacts and mercury bioaccumulation,
- Lists the regulatory criteria for water pollutants,
- Describes the methodology and calculations used to estimate water quality impacts,
- Describes mercury speciation processes related to project activities and mercury bioaccumulation pathways
- Estimates project specific and cumulative impacts, and
- Identifies mitigation measures to reduce the severity of impacts.

The purpose of this technical memorandum is to provide supporting details for the analysis of potential effects on water quality and mercury bioaccumulation potential related to the JFP at Folsom Dam, Approach Channel Excavation. Section 1 provides an overview of the affected environment and the regulatory setting, including priority pollutants and water quality objectives. Section 2, Water Quality, presents details on existing water quality and sediment conditions and an analysis of the relationship between metals concentrations in sediments, total suspended solids (TSS) concentrations, and dissolved metals in the water column. Section 3, Mercury Bioaccumulation, provides details on the conceptual model for mercury sources, transformations, and bioaccumulation processes relevant to the analysis of impacts.

Major Findings

The major findings of the water quality and bioaccumulation studies include the following:

- Models of TSS and the affinity of metals to adsorb to TSS demonstrated that controlling and mitigating TSS, would also reduce suspended metals.
- Sources of inorganic mercury in the American River Watershed include tunnels and hydraulic mine workings from historic gold mining operations, municipal

discharges, urban and agricultural runoff, and deposition from the air. Methylmercury, a highly toxic form of mercury, is formed from this inorganic mercury by particular bacteria in lakes and stream beds.

- Mercury concentrations in the Sediment Samples collected within Folsom Lake around the area of the Auxiliary Spillway Approach Channel alignment were compared to the mercury probable effect concentration (PEC) objective. All 29 sediment samples collected were below the mercury PEC objective of 1.06 mg/kg. This would indicate that the mercury contaminant concentration levels are below the amount in which harmful effects on sediment-dwelling organisms would be expected to occur on a frequent basis. Moreover, of the 29 samples collected, only 2 samples exceeded the mercury threshold effect concentration (TEC) objective of 0.18 mg/kg. Therefore, for most of the sediment samples collected, the concentrations of mercury were below the level in which no harmful effects would occur to sediment dwelling organisms.
- With proper mitigation and application of best management practices, both Alternatives 2 and 3 pose less than significant impacts under the California Environmental Quality Act, and negligible impacts under the National Environmental Policy Act.

1.0 SETTINGS/ AFFECTED ENVIRONMENT

1.1 Background

The final phase of the Folsom Modification project, known as the Joint Federal Project (JFP) at Folsom Dam Upstream, is the completion of the approach channel and spur dike. There are two action alternatives that are being considered for this project in addition to the No Action Project Alternative (Alternative A): (1) approach channel excavation with cutoff wall (known henceforth as Alternative 2), and (2) approach channel excavation with cofferdam (known henceforth as Alternative 3).

1.2 Purpose and Scope

URS Corporation/Brown and Caldwell Joint Venture has been contracted by the Sacramento District, U.S. Army Corps of Engineers (Corps), to perform a water quality and mercury bioaccumulation impact analysis for the Approach Channel portion of the JFP. This technical report explains relevant water quality regulations and quantifies/qualifies water quality and mercury bioaccumulation impacts that would be expected during the construction of the Project alternatives. The analysis:

- Describes the affected environment and identifies sensitive receptors and pathways for water quality impacts and mercury bioaccumulation,
- Lists the regulatory criteria for water pollutants,
- Describes the methodology and calculations used to estimate water quality impacts,
- Describes mercury speciation processes related to project activities and mercury bioaccumulation pathways
- Estimates project specific and cumulative impacts, and
- Identifies mitigation measures to reduce the severity of impacts.

1.3 Project Description

The following sub-sections describe the project alternatives, along with relevant details of some construction techniques. The project site is depicted in Figure 1. The construction footprint of each site is shown on Figure 2.

1.3.1 Alternative 2: Approach Channel Construction with Cutoff Wall

Proposed construction elements for Alternative 2 are discussed below in detail, beginning with construction of the cutoff wall (Figure 3).

<u>Cutoff Wall Construction</u>

Installation of the cutoff wall across the width of the future approach channel would occur in-the-dry.

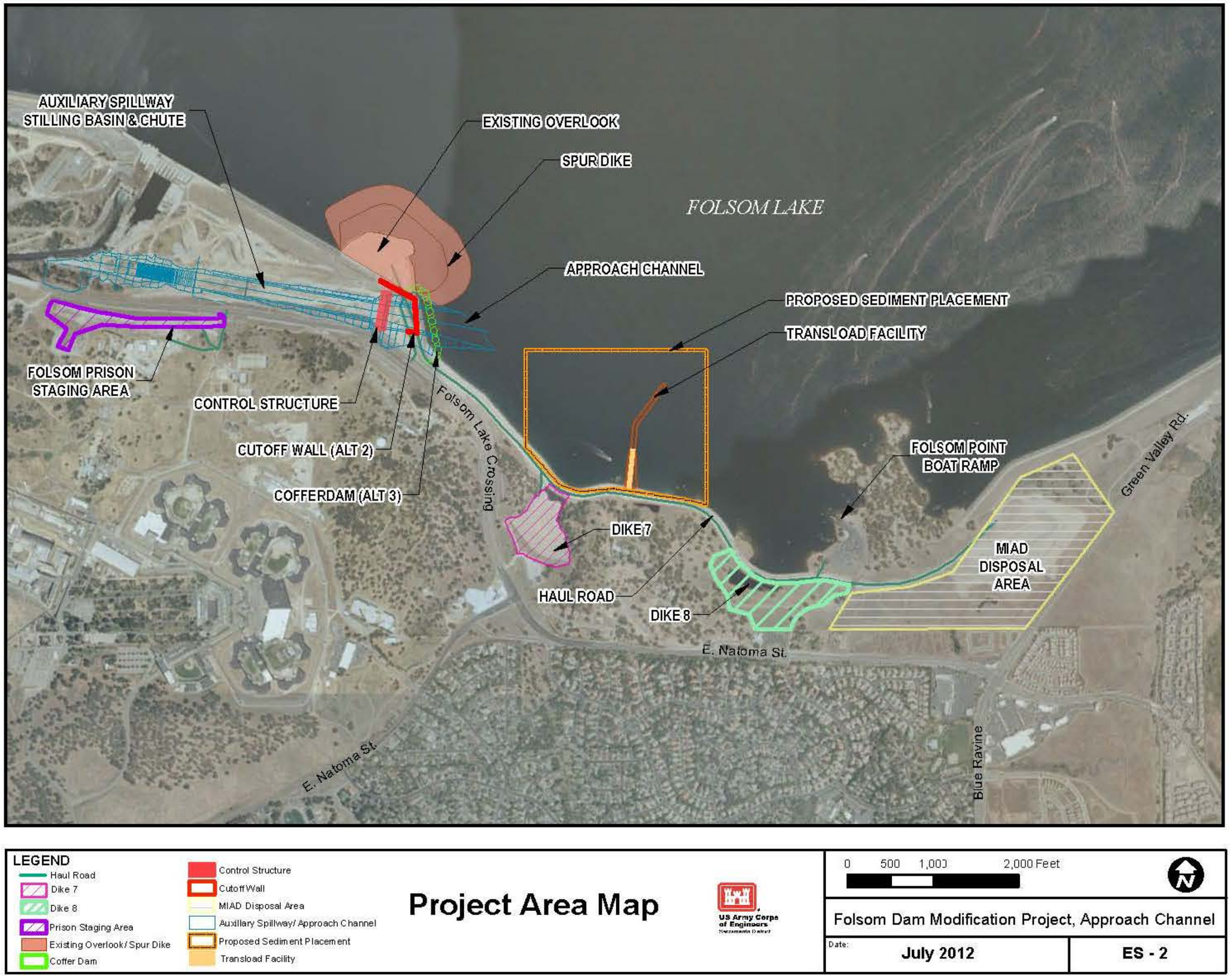


Figure 1. Project Area Map

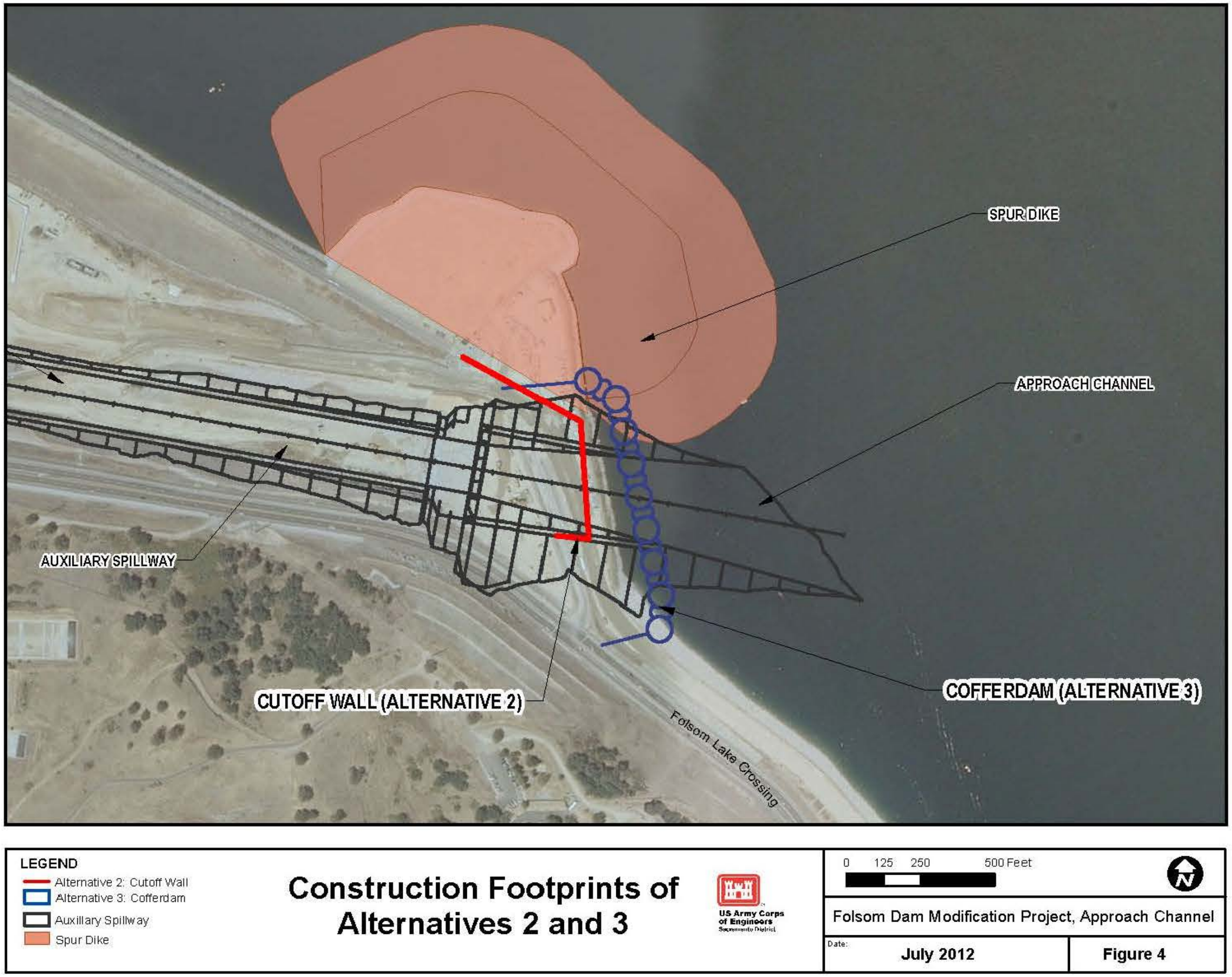
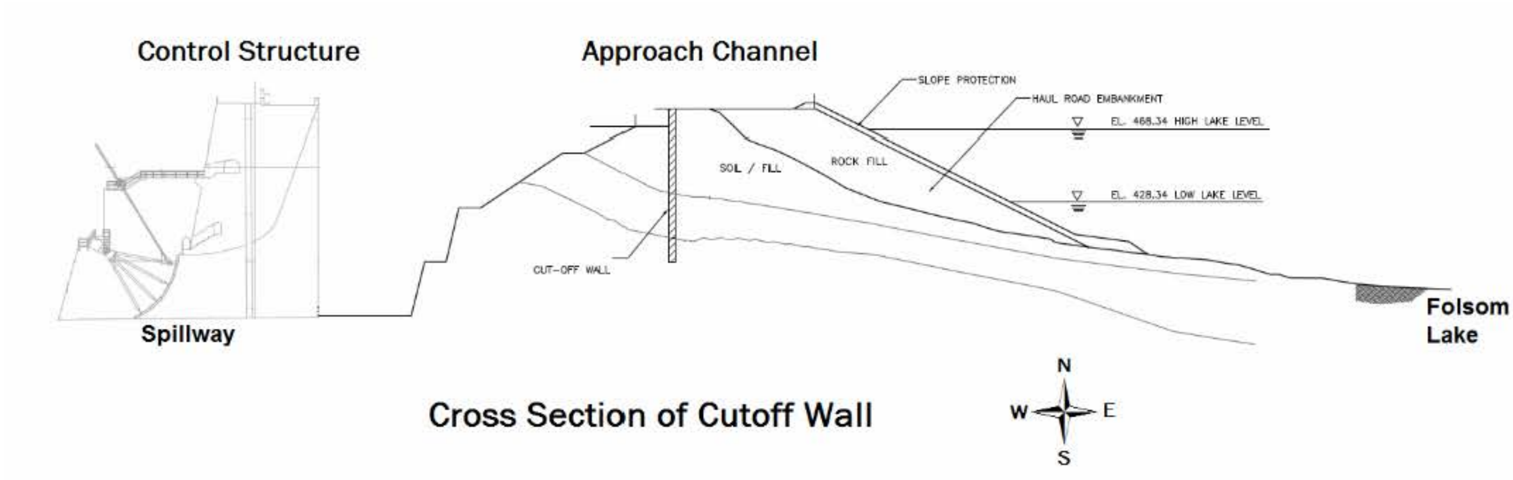


Figure 2. Comparison of Alternatives



Alternative 2 - Cutoff Wall Alignment, Cross Section	US Army Corps of Engineers Sacramento District	Folsom Dam Modification Project, Approach Channel
	Date: March 2012	Figure 3

Figure 3. Cutoff Wall Cross Section

Approach Channel Excavation

The approach channel for the auxiliary spillway is expected to extend approximately 1,100 feet upstream of the concrete control structure (Figure 1). In the dry excavation effort for the approach channel would consist of removal of rock plug material between the constructed control structure and the cutoff wall in the dry over eighteen months. During this timeframe the control structure's bulkhead gates would be completed and operational. Excavation of the rock plug would continue in-the-dry until the approach channel is ready for flooding or the lake level overtops the rock plug.

- The remaining rock plug excavation would be timed to follow the dropping lake level as possible and maximize in the dry excavation; top-down excavation of the rock plug would be performed following the lake level down to elevation 425.34 feet or less.
- As lake levels rise, excavation of the rock plug would be performed in-the-wet. An estimated total of 400,000 cubic yards (cy) is expected to be excavated in-the-wet under Alternative 2 (Table 1).
- Blasting and dredging would be required for rock plug excavation. Dredging of approximately 122,000 cy of soft material and silts on the lake bottom would be conducted first to reduce turbidity during the blasting phase. Large silt curtains would be utilized for all operations conducted in-the-wet in order to contain and minimize turbidity. Low lake levels would be utilized where possible to maximize activity in lower lake levels or dry conditions. After fine materials are removed, the underlying rock would be blasted. Blasted material would be dredged using a barge-mounted clam shell or hydraulic excavator dredge, down to an elevation of 350 feet. The dredging would be performed from barges and would require marine equipment to be mobilized and the transload facility to be operational. The removal of remaining rock fragments from the dredging operations would be conducted using airlift systems. An airlift system is utilized to vacuum rock fragments from the lakebed up through a riser to bring fragments to the surface for discharge into a barge.
- In-the-wet excavation would continue to widen the channel. Once the lake level has risen sufficiently to inundate the approach channel between the reduced rock plug and the control structure, the area would be flooded in a controlled fashion to prevent damage to the approach slab and wall and to avoid uncontrollable erosion of the remaining rock plug. The remaining rock plug would be excavated in-the-wet, using underwater blasting and dredging techniques. Seepage and water overflow will be treated and/or discharged back into the lake under appropriate permits.
- Wet dredged material would be drained at site behind silt curtains, and will not be transported with high water content to disposal sites.

Table 1. Approach Channel Excavation Estimates Alternative Comparison

Activity	Alternative 2	Alternative 3
Quantities of excavated material in-the-dry (cubic yards)	600,000	800,000
Quantities of excavated and dredge material in-the-wet (cubic yards)	400,000*	200,000**
Number of days of construction in-the-dry	465	390
Number of days of construction in-the-wet	456	290***

*An additional 400,000 cy of temporary fill material associated with the haul route embankment would be removed under Alternative 2.
**An additional 150,000 cy of cofferdam fill material would be removed under Alternative 3.
***An additional 100 days of in-the-wet deconstruction work may be required for the cofferdam removal.

<u>In-the-Dry (Land-Based) Excavation and Blasting</u>

Land-based rock excavation would consist of conventional drilling and blasting methods. Water-resistant emulsified slurry would be required since water intrusion is anticipated. Explosives would be stored off-site, and would be trucked to the site on a daily basis. The land-based blasting would be conducted up to one blast per day between 1:30 p.m. and 2:30 PM., over 48 months (estimated February 2014 to October 2017) for up to six days per week. Up to 200 land-based blasts are expected in Alternative 2.

<u>In-the-Wet (Underwater) Blasting and Excavation</u>

Underwater rock excavation would be accomplished by drill and blast methods (URS 2009). Each blast would produce approximately 2,000 cy of rock. The removal of material would be completed in two blasted consecutive layers, or lifts, when the rock depth exceeds 30 to 40 feet. Approximately 400 blasts will be conducted underwater over a projected period extending from 2015 to 2017.

- The contractor's blasting plan would be approved by the Corps, and public notices and meetings will be conducted by the contractor prior to commencement of blasting.
- Explosives would be stored off-site and trucked to the site on a daily basis.
- Barge platforms would be transported and assembled on-site to accommodate drilling and excavation equipment.
- Down-the-hole hammer drills would bore 5-inch holes and the holes would be charged with emulsified slurry explosives. Blasting techniques including decking, delayed charges and stemming will be conducted to reduce underwater blast pressures. All charges at least 20-charge diameters would be confined by rock burden and crushed stone stemming to limit the blast over-pressures.
- Up to ten test blasts with reduced charges will be conducted over a week period prior to production blasting. Underwater blast pressures would be limited to 5.8

pounds per square inch at a distance of 2,500 feet from the blast point for human safety.
- A floating safety and exclusion boundary would be maintained at 3,000 feet from the blast point for safety of recreational swimmers and boaters.
- Prior to detonations, the drill and fleeting barge would move 300 to 500 feet from the blast area.
- After verification all charges have been detonated, a long stick excavator or crane supported clam shell would dredge the shot rock into material barges for tow to the temporary transload facility.
- The cleanup of rock fragments would be removed from the channel by airlift systems. Following the use of airlifts, in-the-wet inspection of the lakebed would take place to identify areas where rock fragments remain and designate areas that have been cleared.
- The airlift and inspection divers would work iteratively until all grid areas have been verified to be free of rock fragments. Dredged material would be drained at site behind silt curtains, and will not be transported with high water content to disposal sites.

The dredging equipment that could be utilized for this project includes barges, excavators, and airlifts:

- A barge-mounted large long reach excavator, with an effective excavating depth of 90 to 95 feet, would be used. Different size buckets can be changed out for the various soil and rock materials to be encountered during construction. The excavator method is limited by its effective digging depth. Accordingly, a 3½ month (mid-November to end of February) low lake level window would be required to effectively dredge to the final grades.
- A 225-ton class barge-mounted crawler crane clam shell unit would supplement the hydraulic excavator to dredge shot rock and common material to grade in periods where the lake level is too high for the hydraulic excavator to dredge to final grade.
- An airlift or sweep would be set up on the drill barge to perform foundation clean up for approximately 90 days in Alternative 2.

The long reach excavator, conventional clam shell, and other overwater equipment would be mounted on portable *"Flexifloat"* units, sized and assembled to maintain stability and manage the excavation sets. The size of the *"Flexifloat"* barges would be approximately 180 to 200 feet by 40 to 50 feet by 7 feet deep. The barges would be held in position by large winch controlled spuds, or in water over 50 feet deep, by a four-point mooring system using bottom founded anchors.

<u>Spur Dike (Overlook Extension) Construction</u>

A spur dike is an embankment designed to induce a free, even flow of water into an opening; in this case the opening would be the approach channel (Figure 2). An extension of the overlook would be constructed by the placement of up to 1,400,000 cy of material to construct a spur dike, which is also referred to as an “overlook extension”.

The proposed elliptical-shaped spur dike, or overlook extension, would be located directly to the northwest of the approach channel (Figure 4). The spur dike would have one vertical (V) by 2 horizontal (H) slopes. The surface area of the top of the spur dike would be up to approximately 9 acres; the overall foot print of the spur dike would be up to approximately 22 acres. The crown elevation would be approximately elevation 483.34 feet (NAVD88 vertical datum).

- Lakebed fines would be dredged from under the footprint of the spur dike (approximately 40,000 cy to 80,000 cy), and this material would be placed into another in-water section of the lake or drained and removed to a terrestrial disposal site.
- The amount of excavated disposal material to be placed into the combined spur dike and overlook extension would determine the footprint size of the spur dike.
- The core of the spur dike would be constructed of a decomposed quartz diorite core, commonly known as decomposed granite. This would be followed by a compacted random rock fill followed by a stone riprap cap.
- A silt curtain would be used around the construction area as needed to contain turbidity.
- Equipment needed for wet construction includes barges, traditional or clamshell excavator, and hydraulic suction dredging equipment. The work zone would be protected within a series of contractor-designed turbidity curtains. The construction would take place over 24 months from 2015 to 2017.
-

Approach Channel Concrete Lining

All concrete work and placement in the approach channel would be conducted in-the-dry conditions; no concrete work would be conducted in-the-wet.

Haul Road Embankment

The existing haul road provides access to the disposal areas from the auxiliary spillway. Because excavation of the rock plug would cause loss of the current haul route, approximately 165,000 cy of fill material would be placed east of the rock plug in the wet to create an embankment in order to maintain the haul road connection to the auxiliary spillway.

- Approximately 40,000 cy of lakebed soft material would be dredged before placement of fill material.
- Fill would consist of 6 inch minus crushed rock with less than 5% fines (approximately 145,000 cy) with slope protection consisting of two layers of 1/4 ton rock (approximately 20,000 cy).

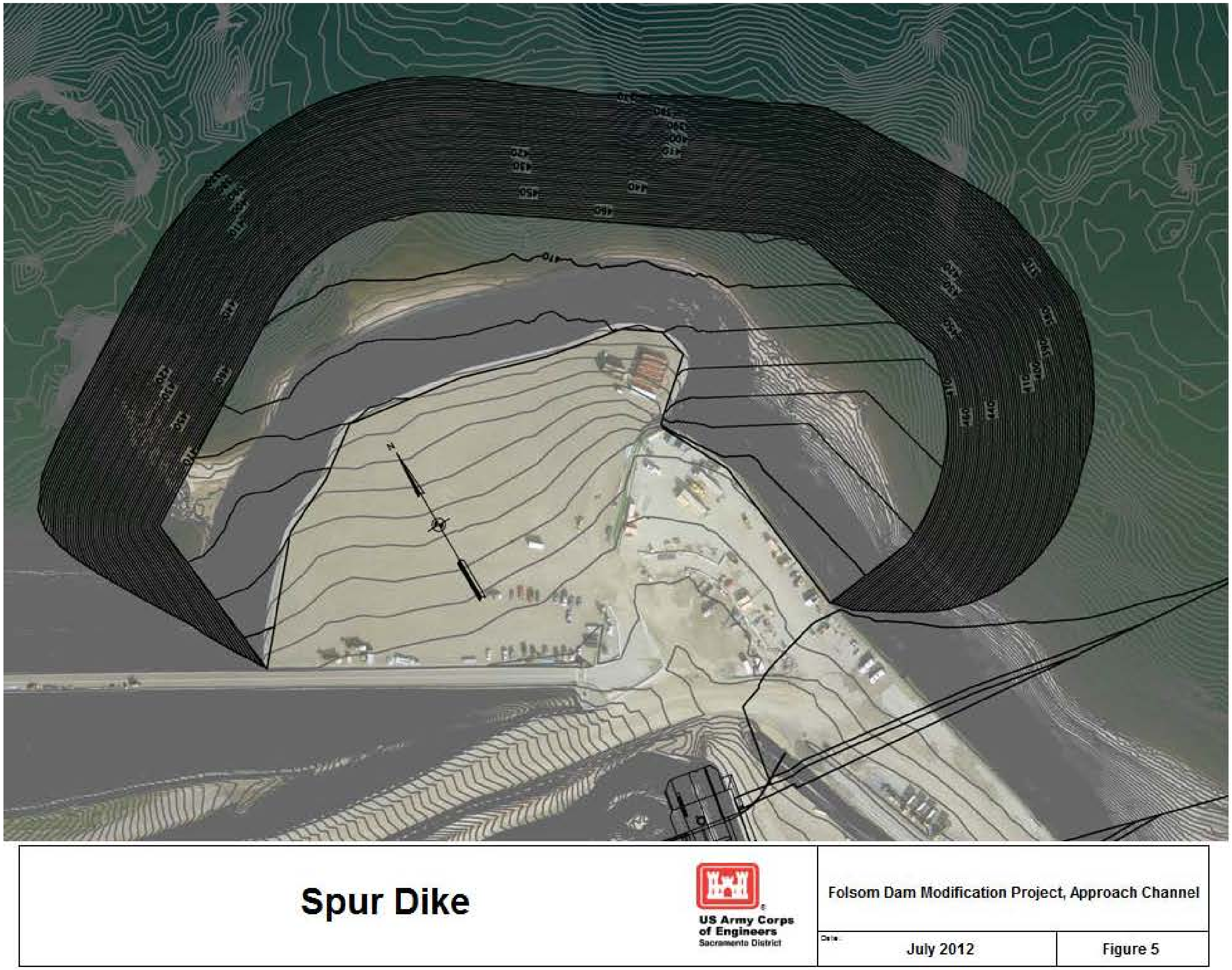


Figure 4. Spur Dike

Transload Facility Construction

A transload facility would be needed for mobilization and demobilization of marine equipment (e.g., sectional barges and heavy cranes), dredge spoil off-loading from barges to trucks, marine equipment fuel and explosives transfer to support barges, equipment maintenance, and marine crew deployment. The proposed transload facility would be comprised of a ramp, crane and crane pad, and a fuel transfer station. The transload facility would be located adjacent to Dike 7 as shown on Figure 1. The ramp structure would require progressive construction to accommodate seasonal and variable lake levels between the elevations of 355 to 475 feet (NAVD 88).

At approximately 1,000 feet from the haul road the ramp would intersect the existing lake bottom. From 1,000 feet to 1,500 feet, steel planks would lie on the existing bottom to control mud and minimize siltation and turbidity within the lake.

The ramp would be constructed from approximately 30,000 to 230,000 cy of compacted 3 inch maximum graded fill with less than five percent fines. Approximately 20,000 cy of ¼ ton riprap would be placed on top of the main fill for protection from wave action. Dredging up to 20,000 cy, or an average of three feet of material, from under the footprint of the ramp may be required depending on the soils at the lake bottom. A silt curtain would be used during construction and removal of the transload facility to contain turbidity.

- Depending on lake levels, ramp material could be placed directly into the water. The fines content of the ramp material would be reduced as much as possible to limit water turbidity during placement of material. Full depth silt curtains would surround the ramp installation to control turbidity and silt movement into the greater lake body.

- The ramp would incur progressive construction, with each stage of horizontal extension depending upon the existing lake level, and depth needed to accommodate the reach to barges. Construction would begin at the shoreline junction with the haul road with extension constructed into the reservoir as needed in response to fluctuating lake levels. Completion of the ramp construction is expected to require four months.

- To offload the dredge spoils from barges, a crane would be at the furthermost extension of the ramp just above lake level. Timber mats would form a work platform for the crane on top of a level crushed rock pad that would be relocated to accommodate fluctuating lake levels.

- A fuel transfer station would be located on the ramp to refuel marine vessels. The transfer station would include a flexible hose from the ramp that would be supported intermittently by a small float anchored offshore. The float would be used to service a utility barge with a storage tank, and then recalled to the ramp to prevent severage by boat traffic. The tank would hold one day's supply of fuel for the floating equipment at the project site. Fuel would be delivered by trucks and pumped from the trucks through the fuel transfer facility to the tank on the utility barge. Protections, BMPs and spill plans will be instituted specifically for fuel actions to maintain water quality.

The transload facility is intended as a temporary structure that will be removed after the completion of the approach channel project in 2017. Ramp material would be removed with excavators and hauled for disposal. Preferably the ramp material will be removed during low lake levels. Silt curtains will be utilized to contain turbidity during transload facility removal if conducted in-the-wet.

Batch Plant Operations

Approximately 13,000 cy of concrete would be needed for the approach channel and approximately 11,200 cy of concrete would be needed for the cutoff wall. This concrete will be exported from off –site or be provided via an on-site concrete batch plant with deliveries and stocking of concrete aggregate, concrete sand, and cement. The batch plant would be located either at Mormon Island Auxiliary Dam (MIAD), Folsom Overlook, downstream chute, or the Folsom Prison site.

The concrete batch plant area would consist of the aggregate storage system, aggregate rescreen system (if needed), rewashing facility (if needed), the batching system, cement storage, ice manufacturing, and the concrete mixing and loading system.

- The aggregate storage system consists of three course aggregate piles and a fine blended sand pile. The aggregate would be transported to the project, dumped into a truck unloading hopper, then conveyed up to an overhead shuttle conveyer, and dropped into respective storage piles.
- The sand and the aggregate would be loaded out of the storage piles with a front end loader, placed into bin hoppers, and conveyed to the batching day hoppers. The aggregates would then be mixed and transported into transit agitator trucks or mixer trucks. Once ready for placement, the concrete would be transported by truck or conveyer from the batch plant site across the auxiliary spillway access road to the concrete conveyor or truck unloading hopper. After delivery of the mix to the unloading hopper, the concrete would be conveyed by a crane for targeted placement.
- Generally, work associated with the batch plant operations would occur during the hours of 7:00 a.m. to 7:00 p.m., however, it is likely that some batching and placements would have to occur in the very early morning or night-time hours. This is especially true for large volume placements and placements that occur in the hot summer season.

Due to the large amounts of rock material being excavated, disposed, and processed as concrete for the project, an on-site rock crushing facility would be necessary. A rock crusher is a machine used to reduce stone to particle sizes that are convenient for their intended uses. Reduction in material size is generally accomplished in several stages and for this project may be used to produce three to six inch rock and smaller aggregate. The rock crusher would be located at either the Folsom Overlook staging area or the MIAD staging and disposal area. The rock crusher would be operated only during noise exempt hours or as permitted by the City of Folsom.

Construction Details

Hydraulic Dredging

Hydraulic cutterhead dredging is proposed for dredge material that does not require blasting prior to excavation or dredging. Hydraulic cutterhead dredging is necessary for site preparation of the transload facility, spur dike, approach channel, and the haul road embankment. A hydraulic dredge floats on the water and excavates and pumps the material through a temporary pipeline to another location. The dredge acts like a floating vacuum cleaner that can remove sediment very precisely.

- A 24-inch or smaller pipeline cutterhead dredge is anticipated to be used to dredge sandy or soft material. A 24-inch pipeline would have an estimated volumetric flow rate, or pumping capacity, of 2,700 to 7,200 cy of dredged sediment slurry per hour, depending on the constraints of the placement site being used (including distance) and the type of sediment being dredged.
- Approximately every 500 feet, the 24-inch flexible pipeline sections would be anchored in the bottom of Folsom Lake to secure it. Pipeline sections and anchors not in use would either be secured on a floating barge, capped and lashed together to float in the project area, or would be stored at the designated staging areas.
- Hydraulic dredging would occur between 2013 and 2017.

Placement of dredged material

Approximately 20,000 cy of soft material from the transload facility footprint, approximately 122,000 from the approach channel, approximately 40,000 cy of material from the haul road embankment, and up to 80,000 cy of the spur dike/expanded overlook footprint could be placed in the proposed dredging deposition site shown in Figure 1.

- Material deposited in the proposed Folsom Lake site below Dike 7 would be spread out to produce a level plane in the depressed lake elevations.
- Silt curtains would be installed to contain sediment and reduce turbidity.

Access and Staging

Access roads to the site, as well as on site haul roads, would be used to transport materials, supplies, equipment, and personnel for the approach channel construction.

The contractor would require staging areas for the following main items and activities: assembly of barges and other marine equipment; stockpiling of materials; contractor's lay-down area; transload facility; concrete batch plant, rock crushing plant; fuel storage; and marine construction and excavation equipment. Staging and stock pile areas would be located at Dike 7, MIAD, Folsom Overlook, and Folsom Prison property (Figure 1). Some staging activities would also occur in the auxiliary spillway chute. The staging area at Dike 7 covers approximately 9 acres and is currently in use to stock pile crushed rock for construction of the control structure. The MIAD staging area is also currently in use for rock crushing and for stockpiling of materials for control structure construction. The Folsom Overlook is approximately 5 acres in size, and is currently in use for equipment staging and stockpiling for the control structure construction.

The haul road between the construction site and the MIAD disposal area is an existing feature and is currently in use for control structure construction activities. Another existing haul road extends from the Folsom Overlook to the chute construction site and down the length of the auxiliary spillway to the stilling basin. This haul road is currently being used for the control structure construction work.

Site Preparation

Prior to construction, the project's office facilities and a parking area would be set up at Dike 7 staging area, the Folsom Overlook point, or the Folsom Prison property. Additional haul road improvements by the rock plug may be implemented. Before construction begins, a safety buffer area up to 1,500 feet wide from all existing construction activity would be physically delineated to serve as safety protection for the public. The 1,500 foot safety buffer will not impede recreational boat traffic from Folsom Point. Lake bed dredging under the footprint of the transload facility may be conducted in initial site preparation depending upon the existing lake level.

Schedule

Alternative 2 would have an expected project length from beginning through completion of approximately 33 months (Table 2). This includes pre-work planning, site preparations, and a five month gap to accommodate construction of the approach channel slab and walls, drilling and blasting operations, excavation of common and blasted rock, spur dike and transload facility construction and bottom cleaning operations. Preparatory work would include an estimated 140 days for setting up office facilities, haul route improvements, and the construction of the transload facility. Construction of the cutoff wall would require approximately 293 days. In-the-dry excavation of the approach channel and casting of the concrete approach channel slab and walls would be conducted over approximately 1,029 days. In-the wet-excavation of the approach channel including clean up and inspection would extend over approximately 484 days. Demobilization and site restoration would require approximately 16 days.

Table 2. Alternative 2 Proposed Construction Activities by Year

Construction Activity	2013	2014	2015	2016	2017
Site Prep / Haul Road Prep	X				
Construct Transload Facility*	X				
Haul Road Embankment*	X	X			
Cutoff Wall Concrete Placement*	X	X			
Common Excavation to Disposal*	X	X	X	X	X
Rock Crusher at MIAD or Overlook Staging Areas	X	X	X	X	X
Batch Plant at MIAD, Prison, or Overlook Staging Areas*	X	X	X	X	X
Dike 7 Staging Area*	X	X	X	X	X
Prison Staging Area*	X	X	X	X	X
On-Site Haul Road Usage to and From Excavation Site and MIAD*	X	X	X	X	X
On-Site Haul Road Usage for Construction of Transload Facility*	X				
Rock Excavation In-the-Dry*	X	X	X	X	X
Mobilization for Approach Walls*		X	X		
Intake Approach Walls and Slab Construction*		X	X	X	
Set up and Operate Silt Curtain/ possible Bubble Curtain**	X	X	X	X	X
Dredge Common Material to Rock*	X	X	X	X	
Drill and Blast / Dredge Rock In-the-Wet***			X	X	X
Spur Dike Riprap***			X	X	X
Transfer Excavated Material to Disposal Site***	X	X	X	X	X
Teardown, Clean Up, and Site Restoration***				X	X
Remove Transload Facility***					X

*potential nighttime construction activity
**potential nighttime construction activity (four 1500 CFM compressors only), if needed;
***nighttime activity with exception of blasting

Borrow and Disposal Sites

Imported rock material may be used for construction of the temporary transload facility, spur dike and concrete production. Material for the remainder of construction activities would originate from on-site sources, such as the spillway and approach channel excavation. Material to construct the spur dike core would likely be short-hauled directly from the approach channel excavation. The riprap and bedding for the spur dike would need to be processed to provide the required gradations for structure stability. Processing this material would also ensure that it contains less than 5 % fines in order to reduce introduction of silt into the reservoir.

There is approximately 1.4 million cy of disposal material associated with construction of the approach channel project. Five potential on-site disposal sites proposed for use as a part of the proposed project. Disposal sites being considered for excavated materials include: 1) the spur dike 2) an in-reservoir site around the transload facility; 3) the MIAD disposal site; and 4) Dike 8 (land based and in-reservoir). The in-Reservoir, Dike 8 and the spur dike would serve as permanent disposal for excavated material. MIAD and Dike 7 would serve as temporary disposal sites, where excavation material will be eventually removed and used for other purposes. The proposed disposal sites are listed in Table 3 below, along with the maximum disposal capacity feasible at each site. The proposed disposal site boundaries are displayed on Figure 1.

Table 3. Proposed Disposal Sites and Capacity

Proposed Disposal Site	Estimated Capacity (cy)
MIAD disposal area	up to 1 million cy
Dike 7	up to 160,000 cy
Dike 8 (land-based and in-reservoir)	up to 730,000 cy
Spur Dike	up to 1.4 million cy
In-reservoir	up to 220,000 cy

Site use feasibility is under assessment at this time for all proposed disposal sites, therefore all proposed disposal sites are to be addressed as options. Environmental effects associated with the use of these sites differ, and the effects of project construction would depend on sites and site combinations selected by the contractor for disposal. Therefore, the effects analyzed in this document accommodate worst-case scenarios to cover all disposal options. It is unlikely that all disposal sites assessed would be used, but it is probable that multiple sites would be selected for use in partial capacity. Currently, all disposal sites are situated on land under the jurisdiction of Reclamation.

The MIAD temporary disposal area is the environmentally preferred disposal site, as it is a previously-disturbed, terrestrial site with minimal overall impacts, and material disposed here will be removed for future projects. However, the use of the MIAD disposal site requires coordination with the scheduling of Reclamation’s MIAD Seismic Modifiation project. Due to potential conflicts in site use, it is possible that this site would not be available during multiple years of construction.

There is potential for additional disposal sites to be proposed for the approach channel construction. Proposed disposal sites must be within a 1.5 to 2 mile radius of the approach channel construction area to remain in compliance with the air quality assessment. Written concurrence is required from the Corps and Reclamation before any disposal site can be used.

Dredged and excavated material that is not used for spur dike construction would be stockpiled at one of the proposed disposal sites. 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 would be removed or recycled in an appropriate manner.

Restoration and Cleanup

Once construction of the approach channel is complete, all equipment and excess materials would be transported offsite via the haul routes discussed above. The access roads and staging areas not used as permanent features of the project would also be restored to pre-project conditions. The work sites and staging areas would be cleaned of all rubbish, and all parts of the work area would be left in a safe and neat condition suitable to the setting of the area. Any un-vegetated areas disturbed during construction would be hydro-seeded with native grass species. Reclamation would conduct additional native vegetative plantings after project completion outside the scope of the Corps project work. Construction debris would be hauled to an appropriate facility. Equipment and materials would be removed from the site, and staging areas and any temporary access roads would be restored to pre-project conditions. Demobilization would occur in various locations as construction proceeds along various elements.

Operation and Maintenance

Long term operations of the approach channel would be performed by Reclamation under a Flood Management Operations Study that is currently in production, and outside the scope of this assessment. The Flood Management Operations Study for Folsom Dam will develop, evaluate, and recommend changes to the flood control operations at Folsom Dam that will further reduce flood risks to the Sacramento area. Operational changes may be necessary to fully realize the flood risk reduction benefits of the following:

- The additional operational capabilities created by the auxiliary spillway;
- The increased downstream conveyance capabilities anticipated to be provided by the American River Common Features Project (Common Features);
- The increased flood storage capacity anticipated to be provided by completion of the Folsom Dam Raise Project (Dam Raise); and
- The use of improved forecasts from the National Weather Service.

Further, the Flood Management Operations Study will evaluate options for the inclusion of creditable flood control transfer space in Folsom Reservoir in conjunction with Union Valley, Hell Hole, and French Meadows Reservoirs (also referred to as Variable Space Storage). The study will result in a Corps decision document and will be followed by a water control manual implementing the recommendations of the Study. It should be recognized that the initial water control manual will implement the recommendations of the study, but will not include the capabilities to be provided by the Dam Raise and additional Common Features project improvements until such time as these projects have been completed.

1.3.2 Alternative 3: Approach Channel Excavation with Cofferdam

Alternative 3 consists of excavation of the approach channel integral using a cofferdam technique. The proposed action is to excavate an approach channel and construct an adjacent spur dike, which would channel flood flows to the auxiliary spillway.

<u>Cofferdam</u>

The cofferdam consists of a series of 84-foot diameter circular sheet pile cells constructed using 85-foot-long flat sheet piles.

- Prior to cofferdam construction, lake sediments and other soils would be dredged to expose decomposed granite. A silt curtain placed around the perimeter of the excavation and during cofferdam installation would be required to control turbidity in the lake.
- The total estimated volume of cofferdam fill materials would be 149,600 cy, almost all of which is cell fill. The construction of the cells requires sheet piles to be installed using a template of two to three horizontally mounted ring wales to provide support for the vertical flat sheets. The sheet piles are installed using a vibratory hammer, working progressively around the ring.
- Once erected, the cells would be filled with well-graded clean crushed rock. The same plan dimension is maintained throughout the cofferdam, allowing for one sheet pile installation template to be utilized for construction of all of the circular cells.
- A layer of riprap would be placed along the upstream toe of the cells for scour protection. The cells are founded directly on the decomposed granite.
- A temporary haul road would be created on top of the cofferdam with the placement of approximately one foot of crushed rock in order to provide continuing access to the overlook. The cofferdam accommodates a high design lake level of elevation 468.34 feet.
- After the cofferdam is installed the downstream area would be dewatered. Timing would be coordinated with the completion of the control structure.
- After excavation of the approach channel is completed, the cofferdam would have a provision for controlled but rapid flooding of the approach channel area to allow for quick equalization of hydraulic loads on both sides of the cofferdam. Rapid flooding of the approach channel excavation would be achieved by two or more flood gates installed in the connector cells. Each gate would consist of an approximately 100-foot long, 4-foot diameter pipe mounted with a slide gate on

the upstream side of the cofferdam. Infilling of the approach channel excavation area up to the high lake level at elevation 468.34 feet would be expected to occur within about 6 hours.

- After approach channel flooding is completed, the cofferdam would be removed. Any remaining materials would be dredged using a barge-mounted clam shell or hydraulic excavator dredge until elevation 350 is reached. Silt curtains would be utilized to contain turbidity.

Approach Channel Excavation

As described in Alternative 2 (Section 1.3.1), the approach channel would extend approximately 1,100 feet upstream of the concrete control structure (Figure 1). The primary difference within Alternative 3 is that a reduced amount of excavation would occur within in-the-wet conditions. Approximately 200,000 cy would be excavated in-the-wet under Alternative 3 (Table 1). After construction of the cofferdam, the downstream area would be dewatered prior to the in-the-dry excavation for the approach channel slab, walls, and rock trap.

As described in Alternative 2, ripping and blasting would be required to facilitate rock excavation. The approach channel slab and concrete walls would be installed once sufficient excavation material is removed. The approach channel excavation and blasting could continue during construction of the approach channel slab and walls provided they do not damage or interfere with the construction of the slab and walls or damage the cofferdam. During this timeframe the control structure’s bulkhead gates would be constructed. Once the control structure’s bulkhead gates are installed and the approach channel is completed, the area downstream of the cofferdam would be flooded in a controlled fashion to equalize the water with lake levels. In-the-wet excavation begins with the removal of the cofferdam.

The remaining common material would be excavated in-the-wet, using underwater blasting and dredging techniques as described in Alternative 2. The remainder of the approach channel excavation under a flooded status would be conducted from barge mounted equipment. Residual rock fragments would be removed from the channel with airlift systems.

In-the-Dry (Land-Based) Excavation and Blasting

Land-based excavation methods would be similar to those described under Alternative 2. An increased amount of land based blasting would occur under Alternative 3 (Table 1) since a decreased amount of blasting and excavation would occur under in-the-wet conditions. Terrestrial based blasting could be expected for up to 137 days. Removing more material in-the-dry, would reduce the total amount of blasting needed for the project due to the higher material density that can be removed in the dry than in the wet.

In-the-Wet (Underwater) Blasting and Excavation

Underwater drill and blast methods are the same as discussed under Alternative 2, and material removal by dredge equipment and barge is expected to follow a similar prescription. The primary difference within Alternative 3 is the reduced amount of blasting and excavation activity in the wet (Table 1) corresponding to installation of a cofferdam. Under Alternative 3, approximately 45 underwater blasts could be expected over a period of 180 days in-the-wet conditions.

Spur Dike (Overlook Extension) Construction

Under Alternative 3, a spur dike would be constructed as described in Alternative 2.

Approach Channel Concrete Lining

The approach channel concrete lining, in-the-wet and in-the-dry excavation and blasting methods for Alternative 3 would be the same as described under Alternative 2 with the exception of the material amounts excavated under wet conditions versus dry conditions (Table 1).

Haul Road Embankment

The haul road embankment specified under Alternative 2 will not be built adjacent to the rock plug under Alternative 3 (Figure 2). Because construction of the cofferdam affords a longer term access to the overlook area, the current haul road accessing the overlook area would be shifted to the top of the cofferdam. The cofferdam affords sufficient level area to support a haul road that would be incorporated into the cofferdam construction by placement of approximately one foot of crushed rock on top of the cofferdam.

Transload Facility Construction

Under Alternative 3, a transload facility would be constructed as described in Alternative 2. Under Alternative 3, the transload facility would likely be constructed within an earlier time frame of the construction schedule to provide facilities for construction of the cofferdam.

Batch Plant Operations

Under Alternative 3, a batch plant would be constructed and operated as described in Alternative 2 with the exception that a reduced amount of concrete would be produced for Alternative 3. Concrete produced by the batch plant would be used only for the construction of the approach channel slab and walls. Approximately 13,000 cy of concrete would be produced under Alternative 3.

Construction Details

Hydraulic Dredging

Hydraulic cutterhead dredging is proposed for dredge material that does not require blasting prior to excavation or dredging. Hydraulic cutterhead dredging is necessary for site preparation of the transload facility, spur dike, approach channel, and the haul road embankment. A hydraulic dredge floats on the water and excavates and pumps the material through a temporary pipeline to another location. The dredge acts like a floating vacuum cleaner that can remove sediment very precisely.

- A 24-inch or smaller pipeline cutterhead dredge is anticipated to be used to dredge sandy or soft material. A 24-inch pipeline would have an estimated volumetric flow rate, or pumping capacity, of 2,700 to 7,200 cy of dredged sediment slurry per hour, depending on the constraints of the placement site being used (including distance) and the type of sediment being dredged.
- Approximately every 500 feet, the 24-inch flexible pipeline sections would be anchored in the bottom of Folsom Lake to secure it. Pipeline sections and anchors not in use would either be secured on a floating barge, capped and lashed together to float in the project area, or would be stored at the designated staging areas.
- Hydraulic dredging would occur between 2013 and 2017.

Placement of dredged material

Approximately 20,000 cy of soft material from the transload facility footprint, approximately 122,000 from the approach channel, approximately 40,000 cy of material from the haul road embankment, and up to 80,000 cy of the spur dike/expanded overlook footprint could be placed in the proposed dredging deposition site shown in Figure 1.

- Material deposited in the proposed Folsom Lake site below Dike 7 would be spread out to produce a level plane in the depressed lake elevations.
- Silt curtains would be installed to contain sediment and reduce turbidity.

Access and Staging

Access and staging areas under Alternative 3 would be the same as described in Alternative 2.

Site Preparation

Site preparation of the project area under Alternative 3 would be the same as described in Alternative 2.

Schedule

Alternative 3 requires combined in-the-dry and in-the-wet excavation of the approach channel with a cofferdam. The construction schedule of Alternative 3 would run approximately 37 months through completion. Work would include pre-work planning, cofferdam construction and demolition (Table 4), a 5-month gap to accommodate construction of the approach channel slab and side walls, in-the-dry and in-the-wet drilling and blasting operations, in-the-dry and in-the-wet excavation of blasted rock, spur dike construction, and bottom cleaning operations. Preparatory work includes 140 days for setting up office facilities, haul route improvements/construction and the construction of the transload facility. Construction of the cofferdam is expected to require approximately 240 days, which includes in-the-dry excavation allowing for soft lake sediments removal below cofferdam along existing shoreline, dredging of soft lake sediments below cofferdam foot print, and the installation of the cofferdam. Dewatering of the approach channel excavation would take place upon installation of all pumps, monitoring and instrumentation equipment. In-the-dry excavation and blasting of the approach channel and casting of the concrete approach channel slab and walls would require approximately 600 days. The removal of the cofferdam would engage approximately 115 days. In-the wet-excavation of the approach channel including clean up and inspection would extend over approximately 290 days. Demobilization and site restoration would be expected to take approximately 16 days.

Borrow and Disposal Sites

Material for the cofferdam would be reused from onsite excavation of the approach channel. Materials for the transload facility, spur dike and approach channel under Alternative 3 would be the same as described in Alternative 2. The disposal of materials would also be the same as described in Alternative 2.

Restoration and Cleanup

Removal of the cofferdam would begin during low lake levels and the aggregate would be disposed at one of the proposed disposal area or at a landfill. The remainder of the restoration and cleanup of the project area under Alternative 3 would be similar to that described in Alternative 2. An exception would include the amount of an estimated 60 days, rather than 90 days, for foundation clean up by an airlift or sweep.

Operation and Maintenance

Under Alternative 3, long term operations would follow the description provided in Alternative 2.

Table 4. Alternative 3 Proposed Construction Activities by Year

Construction Activity	2013	2014	2015	2016	2017
Mobilization for Cofferdam	X	X			
Construct Transload Facility*	X				
Common Excavation Below Cofferdam*	X				
Common Dredge Below Cofferdam*	X				
Construction of Sheet Pile Cells*	X	X			
Fill Cells*	X	X			
Set up and Operate Silt Curtain**	X	X	X	X	X
Rock Crusher at MIAD or Overlook Staging Areas	X	X	X	X	X
Batch Plant at MIAD, Prison, or Overlook Staging Areas*	X	X	X	X	X
Dike 7 Staging Area*	X	X	X	X	X
Prison Staging Area*	X	X	X	X	X
On-Site Haul Road Usage to and From Excavation Site and MIAD*	X	X	X	X	X
On-Site Haul Road Usage for Construction of Transload Facility*	X				
Dewater Behind Cofferdam*		X			
Mobilization for Approach Walls*			X		
Intake Approach Walls and Slab*			X	X	X
Import of Construction Material*	X	X	X		
Rock Excavation In-the-Dry*	X	X	X	X	X
Spur Dike Riprap*				X	
Transfer Excavation Material to Disposal Site*	X	X	X	X	X
Remove Cell Rubble Fill*					X
Remove Sheets*					X
Dredge Common Material to Rock*	X	X	X	X	X
Drill and Blast / Dredge Rock In-the-Wet*			X	X	X
Teardown, Clean Up, and Site Restoration*				X	X
Remove Transload Facility*					X

*potential nighttime construction activity
**potential nighttime construction activity (four 1500 CFM compressors only), if needed

1.4 Regulatory Setting

This section discusses federal, state, and local regulatory standards applicable to in-water activities, water quality, dredging and discharge of materials into water bodies, and aquatic priority pollutants including mercury.

Dredging projects subject to regulation from a government agency consist of the following four activities:

- The physical removal of sediment material from the bottom of a water body;
- The incidental discharge of sediment during the dredging, as a result of disturbing and physically moving the sediments;
- The placement of the dredged sediments on land; and
- The return of any water from the dredged sediments back to surface water either during removal or after placement.

1.4.1 Federal Regulations

Clean Water Act

The Clean Water Act (CWA) is the primary federal law governing water pollution. It established the basic structure for regulating discharges of pollutants into the waters of the U.S. and gives the U.S. Environmental Protection Agency (USEPA) the authority to implement pollution control programs such as setting wastewater standards for industries (USEPA 2002). In certain states such as California, the USEPA has delegated authority for the CWA to state agencies.

The CWA requires that a permit be obtained from the USEPA and the Corps when discharge of dredged or fill material into wetlands and waters of the United States occurs. Under Section 404 of the CWA, the Corps regulates such discharges and issues individual and/or general permits for these activities. Before the Corps can issue a permit under CWA Section 404, it must determine that the project is in compliance with the CWA Section 404(b) (1) guidelines. The 404(b)(1) guidelines specifically require that “no discharge of dredged or fill material shall be permitted if there is a practical alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences” (40 CFR 230.10[a]). The USEPA, however, has “veto” authority over permits issued by the Corps. When performing its own civil works projects, the Corps does not issue itself these permits, rather, the Corps must determine that the project is incompliance with the CWA Section 404(b)(1) guidelines issued by the USEPA as stated in Corps regulations.

Section 401 of the CWA regulates the water quality for any activity which may result in any in-water work or discharge into navigable waters. These actions must not violate federal or state water quality standards. The Central Valley Regional Water

Quality Control Board (CVRWQCB) administers Section 401 in the State of California, and either issues or denies water quality certifications depending upon whether the proposed discharge or fill material complies with applicable State and Federal laws. Water quality certifications for large or complex actions such as this Project typically include project-specific requirements established by the CVRWQCB to ensure attainment of water quality standards and compliance with applicable policies and regulations.

Section 303(d) of the CWA requires that States establish priority rankings for water on the lists and develop action plans, called Total Maximum Daily Loads (TMDLs), to improve water quality (USEPA 2002). A TMDL is a tool for implementing water quality standards and is based on the relationship between pollution sources and in-stream water quality conditions.

The Lower American River, downstream of the Project setting, has been placed on the State's list of impaired water bodies (the 303(d) list of the CWA) for mercury and polychlorinated biphenyls (PCBs) and unknown toxicity. The upper American River, including Lake Natoma downstream of the Project Setting, Folsom Lake within the project setting, and the North and South Forks of the American River, upstream of the Project setting, have been placed on the 303(d) list for mercury. Placement on the State's 303(d) list means that TMDLs will eventually be required for those pollutants in each affected water body. Mercury TMDLs for all those water bodies will be addressed though a Statewide mercury TMDL plan, which is anticipated to be completed in 2013.

<u>Jurisdictional Waters of the United States</u>

Regulated or jurisdictional waters include all wetlands adjacent to navigable waters in addition to navigable waters, interstate waters, and their tributaries. Therefore, any discharge of dredged or fill material into these jurisdictional waters would be subject to compliance with Section 404 and 401 of the CWA. Project construction related to impacts to jurisdictional wetlands would be subject to regulations stated within these permits. All waters of the United States are also considered waters of the State and are subject to regulation under the Porter-Cologne Water Quality Control Act.

Seasonal wetlands and freshwater marshes exist along the margins of the reservoir, typically within or adjacent to streams, swales, or other drainages. In addition, groundwater upwelling is creating a wetland near Dike 5 on the western side of the reservoir.

The Corps verified a wetland delineation submitted by Reclamation for the 2007 Final Environmental Impact Statement/Environmental Impact Report on December 11, 2007. Approximately 314.46 acres of waters of the United States, including Folsom Lake, the American River, and wetlands, were present within the survey area. The survey did not delineate any wetlands within the project area that comprises approximately 10 acres of Folsom Lake. Folsom Lake and all tributaries are regulated under Section 404 of the CWA, since they are tributaries to navigable waters of the United States.

The Mormon Island Wetlands Natural Preserve is located south of Green Valley Road between Natoma Street and Sophia Parkway. The 100-acre preserve is approximately 0.50 miles upstream from the project site. The excavation of the approach channel and disposal of materials at the MIAD disposal area would not impair wetland functions of the Mormon Island Wetlands Natural Preserve.

Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act of 1899 regulates alteration of (and prohibits unauthorized obstruction of) any navigable waters of the United States. Construction of any bridge, dam, dike or causeway over or in navigable waterways of the U.S. is prohibited without Congressional approval. Construction plans for a bridge or causeway must be submitted to and approved by the Secretary of Transportation, while construction plans for a dam or dike must be submitted to and approved by the Corps. Excavation or fill within navigable waters also requires the approval of the Corps.

National Pollutant Discharge Elimination System

All point sources that discharge into navigable waters of the United States must obtain a National Pollutant Discharge Elimination System (NPDES) permit under provisions of Section 402 of the CWA. In California, the State Water Resources Control Board (SWRCB) and CVRWQCBs are responsible for the implementation of the NPDES permitting process at the state and regional levels, respectively. Individual NPDES permits have previously been issued in California to dewatering operations having a long duration, but not for shorter duration dewatering activities such as the Folsom Dam JFP.

The NPDES permit process also provides a regulatory mechanism for the control of non-point source pollution created by runoff from construction and industrial activities, and general and urban land use, including runoff from streets. Projects involving construction activities (e.g., clearing, grading, or excavation) involving land disturbance greater than one acre must file a Notice of Intent (NOI) with the CVRWQCB to indicate their intent to comply with the State General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order No. 2010-0014-DWQ Construction General Permit (CGP). This Project would be required to file an NOI to and comply with the provisions of the CGP.

The Construction General Permit establishes conditions to minimize sediment and pollutant loadings and requires preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) prior to construction. The SWPPP is intended to help identify the sources of sediment and other pollutants, and to establish Best Management Practices (BMPs) for storm water and non-storm water source control and pollutant control. The Construction General Permit also has detailed requirements regulating the use of active treatment systems (ATS) used to control turbidity for construction and dewatering. ATS are used where traditional erosion and sediment controls are not sufficient to prevent water quality standards from being exceeded. If this Project were to implement ATS, an approved ATS would be required by the CGP.

Safe Drinking Water Act

The federal Safe Drinking Water Act (SDWA) was established to protect the quality of drinking water in the United States. This law focuses on all waters actually or potentially designated for drinking use, whether from above ground or underground sources, in other words, the municipal drinking water beneficial use of Folsom Reservoir. Contaminants of concern in a domestic water supply are those that either pose a health threat or in some way alter the aesthetic acceptability of the water and are currently regulated by the USEPA as primary and secondary maximum contaminant levels (MCLs). Therefore, MCLs set the water quality standards for municipal drinking water uses.

1.4.2 State Regulations

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1970 established the SWRCB and nine regional water quality control boards within the State of California. These groups are the primary state agencies responsible for protecting California water quality to meet present and future beneficial uses and regulating appropriative surface rights allocations. The preparation and adoption of water quality control plans, or Basin Plans, and statewide plans, is the responsibility of the SWRCB.

California Water Code and Basin Plans

State law requires that Basin Plans conform to the policies set forth in the California Water Code beginning with Section 13000 and any State policy for water quality control. These plans are required by the California Water Code (Section 13240) and supported by the Federal CWA. Section 303 of the CWA requires states to adopt water quality standards which "consist of the designated uses of the navigable waters involved and the water quality criteria for such waters based upon such uses." According to Section 13050 of the California Water Code, Basin Plans consist of a designation or establishment for the waters within a specified area of beneficial uses to be protected and water quality objectives to protect those uses. Adherence to Basin Plan water quality objectives protects continued beneficial uses of water bodies.

The Project is located within the jurisdiction of the Central Valley Region (Region 5) office of the RWQCB, which guides and regulates water quality in streams and aquifers of the Sacramento-San Joaquin Valley through designation of beneficial uses, establishment of water quality objectives, administration of the NPDES permit program for storm water and construction site runoff, and Section 401 water quality certification where development results in fill of jurisdictional wetlands or waters of the US under Section 404 of the Clean Water Act.

The Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins presents the beneficial uses that the Regional Board has specifically designated for local aquifers, streams, marshes, rivers, and the Delta, as well as the water quality objectives and criteria that must be met to protect these uses. The project site within Folsom Lake drains to American River. The following applicable beneficial uses include:

Folsom Lake:

- Municipal and agricultural water supply
- Power
- Contact and non-contact aquatic recreation
- Warm and cold freshwater wildlife habitat
- Warm-water fish spawning

Downstream of Folsom Dam to the Sacramento River:

- Municipal and agricultural water supply
- Power and Industrial supply
- Contact and non-contact aquatic recreation
- Warm and cold freshwater wildlife habitat
- Warm and cold water fish migration
- Warm and cold water fish spawning

To protect the beneficial uses, the Basin Plan includes numerical and narrative water quality objectives for physical and chemical water quality constituents. Numerical objectives are set for temperature, dissolved oxygen (DO), turbidity, and pH; total dissolved solids (TDS), electrical conductivity, bacterial content and various specific ions; trace metals; and synthetic organic compounds. Narrative objectives are set for parameters such as suspended solids, biostimulatory substances (e.g. nitrogen and phosphorus), oil and grease, color, taste, odor, and aquatic toxicity. The primary method used by the CVRWQCB to ensure conformance with the Basin Plan's water quality objectives and implementation policies and procedures is to issue Waste Discharge Requirements (WDRs) for projects that may discharge wastes to land or water. WDRs specify terms and conditions that must be followed during the implementation and operation of a project.

Table 5 presents surface water objectives for TDS, DO, turbidity, temperature and pH for the construction area. These parameters are discussed in relation to their particular water quality objectives as stated in the CVRWQCB Basin Plan.

Table 5. CVRWQCB Basin Plan Water Quality Objectives

Parameter	Minimum Requirement	Maximum Requirement	Comments
pH	6.5	8.5	
Turbidity		10	Except during periods of storm runoff, per the CVRWQCB Basin Plan
DO	• 7.0 mg/L for support cold water ecosystems and spawning, reproduction and/or early development beneficial uses • 5.0 mg/l for water designated to support warm water ecosystems		Average of 5.0 mg/l in water designated to support warm water ecosystems daily minimum is 85 percent of saturation in the main water mass, and the 95th percentile concentration minimum 75 percent of saturation
TOC	NA	NA	
Nitrogen	NA	NA	
Phosphorus	NA	NA	
TDS		100 mg/L	90^{th} percentile
Temperature		$5^{o}F$	Maximum allowable increase in temperature of waterbody
Electric Conductivity	NA	NA	

NA – not applicable as no water quality objectives for this parameter are presented in the Basin Plan

On May 18, 2000, the USEPA published the California Toxics Rule (CTR) in the Federal Register, adding Section 131.38 to Title 40 of the CFR and establishing new water quality objectives for some constituents in the Basin Plans. On May 22, 2000, the Office of Administrative Law approved, with modifications, the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (Phase 1 of the Inland Surface Waters Plan and Enclosed Bays and Estuaries Plan). The Policy establishes implementation procedures for three categories of priority pollutant criteria or water quality objectives. These are:

1) Criteria promulgated by the U.S. EPA in the National Toxics Rule that apply in California;
2) Criteria proposed by the USEPA in the California Toxics Rule; and
3) Water quality objectives contained in RWQCB Basin Plans.

California Office of Environmental Health Hazard Assessment

The California Office of Environmental Health Hazard Assessment (OEHHA) is responsible for protecting and enhancing public health and the environment by scientific evaluation of risks posed by hazardous substances. In the Project setting, OEHHA's recent Public Health Goal (PHG) for hexavalent chromium in drinking water and risk assessment guidelines for mercury in fish are used to establish thresholds for effects. The California Department of Health (DPH) implements guidance established by OEHHA, the United States Environmental Protection Agency, and other sources by establishing maximum concentration limits (MCLs) for chemical constituents in drinking water. MCLs are enforceable as numeric water quality objectives in California. The PHG for hexavalent chromium established by OEHHA has not yet been adopted as an MCL by DPH. An MCL for hexavalent chromium may be adopted by DPH during the duration of the Project, but the final value is not certain and the implementation plan for that MCL has not been specified by DPH.

California Toxics Rule

Although federal MCLs are used for municipal drinking water uses, the aquatic life objectives put forth in the California Toxics Rule (CTR) are more stringent because, in general, aquatic life are more sensitive to metals exposure than people are through drinking water. At least one exception to this is hexavalent chromium, which has a PHG of 0.02 µg/L for human exposure through drinking water, as compared to a chronic water quality objective of 11 µg/L for protection of freshwater organisms.

The aquatic life objectives are the average for two periods for exposure: a 4-day chronic exposure and a 1-hr acute exposure. The analysis presented in the memo focuses on the chronic exposure because this is a lower, more stringent value. These objectives are based on the dissolved metal concentrations. Dissolved metal concentration is the metal concentration present in a sample that has passed through a 0.45 µm filter. The dissolved metal form is most damaging to aquatic organisms, entering through the gills and membranes. Due to the formation of inorganic complexes, the hardness concentration in the sample affects the toxicity of many metals to aquatic organisms. Therefore, aquatic life objectives are expressed as hardness dependent equations for cadmium, total chromium, copper, lead, nickel and zinc.

The aquatic life objectives, in other words, the not to exceed concentrations, presented in the CTR (2000) are based on 100 mg/L of hardness. Background data provided for Folsom Lake indicate that the hardness concentration is approximately 30 mg/L; therefore, the aquatic life objectives were corrected assuming a hardness of 30 mg/L (Tables 6 and 7).

Table 6. Chronic Aquatic Life Criteria Given for 100 mg/L Hardness and Corrected for 30 mg/L Hardness

Trace Element	Chronic (4-day average) (100 mg/L Hardness)	Chronic (4-day average) (30 mg/L Hardness)
Arsenic	150	150
Cadmium	2.2	0.92
Chromium (total)	180	66.
Copper	9.0	3.20
Lead	2.5	0.66
Nickel	52	19.
Zinc	120	43.

Table 7. Acute Aquatic Life Criteria Given for 100 mg/L Hardness and Corrected for 30 mg/L Hardness

Trace Element	Acute (1-hr average) (100 mg/L Hardness)	Acute (1-hr average) (30 mg/L Hardness)
Arsenic	340	340
Cadmium	4.3	1.2
Chromium (total)	550	205
Copper	13	4.3
Lead	65	17.
Nickel	470	170
Zinc	120	44

1.4.3 Local Regulations

General Plans for El Dorado, Placer, and Sacramento Counties each have provisions aimed at protecting local water resources for future and current use. The El Dorado County General Plan establishes a county-wide water resources program to conserve, enhance, manage, and protect water resources and their quality from degradation. These objectives consist of the following: ensuring an adequate quantity and quality of water is available; protection of critical watersheds, riparian zones, and aquifers; improvement and subsequent maintenance of the quality of both surface water and groundwater; wetland area protection; utilization of natural drainage patterns; and encouraging water conservation practices including re-use programs for applicable areas such as agricultural fields (El Dorado County 2004).

The Placer County General Plan's main goal pertaining to local water resources states that the natural qualities of its streams, creeks and groundwater would be protected and enhanced. To accomplish this goal, the County has enacted policies such as requiring various setbacks and easements from sensitive habitat areas or creek corridors, requiring mitigation measures for developments encroaching water bodies, implementing BMPs to protect streams from runoff during construction activities or due to agricultural practices, and protecting groundwater resources from contamination (Placer County 1994).

The Conservation Element of Sacramento County's General Plan contains measures to implement water conservation and to protect surface water supplies and surface water quality. Specific goals include the following: use of surface water to ensure long-term supplies exist for residents while providing recreational and environmental benefits; protecting surface water quality for both public use and support of aquatic environment health; and promoting water conversation and reuse measures.

In general, it is assumed that compliance with Federal and State water quality regulations will ensure compliance with local policies and regulations.

1.4.4 Beneficial Uses and Metals Water Quality Objectives

The federal SDWA was established to protect the quality of drinking water in the United States. This law focuses on all waters actually or potentially designated for drinking use, whether from above ground or underground sources, in other words, the municipal (MUN) beneficial use of Folsom Reservoir. Contaminants of concern in a domestic water supply are those that either pose a health threat or in some way alter the aesthetic acceptability of the water and are currently regulated by the USEPA as primary and secondary MCLs. Therefore, MCLs set the water quality standards for MUN uses.

Although MCLs are used for MUN, the aquatic life objectives put forth in the CTR are more stringent because, in general, aquatic life are more sensitive to metals exposure than people are through drinking water. At least one exception to this is hexavalent chromium, which has a PHG of 0.02 µg/L for human exposure through drinking water, as compared to a chronic water quality objective of 11 µg/L for protection of freshwater organisms.

The aquatic life objectives are the average for two periods for exposure: a 4-day chronic exposure and a 1-hr acute exposure. The analysis presented in the memo focuses on the chronic exposure because this is a lower, more stringent value. These objectives are based on the dissolved metal concentrations. Dissolved metal concentration is the metal concentration present in a sample that has passed through a 0.45 µm filter. The dissolved metal form is most damaging to aquatic organisms, entering through the gills and membranes. Due to the formation of inorganic complexes, the hardness concentration in the sample affects the toxicity of many metals to aquatic organisms. Therefore, aquatic life objectives are expressed as hardness dependent equations for cadmium, total chromium, copper, lead, nickel and zinc.

2.0 WATER QUALITY

This section provides details on existing water and sediment conditions in Folsom Reservoir, at the project site, and downstream in the American River. It reviews sediment samples collected to characterize existing conditions and details the analysis of potential impacts to water quality parameters, including dissolved metals concentrations, as a result of project construction.

Snowmelt and precipitation from the upper American River Watershed discharges water into Folsom Reservoir. In general, runoff from the relatively undeveloped watershed is of very high quality, rarely exceeding the State of California's water quality objectives (Wallace, Roberts, and Todd, et al. 2003).

The following beneficial uses have been defined by the CVRWQCB for Folsom Reservoir: municipal and domestic water supply; irrigation; industrial power; water contact and non-contact recreation; warm and cold freshwater habitat, warm freshwater spawning habitat; and wildlife habitat, along with potential beneficial uses for industrial service supply (RWQCB 1998). Water quality within Folsom Reservoir is generally acceptable to meet the beneficial uses currently designated for the waterbody. However, in the past, occasional taste and odor problems have occurred in municipal water supplies diverted from Folsom Reservoir. Blue-green algal blooms that occasionally occur in the reservoir due to elevated water temperatures were identified as the cause of these problems.

2.1 Water Quality Data for Construction Area

This section presents data describing general water quality parameters including pH, turbidity, DO, total organic carbon (TOC), nitrogen, phosphorus, electric conductivity, TDS, and fecal coliform for Folsom Reservoir.

The minimum, maximum, and average levels of pH, turbidity, DO, TOC, nitrogen, phosphorous, and electric conductivity within Folsom Reservoir are presented in Table 8. All of the data were collected over a six year period from 1992 to 1998; 104 samples were taken for both pH and turbidity; 47 samples were taken for TOC; and 101 samples were taken for electric conductivity (Larry Walker Associates 1999).

Table 8. Water Quality Parameters (1992-1998)

Parameter	Minimum	Maximum	Average
pH	5.82	8.46	7.09
Turbidity	1	68	1.2
DO	6.1	13.6	10.3
TOC	2	3.5	NA
Nitrogen	NA	NA	NA
Phosphorus	NA	NA	NA
Electric	18.5	123	52.2

Conductivity			

Table 9 presents the minimum, maximum, and average levels of pH, electric conductivity, DO, turbidity, TOC, nitrogen, phosphorus, and TDS within Folsom Reservoir. The pH, electric conductivity, DO, and turbidity data were collected on June 28, 2005; a total of 47 samples were taken. The TOC data were collected on June 11, 2003; a total of 6 samples were taken. The nitrogen, phosphorus, and TDS data were collected over a 13-month period from February 2001 to February 2002; 5 samples were taken for each of these parameters.

Table 9. Folsom Reservoir Water Quality Parameters (2001-2005)

Parameter	Minimum	Maximum	Average
pH	6.6	8.23	6.94
Turbidity	1	126.9	8.4
DO	4.95	7.93	6.88
TOC	1.5	1.8	1.6
Nitrogen	<0.050	0.11	0.062
Phosphorus	<0.010	<0.050	0.0212
TDS	39	44	41.8
Electric Conductivity	32.5	61.6	46.2

2.2 Methodology

Potential impacts associated with each alternative were assessed through a qualitative evaluation. Information presented in the existing conditions as well as construction practices and materials, location, and duration of construction were evaluated during the assessment process.

2.2.1 Significance Criteria

<u>CEQA Significance Criteria and NEPA Substantial Effects Criteria</u>

Thresholds of significance are used to define indicators of significant environmental effects. In general, thresholds should be objective, quantitative wherever reasonably possible, and based on existing standards wherever possible.

Based on CEQA Guidelines, effects on hydrologic resources and water quality conditions as it applies to bioaccumulation potential would be significant if construction would:

a) Violate any water quality standards or waste discharge requirements.

b) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.

c) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

d) Substantially degrade water quality.

2.2.2 **Methods and Assumptions**

Water quality standards and sediment quality criteria, described below, were applied to the methods used for the assessment process. The standards and criteria, with the existing conditions, construction practices and materials, location, and duration of construction were evaluated during the assessment process.

Any assumptions applied during the assessment process are detailed in the section describing each assessment.

2.3 **Water Quality Standards**

The *Water Quality Control Plan for the Sacramento River and the San Joaquin River Basins, Fourth Edition* (Basin Plan) designates beneficial uses, establishes water quality objectives, contains implementation plans and policies for protecting water of the basin, and incorporates by reference plans and policies adopted by the CVRWQCB.

The Basin Plan lists the beneficial uses of Folsom Lake. The existing beneficial uses that apply to the Project are as follows.

- Water contact recreation (REC-1);
- Freshwater fish habitat (WARM and COLD);
- Wildlife habitat (WILD)

The Basin Plan also states, under the section, *Other Discharge Activities*, that the "Regional Water Board regulates dredging operations on a case-by-case basis. Operational criteria may result from permits or the water quality certification requirements stemming from Section 401(a) of the CWA."

Sediment Quality Criteria

The SWRCB published in November 2006, the "Revision of the Clean Water Act Section 303(d) List of the Water Quality Limited Segments, Volume 1." The purpose of this staff report was to present the SWRCB section 303(d) listing methodology. The SWRCB recommended sediment quality guidelines based on published peer-reviewed literature or developed by state or federal agencies. Acceptable guidelines included selected values (e.g., effects range-median, probable effects level, probable effects concentration), and other sediment quality guidelines. Only those sediment guidelines that are predictive of sediment toxicity were used (i.e., those guidelines that have been shown in published studies to be predictive of sediment toxicity in 50 percent or more of the samples analyzed).

The SWRCB values for freshwater sediments were based on the sediment quality guidelines (SQG) developed by *MacDonald, et al. (2000)*, in the document entitled*, "Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems."* This document was an effort to develop standardized limits using various published SQGs. For each contaminant of concern, two SQGs were developed from the published SQGs - a threshold effect concentration (TEC) and a PEC. TECs would indicate a reliable basis for predicting the absence of sediment toxicity. Similarly, PECs provide a reliable basis for predicting sediment toxicity.

The sediment quality guidelines for freshwater sediments are presented below in Table 10.

Table 10. Sediment Quality Guidelines for Freshwater Sediments

Substance	Units	Probable Effect Concentrations (PEC)
Arsenic	mg/kg	33.0
Cadmium	mg/kg	4.98
Chromium	mg/kg	111
Copper	mg/kg	149
Lead	mg/kg	128
Mercury	mg/kg	1.06
Nickel	mg/kg	48.6
Zinc	mg/kg	459

2.3.1 Factors Affecting Dissolved Metals Concentrations

Water quality objectives for metals are based on the dissolved fraction (i.e., that fraction which passes through a 0.45 µm filter). Dissolved metal concentrations in water can be modeled based on assumptions about the total suspended soilds (TSS) concentration, the metal concentration in suspended sediments, and the sediment-water partition coefficient for the metal in question. That model is used in this analysis to forecast the potential for exceeding dissolved metal water quality objectives.

A partition coefficient (Kp) models the equilibrium of metals between the dissolved and particulate phase by relating the concentrations of dissolved metals, particulate (i.e., sediment) metals, and total suspended sediment concentrations. The maximum and minimum log Kp values found in the literature are presented with the mean sediment concentrations in Table 11. By applying a partition coefficient or a range of partition coefficients, in combination with known sediment and TSS data, the dissolved metal concentration can be determined. Modeling this calculation, with a range of partition coefficients and TSS concentrations, can forecast potential exceedances of the aquatic life objectives. Kps are typically presented as log base 10 values, Table 11.

Table 11. Literature-based[1] log Kp Values For Freshwater Sediments

Substance	Mean Sediment Concentration (µg/kg)	Log K_p (Max)	Log K_p (Min)	Water quality objective (µg/L)
Arsenic	74000	6.0	2.0	150
Cadmium	250	6.3	2.8	0.9
Chromium (total)	65000	6.0	3.9	66
Copper	56000	6.1	3.1	3.2
Lead	20000	6.5	3.4	0.7
Nickel	76000	5.7	3.5	52
Zinc	80000	6.9	3.5	120

Sediment concentrations based on Reclamation (2006); cadmium concentration is based on half the detection limit.
Log Kp Values For Freshwater Sediments from Allison et al. (2005)
Water quality objectives based on the chronic (4-day average) criteria established in the CTR assuming a hardness of 30 mg/L.

Water-column partition coefficients are a ratio between the particulate metal concentration (or sorbed metal) and the dissolved metal concentration and are calculated as presented in the following equation (Allison et al. 2005):

$$K_p = \frac{sorbed\ metal\ concentration\ \left(\frac{mg}{kg}\right)}{dissolved\ metal\ concentration\ \left(\frac{mg}{L}\right)} = \frac{(C_t - C_d)}{C_d \times TSS}$$

where:

C_d = dissolved concentration of the metal (µg/L)

TSS = total suspended solids (mg/L)

C_t = total concentration of the metal (µg/L) and

[1] (Allison, et al. 2005)

$$C_t = \frac{C_s * TSS}{10^6}$$

where:

C_s = concentration of the metal in the sediment (µg/Kg)

10^6 = unit conversion factor = 10^6 mg in 1 Kg

By rearranging these terms and substituting TSS and C_s for C_t, C_d becomes:

$$C_d = \frac{C_s}{K_p + \frac{10^6}{TSS}}$$

A model was developed to solve this equation for the TSS concentration that would yield a C_d that exceeds the water quality objective for that metal. The Kp values applied to the model were the maximum and minimum values presented in Allison et al. (2005). The water quality objectives were corrected for typical hardness concentrations, 29 – 32 mg/L. The results from this model are discussed in the Results section.

2.4 Existing Conditions

Folsom Dam and Reservoir is a multipurpose water project constructed by the Corps and operated by The United States Bureaus of Reclamation (Reclamation) as part of the Central Valley Project (CVP). At an elevation of 466 feet above mean sea level (msl), Folsom Reservoir is the principal reservoir on the American River impounding runoff from a drainage area of approximately 1,875 square miles. Folsom Reservoir has a normal full-pool storage capacity of approximately 975,000 acre-feet, with a seasonally designated flood management storage space of 400,000 acre-feet. An interim agreement between the Sacramento Area Flood Control Agency and Reclamation provides variable flood storage ranging from 400,000 to 670,000 acre-feet.

Flood-producing runoff occurs primarily during the months of October through April and is usually most extreme between November and March. From April to July, runoff is primarily generated from snowmelt from the upper portions of the American River watershed. Approximately 40 percent of the runoff from the watershed results from snowmelt. Runoff from snowmelt usually does not result in flood-producing flows; however, it is normally adequate to fill Folsom Reservoir's available storage.

Folsom Reservoir

Folsom Reservoir comprises approximately 12,000 acres of the North Fork, South Fork, and main stem of the American River. Although the maximum depth of the

Reservoir is 266 feet just behind Folsom Dam, most of the reservoir is shallower, averaging 66 feet in depth. The reservoir has about 85 miles of shoreline. The waters of Folsom Reservoir stratify in the warmer months from April through November, with a layer of warmer water sitting on top of a bottom layer of cold water. Boating, swimming, and fishing are common uses of the Folsom Reservoir.

Habitat within Folsom Reservoir allows for a diverse assemblage of native and introduced fish species to coexist. Folsom Reservoir is managed as a 'two-story' fishery, with cold-water fish such as trout inhabiting the cold layer and warm-water fish such as bass and sunfish inhabiting the warm layer and shoreline areas. Two cold water fisheries for rainbow trout and Chinook salmon are actively maintained through a stocking program. The populations of most other species are currently self-supporting. Introduced fish are more commonly found in the reservoirs than are native fish. Most of these fish were introduced into the State as game fish or as forage fish to support game fish populations. Some of the introduced fish may have been unintentionally introduced into Folsom Reservoir over the past 50 years.

Wetlands

Regulated or jurisdictional waters include all adjacent wetlands in addition to navigable waters, interstate waters, and their tributaries. Therefore, any discharge of dredged or fill material into these jurisdictional wetlands would also be subject to compliance under Section 404 and 401 of the CWA. Project construction related to effects to jurisdictional wetlands would be subject to regulations stated within these permits.

Seasonal wetlands and freshwater marshes exist in the construction area typically within or adjacent to streams, swales, or other drainages. Furthermore, groundwater upwelling is creating a wetland near Dike 5 on the western side of the reservoir.

2.4.1 Previous Sediment Sampling

In an effort to characterize the sediments within the project area, the Corps and Reclamation conducted several assessments to characterize sediment contaminants. These assessments are summarized below. Trace element (arsenic, cadmium, chromium, copper, lead, nickel and zinc) concentrations in sediments are used below to predict dissolved metals concentrations under different TSS concentrations. Mercury concentrations are used in Section 3 below to evaluate the potential for mercury bioaccumulation effects.

Joint Federal Project Auxiliary Spillway Folsom Lake Sediment Characterization (August 2006).

Reclamation conducted an assessment (Reclamation, 2006) of the concentrations of mercury and metals present within the reservoir sediments that would become suspended as a result of the construction activities related to the Auxiliary Spillway. Of the 18 samples that were collected, two were reported at 0.2 mg/kg, which is the threshold for mercury. No samples exceeded the threshold. The mean of all sites was 0.16 mg/kg for mercury. Table 12 below provides the mean concentrations of the reported results for mercury and other metals within the sediment samples. Locations of the sediment samples are indicated in Figure 5 and 6 below.

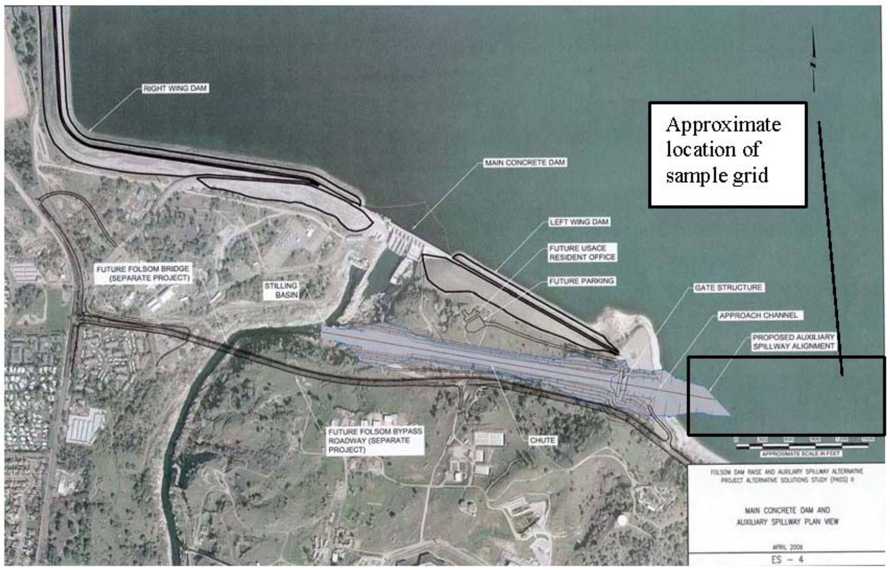


Figure 5. Approximate location of sediment samples collected by Reclamation (2006)

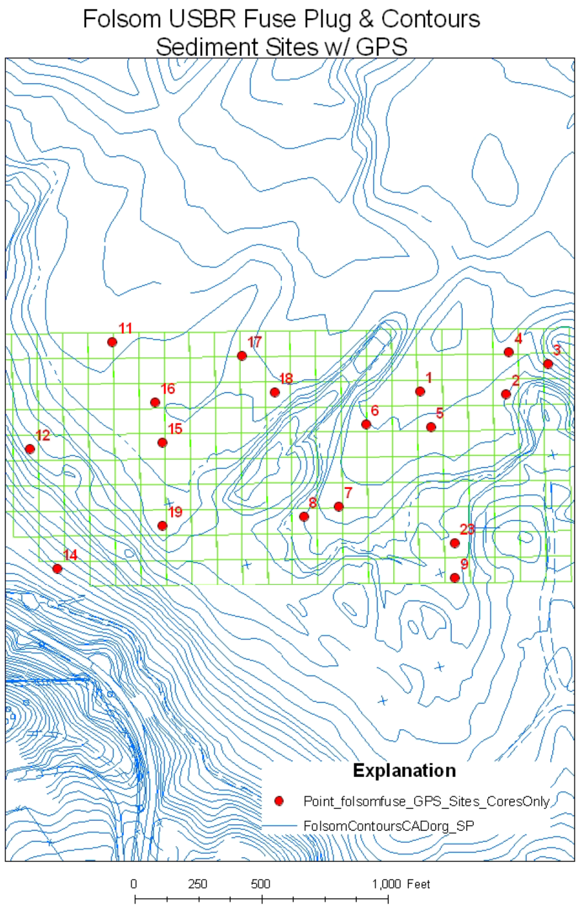


Figure 6. Specific location of sediment samples collected by Reclamation (2006)

<u>Sediment Characterization Study at Folsom Dam Auxiliary Spillway within the Area of the Seismic Refraction Study (March 2008).</u>

The Corps prepared a Sediment Characterization Report (Corps 2008) along the alignment of the Folsom Dam Auxiliary Spillway. Eight sediment samples were collected and analyzed for concentrations for metals. Table 12 below provides the reported mean concentrations of mercury and other metals within the sediment samples.

<u>Draft Summary Report of Sediment Testing Pre-dredge Sediment and Water Quality Samples, Folsom Dam Auxiliary Spillway (October 2011).</u>

The Corps report (Corps 2011) was prepared to document the pre-dredge sediment concentrations for the proposed Folsom Dam Auxiliary Spillway. Two composite samples were collected from the proposed approach channel location and one composite sample was collected from the proposed transload facility location. Chemical constituents for characterization include metals, total petroleum hydrocarbons, organochlorine pesticides, and polynuclear aromatic hydrocarbons.

Table 12 below provides the reported mean concentrations of the reported results for mercury and other metals within the sediment samples.

Table 12. Folsom Dam Auxiliary Spillway Approach Channel Sediment Quality Samples

Element (Natural Background)*	Units	August 2006 (Reclamation 2006)		March 2008 (USACE 2008)		October 2011 (USACE 2011)		PEC
		Range	Mean	Range	Mean	Range	Mean	
Arsenic (4.8 ± 0.5)	mg/kg	4.1-12	7.44	1.67-5.74	2.84	0.711-2.13	1.43	33.0
Cadmium (.09 ± .01)	mg/kg	<0.4-<0.61	<0.50	<1.00-<1.00	<1.00	<0.400-<0.400	<0.400	4.98
Chromium (92 ± 17)	mg/kg	44-87	65.06	13.2-36.39	18.52	20.1-35	26.80	111
Copper (28 ± 4)	mg/kg	41-72	56.34	4.98-8.29	6.88	10.7-26.5	16.90	149
Lead (17 ±0.5)	mg/kg	12-26	19.65	3.43-8.3	5.02	2.63-6.97	4.47	128
Mercury (0.05 + 0.04)	mg/kg	0.12-0.2	0.16	<0.100-<0.100	<0.100	0.015-0.0528	0.03	1.06
Nickel (47 ± 11)	mg/kg	50-100	76.28	10.4-17	13.49	16.1-33.9	22.30	48.6
Zinc (67 ± 6)	mg/kg	60-99	80.06	15.3-30.3	23.20	21.7-45.4	30.83	459
Total Samples		18		8		3		

*Note: Natural background concentrations based on average ± 1 standard deviation of upper continental crustal abundance, as reported by Rudnick (2003).

2.5 Results

The modeled TSS results indicate that exceedances of the water quality objectives in the CTR will likely occur for dissolved lead for TSS concentrations greater than 33 mg/L. Exceedances likely occur for dissolved copper for TSS concentrations greater than 54 mg/L. Exceedances of the CTR are likely to occur for dissolved nickel for TSS concentrations greater than 507 mg/L. TSS concentrations less than 1000 mg/L will not cause exceedances of the CTR the other dissolved metals.

Based on the model results, some trace elements (arsenic, cadmium, and chromium) are not likely to exceed the aquatic life objectives at any TSS concentration; however, copper, lead, zinc, and nickel could exceed the objectives at moderate TSS (30 – 100 mg/L). These are the metals most commonly observed in exceedances.

The analysis signifies that the two circumstances driving the water quality exceedances are site specific K_p values, which cannot be controlled, and turbidity, which can be controlled. Mitigation in this case is turbidity control (previously described), and monitoring for dissolved metals during operations. If exceedances are detected, a higher frequency monitoring program should be installed to evaluate the 4-day average. If this does not control the dissolved metals concentrations, then work should be slowed until the concentrations decrease.

There are several options for controlling TSS and mitigating the dissolved metal exceedances. These include:

- Silt curtains and other measures that control TSS outside working zone
- Use monitoring to address dissolved trace elements inside and outside working zone
- If dissolved objectives are exceeded outside working zone:
    - Increase monitoring frequency and monitor at night to evaluate the four-day average
    - Slow down work to bring down four-day average
    - Perform active treatment within working area using alum or some other coagulant.

2.6 Impact Analysis

2.6.1 Alternative 2

<u>Construction of the Approach Channel with the use of a Cut-off Wall alternative would degrade water quality</u>

An approach channel excavation associated with Alternative 2 could result in impacts to water quality caused by dredging, underwater blasting, underwater excavation, on-water engines, and blasting hoses and materials. Alternative 2 consists of more dredging, blasting and excavation in-the-wet than Alternative 3. However, Alternative 2 does not require the additional in-the-wet construction and dewatering of a cofferdam.

Dredging, excavation and blasting would occur within Folsom Reservoir as part of Alternative 2. These activities could create substantial turbidity, thus affecting water temperature and dissolved oxygen concentrations, and negatively impacting water quality. Additionally, these activities have the potential to mobilize existing contaminants such as mercury or to cause a bedrock chromite release. An estimated 1,000,000 cy of earthen material would be excavated as part of the approach channel construction, with over half of this being removed in-the-wet. A portion of the earthen material removed may be used to construct the spur dike.

Installation of the Cut-off Wall

Before spillway excavation, a cut-off wall would be installed adjacent to Folsom Lake southeast of the Left Wing Dam and east of the Auxiliary Spillway chute excavation. The cut-off wall would provide seepage control to the spillway excavation between the rock plug and the Control Structure. The cut-off wall would consist of a reinforced concrete secant pile wall installed across the width of the future approach channel. The total length of the wall would be approximately 1,000 feet. The wall would be socketed into the underlying highly weathered granitic rock. As cut-off wall construction would be conducted in-the-dry, there is a negligible risk to water quality.

The construction of the cut-off wall would require large quantities of temperature controlled concrete. This would necessitate the use of a contractor-provided, on-site concrete batch plant and deliveries of large quantities of concrete aggregate, concrete sand, and cement. Approximately 11,200 cy of concrete would be needed for the cutoff wall.

This has a low potential for impact to water quality. Mitigation Measures ***HWQ-1*** *and* ***HWQ-2*** *would reduce impacts to a less than significant level. BMPs would be used to control runoff, and to prevent mixing between concrete and water the batch plant would be located at Dike 7 away from Folsom Lake.*

Determination: Less than significant with mitigation under CEQA, and negligible under NEPA.

Excavation in-the-Dry

Once the cut-off wall is installed, the excavation of the spillway in-the-dry would commence. This construction would create runoff with potentially high concentrations of TSS. Should the runoff reach the reservoir it has the potential to create turbidity or introduce new contaminants to the receiving waters. Additionally, since there would be some seepage from the reservoir into the excavation area, dewatering would be necessary. This could affect water quality should the water being removed have high TSS content and thus contribute to turbidity.

This has a medium potential for impact. Mitigation ***Measures HWQ-1*** *and* ***HWQ-5*** *would reduce impacts to a less than significant level. The use of silt curtains and water quality monitoring should be effective control. Since construction is primarily in-the-dry conditions, this activity has low potential to increase the bioaccumulation of mercury.*

<u>Determination</u>: Less than significant with mitigation under CEQA, and negligible under NEPA.

<u>*Excavation in-the-Wet*</u>

Alternative 2 would involve finishing the excavation and dredging of the spillway approach channel and blasting to the spur dike in-the-wet. These activities have the potential to create substantial turbidity, thus affecting water temperature and dissolved oxygen concentrations, and negatively impacting water quality. These activities have the potential to mobilize existing contaminants such as mercury or to cause a bedrock chromite release. Additionally, during construction, it would be necessary to transport and assemble barge platforms on-site to accommodate drilling and excavation equipment. Construction activities that could pose impacts to water quality are listed below:

- Removal of sediments via dredge
- Underwater excavation of granite via dredge
- Underwater blasting
- On-water engines

Approximately 400,000 cy of material would be removed under the in-the-wet conditions of the project area. This includes 109,240 cy of soil and existing fill material, 166,310 cy of decomposed granite, and 146,360 cy of weathered and fresh granite.

This has a high potential for impact. Mitigation Measures ***HWQ-1, HWQ-2, HWQ-3 HWQ-6, HWQ-7*** *and* ***HWQ-8*** *would reduce impacts to a less than significant level. Turbidity curtains, silt curtains and a thorough monitoring plan would be necessary to perform this construction and avoid impacting water quality.*

Determination: Less than significant with mitigation under CEQA, and negligible under NEPA.

Cut-off Wall Removal would not affect water quality

After the conclusion of the in-the-dry spillway channel excavation and the approach channels slab has been placed, it would be necessary to remove the cut-off wall before starting construction in-the-wet. Cut-off wall removal should have negligible effect on water quality if proper BMPs are in place and maintained.

*This has a low potential for impact. Mitigation Measures **HWQ-1** would reduce impacts to a less than significant level..*

Determination: Less than significant with mitigation under CEQA, and negligible under NEPA.

Placement of Concrete for Approach Channel Walls

The construction of the approach channel would require large quantities of temperature controlled concrete. This would necessitate the use of a contractor-provided, on-site concrete batch plant and deliveries of large quantities of concrete aggregate, concrete sand, and cement. Approximately 13,000 cy of concrete would be needed for the approach channel.

*This has a low potential for impact. Mitigation Measures **HWQ-1** and **HWQ-2** would reduce impacts to a less than significant level. BMPs would be used to control runoff, and to prevent mixing between concrete and water the batch plant would be located at Dike 7 away from Folsom Lake.*

Determination: Less than significant with mitigation under CEQA, and negligible under NEPA.

2.6.2 Environmental Consequences/Impacts Common to Alternatives 2 and 3

Construction of the Spur Dike

For both Alternatives 2 and 3, spur dike construction would be located directly to the northwest of the approach channel. The core of the spur dike would be constructed of a decomposed quartz diorite core, commonly known as decomposed granite. This would be followed by a compacted random rock fill followed by a stone riprap cap. The quantity of material estimated to complete the spur dike is 395,000 cy. Material for the spur dike construction would come from the excavation of the approach channel excavation, or MIAD. The construction equipment needed to build the spur dike consists of normal scrapers, bulldozers, and sheep-foot rollers for the body of the spur dike, and backhoes, bulldozers, and smooth rollers for the bedding, riprap, and surfacing materials. Spur dike construction would commence in-the-dry leading to negligible impacts to water quality if proper BMPs for sediment control are in place.

*This has the potential for impact to water quality. Mitigation Measures **HWQ-1, HWQ-2, HWQ-3, HWQ-4, HWQ-6** and **HWQ-8** would reduce impacts to a less than significant level. It is essential that BMPs for sediment control be used, and that fill material for the spur dike be processed and analyzed prior to installation to ensure that no pollutants, such as mercury, would be introduced into the reservoir.*

Determination: Less than significant with mitigation under CEQA, and negligible under NEPA.

Construction of the Transload Facility

For both Alternatives 2 and 3, during transload facility construction, it may be necessary to place ramp material directly into the water. This would be dependent on lake levels. The ramp would be constructed from approximately 30,000 to 230,000-250,000 cy of compacted 3 inch maximum graded fill with little or no fines. Approximately 20,000 cy of ¼ ton riprap would be placed on top of the main fill for protection from wave action. Dredging out an average of three feet of material under the footprint of the ramp (up to 20,000 cy) may be required depending on the soils at the lake bottom. These construction processes have the potential to cause turbidity in Folsom Lake, thus negatively impacting the water quality.

*This has a medium potential for impact. Mitigation Measures **HWQ-3, HWQ-4, HWQ-6, HWQ-7** and **HWQ-8** would reduce impacts to a less than significant level. Specifically, the fines content of the ramp material would be reduced as much as possible to limit water turbidity during placement of material. Full depth silt curtains would surround the ramp installation to control turbidity, the mobilization of mercury, and silt movement into the greater lake body. Additionally, ramp material must be analyzed prior to installation to ensure that no pollutants that would harm water quality objectives would be introduced into the reservoir.*

Determination: Less than significant with mitigation under CEQA, and negligible under NEPA.

Construction of the Haul Road

It would also be necessary to maintain the existing haul road's connection to the spillway. Approximately 165,000 cy of fill material would be placed east of the rock plug to maintain this. The fill would consist of 3 inch minus crushed rock (approximately 145,000 cy) and a slope protection consisting of two layers of 1/4 ton rock (approximately 20,000 cy). Material would be placed during the low lake period utilizing land based equipment. As the haul road construction would be conducted in-the-dry conditions, it should have little impact on water quality as long as appropriate BMPs are in place.

This has a medium potential for impact. Mitigation Measure ***HWQ-1*** *would reduce impacts to a less than significant level. Specifically, the installation of silt curtains would be used to contain the turbidity within the construction area of the lake.*

Determination: Less than significant with mitigation under CEQA, and negligible under NEPA.

Disposal of Dredge Materials on Land

For Alternatives 2 and 3 it would be necessary to dispose of excess dredge material on land. To offload the dredge spoils from barges, a crane would be placed on a level crushed rock pad located near the bottom of the ramp just above lake level. Timber mats would form a work platform for the crane. The pad would need to be relocated to accommodate fluctuating lake levels.

Dredged and excavated material that is not used for spur dike construction would be stockpiled in disposal sites D1 (22 acres) and D2 (71 acres) at MIAD disposal site, approximately 1.5 to 2 miles southeast of the approach channel. Excavated material not suitable for fill, such as vegetation, debris, and old fill, would be disposed of at a local landfill. As the haul road construction would be conducted in-the-dry conditions, it should have little impact on water quality as long as appropriate BMPs are in place.

This has a low potential for impact. Mitigation Measure ***HWQ-1*** *would reduce impacts to a less than significant level.*

Determination: Less than significant with mitigation under CEQA, and negligible under NEPA.

Dam Operations Upon Completion

Long term operations of Folsom Dam would be performed by Reclamation. The Flood Management Operations Study is being completed in conjunction with the Folsom JFP and would develop, evaluate, and recommend changes to the flood control operations at Folsom Dam that would further reduce flood risks to the Sacramento, California area. At the conclusion of this study, operational changes may be necessary to fully realize the flood risk reduction benefits. This study should not have any impact on water quality. However, should findings indicate that further updates are necessary for the dam to maintain public safety, an additional EIS/EIR would be required.

This has a low potential for impact. Mitigation Measures would be selected at the conclusion of the Flood Management Operations Study should further construction activities be necessary.

2.6.3 Alternative 3

Construction of the Approach Channel with the use of the small cofferdam alternative would degrade water quality

Approach channel and spillway excavation associated with Alternative 3 could result in impacts to water quality caused by construction runoff, dredging, underwater blasting, underwater excavation, dewatering, water entrainment, on-water engines, and blasting hoses and materials. For Alternative 3, construction would be conducted both in-the-wet and in-the-dry conditions.

Construction of the Cofferdam

Alternative 3 requires the use of a small cofferdam. To prepare the foundation for the cofferdam, lake sediments and other soft materials would be dredged until decomposed granite is reached. The following activities under this Alternative have the potential to resuspend sediments and would create risks involving turbidity, temperature, dissolved oxygen, mobilization of existing contaminants and fuel spills:

- Removal of sediments via dredge
- Underwater excavation of granite via dredge
- Underwater blasting
- Placement of cofferdam cells
- On-water engines

The total amount of excavated material in-the-wet is 266,300 cy.

*This has a medium potential for impact. Mitigation Measures **HWQ-1, HWQ-2, HWQ-3, HWQ-6, HWQ-7** and **HWQ-8** would reduce impacts to a less than significant level. Specifically, a silt curtain placed around the perimeter of the excavation would be required to control turbidity or the mobilization of mercury in the lake, and stemming and bubble curtains would be used to reduce blast induced water pressures.*

Determination: Less than significant with mitigation under CEQA, and negligible under NEPA.

Dewatering behind the Cofferdam

Once the cofferdam is in place, dewatering would take place to create an in-the-dry working environment within the reservoir. Dewatering would also be necessary to mitigate seepage from the reservoir into the excavation area. This could affect water quality should the water being removed have high TSS content and thus contribute to turbidity.

*This has a medium potential for impact. Mitigation Measures **HWQ-1** and **HWQ-5** would reduce impacts to a less than significant level. The use of silt curtains and water quality monitoring should be effective control.*

Determination: Less than significant with mitigation under CEQA, and negligible under NEPA.

Excavation in-the-dry

After the cofferdam is in place and dewatered, excavation and blasting of the spillway in-the-dry would occur. Approximately 800,000 cy of excavation in the dry would occur under Alternative 3. This includes 355,600 cy of sediment removal and 310,700 cy of sediment removed from blasting activities. This construction could create runoff with potentially high concentrations of TSS or other substances. The runoff could deposit sediments that may contain mercury concentrations that could affect the downstream receiving waters.

*This has the potential to impact water quality. Mitigation Measures **HWQ-1** would reduce impacts to a less than significant level. The use of silt curtains and water quality monitoring should be effective control.*

Determination: Less than significant with mitigation under CEQA, and negligible under NEPA.

Removal of the Cofferdam

The removal of the cofferdam would commence by flooding the construction site until water levels on both sides of the reservoir were level. This could potentially lead to turbidity should the water entering the construction site stir up bottom sediment. Following this process it would be necessary to excavate the fill from the cofferdam while also pulling out the sheet piles. This would involve the mobilization of equipment on the water surface opening up the potential for a fuel spill. Also, removing the sheet piles could potentially cause turbidity within the reservoir or cause variation in lake levels.

*This has a medium potential for impact. Mitigation Measures **HWQ-1** would reduce impacts to a less than significant level.*

Determination: Less than significant with mitigation under CEQA, and negligible under NEPA.

<u>Excavation in-the-wet</u>

After cofferdam removal, construction would continue to occur within Folsom Reservoir as part of Alternative 3. The bathymetry outside of the cofferdam leading to the approach channel spillway would need to be smoothed out. The remaining materials would be dredged using a barge-mounted clam shell or hydraulic excavator dredge until elevation 350 is reach (that matches the slab). These activities in-the-wet could create substantial turbidity, thus affecting water temperature and DO concentrations, and negatively impacting water quality. Additionally, these activities have the potential to mobilize existing contaminants such as mercury or to cause a bedrock chromite release.

Under Alternative 3, approximately 200,000 cy of material would be removed under the in-the-wet conditions of the project area. The excavation activities in-the-wet (dredging and blasting) have the potential to mobilize existing contaminants present in lake sediments.

> *This has a high potential for impact. Mitigation Measures **HWQ-1, HWQ-2, HWQ-3 HWQ-6, HWQ-7** and **HWQ-8** would reduce impacts to a less than significant level. Turbidity curtains, silt curtains and a thorough monitoring plan would be necessary to perform this construction and avoid impacting water quality.*
>
> <u>Determination</u>: Less than significant with mitigation under CEQA, and negligible under NEPA.

<u>Construction of the Approach Channel Walls</u>

The construction of the approach channel would require large quantities of temperature controlled concrete. This would necessitate the use of a contractor-provided, on-site concrete batch plant and deliveries of large quantities of concrete aggregate, concrete sand, and cement. Approximately 13,000 cy of concrete would be needed for the approach channel.

> *This has a low potential for impact. Mitigation Measures **HWQ-1** and **HWQ-2** would reduce impacts to a less than significant level. BMPs would be used to control runoff, and to prevent mixing between concrete and water the batch plant would be located at Dike 7 away from Folsom Lake.*
>
> Determination: Less than significant with mitigation under CEQA, and negligible under NEPA.

2.7 Mitigation Measures

Implementation of Mitigation Measures HWQ-1 through HWQ-8 would reduce the significant impact on water quality and water levels to a less than significant level. Compliance and evaluation as part of the provisions stated for the various permits discussed below would serve to minimize and mitigate potential hydrologic impacts due to construction activities.

HWQ-1: An NPDES permit would be obtained prior to construction activities, commencing by filing an NOI with the CVRWQCB and preparing a SWPPP. As required under the General Permit, the SWPPP would identify implementation measures necessary to mitigate potential water quality degradation as a result of construction. These measures would include BMPs and other standard pollution prevention actions such as erosion and sediment control measures, proper control of non-stormwater discharges, and hazardous spill prevention and response. The SWPPP would also include requirements for BMP inspections, monitoring, and maintenance.

The NOI indicates the intent to comply with the General Permit which outlines conditions to minimize sediment and pollutant loading.

The following items are examples of BMPs that would be implemented during construction to avoid causing water quality degradation:

- Erosion control BMPs such as use of mulches or hydroseeding to prevent detachment of soil following guidance presented in the California BMP Handbooks – Construction (The California Stormwater Quality Association (CASQA) 2003). A detailed site map would be included in the SWPPP outlining specific areas where soil disturbance may occur, and drainage patterns associated with excavation and grading activities. In addition, the SWPPP would provide plans and details for the BMPs to be implemented prior, during and after construction to prevent erosion of exposed soils and to treat sediments before they are transported offsite.
- Sediment control BMPs such as silt fencing or detention basins that trap soil particles.
- Construction staging areas designed so that stormwater runoff during construction would be collected and treated in a BMP such as a detention basin.
- Management of hazardous material and wastes to prevent spills.
- Vehicle and equipment fueling BMPs so these activities occur only in designated staging areas with appropriate spill controls.
- Maintenance checks of equipment and vehicles to prevent spills or leaks of liquids of any kind.

HWQ-2: Measures to control on-site spills would be included in the SWPPP. In addition to the spill prevention and control BMPs presented above, the SWPPP would contain a visual monitoring program and a chemical monitoring program for pollutants that are non-visible to be implemented if there is a failure of BMPs. Proper storage and handling of materials and equipment servicing would only occur in designated areas. Should a spill occur, appropriate steps would be taken to inform local regulatory agencies as well as implementation of a spill response program as outlined in the SWPPP.

HWQ-3: Permits prepared by the responsible Federal agency would be obtained and abided by as stated in Section 401 and Section 404 of the CWA regarding dredging or filling of waters of the United States, and activities involving discharging into those waters, which include wetlands, respectively. Construction activities related to temporary or permanent alteration of any water body within the construction area would be subject to regulation pursuant to these permits. Compliance under these permit provisions would serve to minimize construction activity impacts on water quality.

HWQ-4: Guidance would be obtained from the CVRWQCB for testing earthen materials before constructing work area platforms within or adjacent to the reservoir to ensure any potentially associated pollutants would not be introduced into the reservoir that would violate water quality standards or substantially degrade existing water quality. Fill material would be placed in the reservoir during periods of lower water elevation, when possible. Best management practices would be adhered to in order to minimize water quality impacts during the placement of fill in the reservoir.

HWQ-5: The Corps would obtain a dewatering permit from CVRWQCB and would implement applicable water quality monitoring during dewatering of the existing Stilling Basin.

HWQ-6: Mitigation measures to minimize water quality impacts due to construction within and along the reservoir shoreline would be developed in consultation with CVRWQCB staff. These measures may include placement of a silt curtain surrounding the construction zone or construction of cofferdams. If appropriate, routine water samples would be collected at the start and completion of each dredging and/or blasting period.

HWQ-7: During the process of dredging material to construct the approach channel for the Auxiliary Spillway, sediment containing mercury would be controlled using a variety of methods, including, but not limited to, silt curtains, silt fences, as well as other BMPs and construction methods approved by the CVRWQCB.

HWQ-8: A water quality monitoring plan would be developed for review by the CVRWQCB prior to any in reservoir construction work. The plan would address sampling requirements during dredging, blasting, excavation, and placement of fill within the reservoir. If turbidity readings exceed action level values established by the CVRWQCB, corrective actions would be implemented in accordance with the plan.

3.0 MERCURY BIOACCUMULATION

This analysis begins with an overview of mercury environmental effects, with a specific focus on processes relevant to Folsom Reservoir. Following that overview, information on mercury concentrations in fish and sediments in Folsom Reservoir is summarized and put into context by comparison to expected background concentrations.

3.1 Existing Conditions

3.1.1 Site History

Mercury is the specific focus of this analysis because Folsom Reservoir, the American River, and the downstream waters of the Sacramento-San Joaquin River Delta have all been placed on the State of California's list of impaired waterbodies (the 303-d list) because of mercury concentrations in fish that exceed risk assessment thresholds.

Mercury is known to have been used and released in the upper watershed of the American River as a result of the historic use of mercury to extract gold in mining operations carried out in the Sierra Foothills (CVRWQCB 2010). Atmospheric deposition is another substantial source of mercury to all surface waters, as a result of releases to the atmosphere from natural sources (i.e., volcanos) and human activities such as coal combustion (Fitzgerald 1994).

3.1.2 Environmental Effects

Mercury is a potent neurotoxin that occurs in several different chemical forms (Mason 1995). The most common form is inorganic mercury (Hg^{2+}), which can form complexes in solution with anions such as chloride and sulfide. Mercury produced from mining is inorganic mercury present as mercury sulfide, the reddish ore also known as cinnabar. Cinnabar ore was crushed and roasted during mining operations to produce elemental mercury (Hg^0), the silvery liquid also known as quicksilver.

In the California Coast ranges during the time period of 1840-1972, millions of pounds of cinnabar ore were mined to produce quicksilver. Much of that quicksilver produced in California was transported to the Sierra Foothills, where it was used to extract gold from placer deposits mobilized by hydraulic mining. As a result of the historic mining use, many lakes and streams in California have mercury-contaminated sediments present (Alpers, et al. 2000).

The chemical form of greatest concern is known as methylmercury, which is inorganic mercury with a carbon attached by a covalent bond. Methylmercury has an extremely high affinity for sulfur atoms present in amino acids, and therefore binds to proteins. Small aquatic organisms (zooplankton and benthic invertbrates) that graze on algae that have assimilated methylmercury into protein will tend to retain the protein, and therefore accumulate mercury (bioaccumulation). Algae pick up methylmercury that is released from methylating bacteria by both direct excretion as well as indirectly, when the bacteria die off and decay.

Bacteria are constantly growing and splitting—like algae, they have bloom and decay cycles (as colonies, or whole populations, not individual organisms) which fluctuate daily and seasonally with temperature, light, food, oxygen availability, etc. The cycle of methylation and demethylation is constantly running. The goal is to avoid, or mitigate for, project activities that push the cycle towards greater net methylation.

Zooplankton graze on bacteria, algae, detritus, anything they can find according to their feeding strategy. Some graze by filtering and straining and, consequently, pick up more bacteria. Some zooplankton scoop up algae in a more targeted manner.

The cycle of methylation and demethylation is constantly running, both in the water column and down in the bottom sediments. In the bottom sediments, where dissolved oxygen is low, the methylation part of the cycle runs faster than the demethylation part; so a net increase of methylmercury concentrations occurs when dissolved oxygen concentrations decrease. Methylmercury produced by methylating bacteria would be released from bacteria cells both by direct excretion and also when they die off and decay. Algae exposed to methylmercury in the water column take it up by either passive diffusion or active transport; it is not yet definitively known.

In general, the bottom sediments are where much of the net methylation occurs, because the bacteria are more numerous and low oxygen conditions are more prevalent than in overlying waters. Resuspension of bottom sediments first brings methylmercury attached to those sediments, and present in sediment porewater, up into the water column, where it is assimilated by algae more readily than if those sediments were lying inert on the bottom.

A second result of resuspension is to move bottom sediments with *inorganic* mercury attached into an environment where it can be more readily methylated. The process is thought to involve increasing the bioavailability of inorganic mercury to the bacteria that turn it into methylmercury. In undisturbed bottom sediments, inorganic mercury is tied up by sulfide, organic matter, and possibly other complexing agents, making it harder for the bacteria to take up the inorganic mercury and methylate it. Shaken up into the water column, some of those complexes break down, making the inorganic mercury that was originally in bottom sediments more available to methylating bacteria. This second process has not been completely documented, other than at the research level. Research has also shown that atmospherically-deposited mercury is more bioavailable initially, but becomes less available with time (in a lake) or with watershed transport across a forest.

Under construction activities with the use of turbidity curtains, mixing bottom sediments and porewater with methylmercury into the overlying waters is more likely to occur than increased methylation rates due to increased bioavailability.

The bubble curtain involved in blasting would keep the Lake well oxygenated in the vicinity of the curtain. Although oxygenation is sometimes used as a mitigation tool during dredging to reduce methylmercury, this effect would ameliorate increased methylmercury bioaccumulation, but not entirely mitigate for this increase.

Although most sentinel organisms have a short life span (fish species such as wakasagi smelt live only one year, and they comprise the greatest fish numbers and volume), that does not reduce the potential for bioaccumulation resulting from the project to a low level. Despite the short duration of in-the-wet activities, and the small footprint of the working area, a small increase of methylmercury within the working area water column caused by resuspension would still have a small net effect on transfer of mercury to higher trophic levels. Predatory birds can catch wakasagi smelt, for example, from all over the lake, whereas only a small fraction of the entire smelt population in the lake would be exposed to the working area (with turbidity curtains in place). The short life span also means that any increased exposure to predatory birds is of short duration—no more than a year.

Bioaccumulation of mercury tends to increase at successively higher levels in the food web (biomagnification). Biomagnification of methylmercury is approximately 1 million fold from dissolved methylmercury in water to the flesh of a top level aquatic predator; in other words, an average concentration of 1 ng/L of methylmercury in water can lead to an average concentration of 1 mg/kg in the flesh of a large mouth bass.

Exposure of people and wildlife to methylmercury through consumption of fish is the focus of this environmental analysis. Exposure to elemental mercury through inhalation is more of an industrial / occupational concern, and not relevant to the project setting. Exposure to mercury through drinking water is also not relevant to this environmental analysis. The very small difference between the CTR criterion for mercury in potable water (0.050 ng/L) and non-potable water (0.051 ng/L) reflects the relatively low risk of exposure to inorganic mercury through the drinking water pathway as compared to consumption of organisms; conventional drinking water treatment to remove sediment is also highly effective at removing inorganic mercury, because of its tendency to adhere to particles.

Methylmercury is produced from inorganic mercury by the metabolic action of naturally occurring bacteria; in particular, sulfate reducing bacteria that thrive under low oxygen conditions are known to be significant sources of methylmercury.

3.2 Methodology

Potential effects associated with each alternative were assessed through a qualitative evaluation. Thresholds of significant effects are primarily based on the state's program for water quality standards. Information presented in the existing conditions as well as construction practices and materials, location, and duration of construction were evaluated.

3.2.1 Significance Criteria

CEQA Significance Criteria and NEPA Substantial Effects Criteria

Thresholds of significance are used to define indicators of significant environmental effects. In general, thresholds should be objective, quantitative wherever reasonably possible, and based on existing standards wherever possible.

Based on CEQA Guidelines, effects on hydrologic resources and water quality conditions as it applies to bioaccumulation potential would be significant if construction would:

a) Violate any water quality standards or waste discharge requirements.

b) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.

c) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

d) Substantially degrade water quality.

3.2.2 Methods and Assumptions

Water quality standards, described below, were applied to the methods used for the assessment process. The standards, with the existing conditions, construction practices and materials, location, and duration of construction were evaluated during the assessment process. Any assumptions applied during the assessment process are detailed in the section describing each assessment.

Water Quality Standards

The *Water Quality Control Plan for the Sacramento River and the San Joaquin River Basins, Fourth Edition* (Basin Plan) designates beneficial uses, establishes water quality objectives, contains implementation plans and policies for protecting water of the basin, and incorporates by reference plans and policies adopted by the CVRWQCB.

The Basin Plan lists the beneficial uses of Folsom Lake. The existing beneficial uses that apply to the bioaccumulation potential for the Project are as follows.

- Water Contact Recreation (REC1);
- Wildlife habitat (WILD);

REC1 applies to people catching and eating fish from Folsom Lake. The CVRWQCB views people eating fish from a watershed as tantamount to those individuals coming into contact with the waterbody. Numeric risk assessment thresholds for mercury concentrations in fish consumed by people would be used to evaluate the significance of effects.

WILD applies to wildlife (e.g., predatory birds and mammals) that eat fish from Folsom Lake. Numeric risk assessment thresholds for mercury concentrations in fish consumed by wildlife would be used to evaluate the significance of effects.

The Basin Plan also states, under the section, Other Discharge Activities, that the "Regional Water Board regulates dredging operations on a case-by-case basis. Operational criteria may result from permits or the water quality certification requirements stemming from Section 401(a) of the Clean Water Act."

3.2.3 Mercury Standards

The USEPA has recommended criteria for mercury to protect aquatic life and human health. The recommended water-quality criterion is 50 ng/L. For fish tissue, EPA and the SWRCB recommend a target of an average of no more than 0.3 mg/kg of methylmercury.

The SWRCB published in November 2006, the "Revision of the Clean Water Act Section 303(d) List of the Water Quality Limited Segments, Volume 1." The purpose of this staff report was to present the SWRCB section 303(d) listing methodology. The SWRCB recommended sediment quality guidelines based on published peer-reviewed literature or developed by state or federal agencies. Acceptable guidelines included selected values (e.g., effects range-median, probable effects level, probable effects concentration), and other sediment quality guidelines. Only those sediment guidelines that are predictive of sediment toxicity were used (i.e., those guidelines that have been shown in published studies to be predictive of sediment toxicity in 50 percent or more of the samples analyzed).

Numerical SQGs for freshwater ecosystems have been developed for a variety of federal, state, and local agencies using matching sediment chemistry and biological effects data. Sediment quality guidelines were developed by MacDonald, et al. (2000) in the document entitled, "Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems." This document was an effort to develop standardized limits using various published SQGs, consensus-based SQGs were developed for 28 chemicals of concern in freshwater sediments (i.e., metals, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, and pesticides). For each contaminant of concern, two SQGs were developed from the published SQGs - a TEC and a PEC. TECs would indicate a reliable basis for predicting the absence of sediment toxicity. Similarly, PECs provide a reliable basis for predicting sediment toxicity. For this analysis, a PEC of 1.06 mg/kg and a TEC of 0.18 mg/kg are applied.

The applicable standards for mercury and methylmercury are presented in **Table 13** below.

Table 13. Water Quality, Sediment Quality, and Fish Tissue Mercury Criteria

Parameter	Substance	Agency	Units	Concentration
Water Quality	Total Mercury[2] (Drinking Water)	USEPA	ng/L	50
	Total Mercury[3] (Freshwater)	USEPA	ng/L	770
Freshwater Sediments	Total Mercury[4]	SWRCB	mg/kg	1.06
Fish Tissue	Total Mercury[5]	USEPA, SWRCB	mg/kg	0.3

A major concern with mercury pollution is the accumulation of methylmercury in biota, particularly at the top of aquatic food webs. Mercury occurs in many forms, but methylmercury is the form which poses the highest bioaccumulation risk. Methylmercury is converted from inorganic mercury primarily by the metabolic activity of bacteria.

Water quality regulators have been struggling for a number of years to develop standards that are based on methylmercury in the food chain, rather than total mercury in the water column. This analysis of mercury effects to both the Project and regional setting focuses on methylmercury in the food chain. This recognizes the latest science supporting water quality standards and moves the evaluation closer to the actual beneficial uses of interest: protecting bird reproduction and making fish safe for wildlife and people to eat.

The linkage between inorganic mercury and methylmercury is complex. Clearly, when no inorganic mercury is present, no methylmercury can be formed. Increased inorganic mercury concentrations in sediments are known to drive increased methylmercury production.

3.2.4 Sources of Inorganic Mercury and Methylmercury in the American River Watershed

Sources of inorganic mercury in the American River Watershed include tunnels and hydraulic mine workings from historic gold mining operations, municipal discharges, urban and agricultural runoff, and deposition from the air. Methylmercury, a highly toxic form of mercury, is formed from this inorganic mercury by particular bacteria in lakes and stream beds.

[2] Water Quality Criterion for the Protection of Human Health: Methylmercury. USEPA. EPA-823-R-01-001.
[3] National Recommended Water Quality Criteria, USEPA, 1999.
[4] Revision to the Clean Water Act Section 303(d) List of the Water Quality Limited Segments, Volume 1. SWRCB, November 2006.
[5] Water Quality Criterion for the Protection of Human Health: Methylmercury. USEPA. EPA-823-R-01-001.

Mercury was mined from the Coast Ranges of California starting in the late 1800s. Much of this mercury was transported to the Sierra Nevada and Klamath-Trinity Mountains to be used for placer gold mining operations. While it is essential to clean up mine sites, mercury lost during historic mining activities is now distributed along miles of downstream streams and rivers. Controlling erosion and transport of contaminated sediment, limiting mercury releases to water and the atmosphere from modern sources, and determining effective ways to reduce production of methylmercury are the most common watershed tools for reducing fish mercury levels in fish.

3.3 Results

This section provides the details of the quantitative and qualitative analysis of the potential for environmental effects due to mercury bioaccumulation as a consequence of project activities. The qualitative analysis relies on a conceptual model of mercury sources, transformations, and bioaccumulation processes in Folsom Reservoir (Figure 7). The quantitative analysis compares mercury concentrations in sediments to effect levels of concern.

3.3.1 Mercury in Folsom Reservoir Fish

Surveys conducted by the SWRCB Surface Water Ambient Monitoring Program (SWAMP) show that mercury concentrations in fish exceed the USEPA's recommended maximum level of 0.3 ppm for protection of human health (Figure 8). Mercury concentrations in higher trophic level fish (e.g., bass) and bottom feeders (e.g., catfish) tends to be higher compared to lower trophic level fish (e.g., bluegill) and regularly stocked fish (e.g., trout).

Mercury in large predatory fish such as large mouth bass tends to increase with increasing age. Length, used as a proxy for age, is correlated with mercury concentrations in large mouth bass (Figure 9). When comparing mercury in fish from one reservoir to another, it helps to use the same fish species and use a standardized length for comparison. The SWAMP program uses a standardized length of 350 mm. Mercury concentrations in large mouth bass are comparable to bass in other lakes and reservoirs throughout the Central Valley (Figure 10) and California (Figure 11).

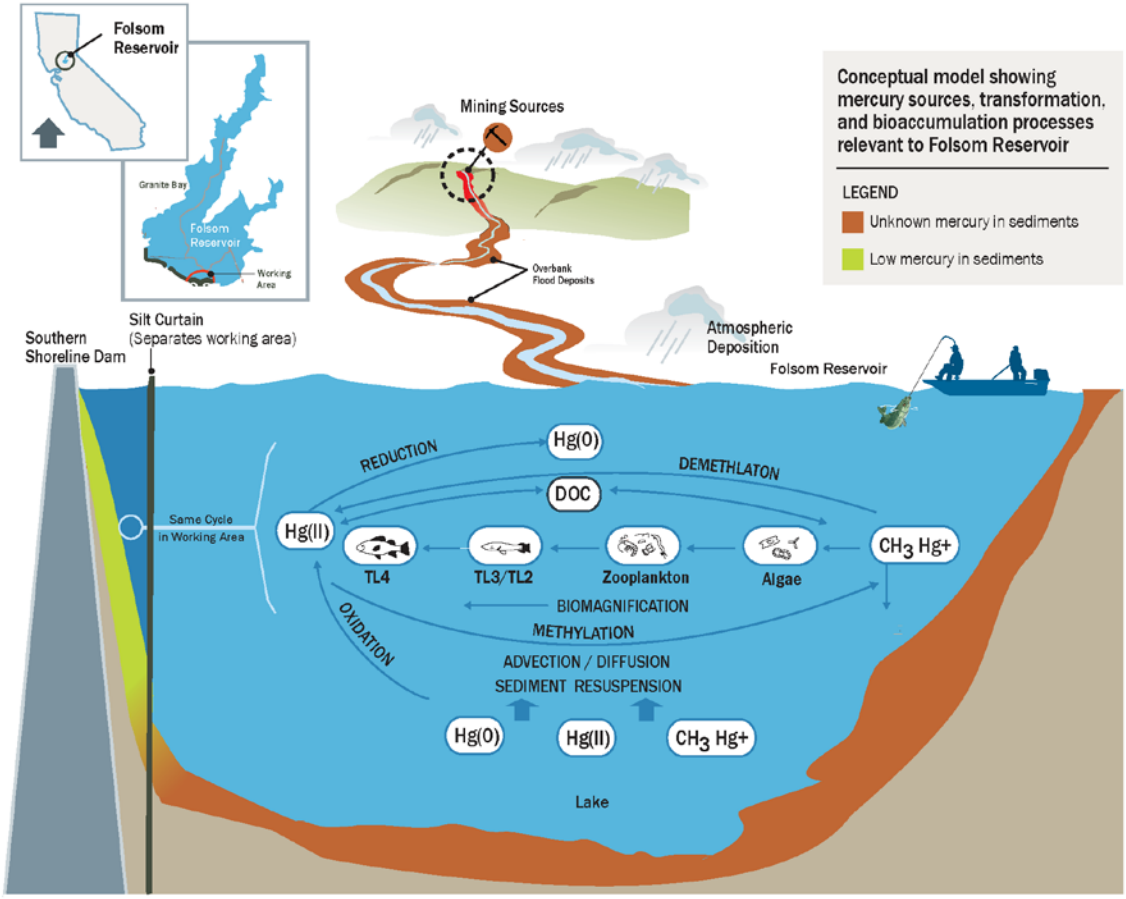


Figure 7: Mercury Conceptual Model

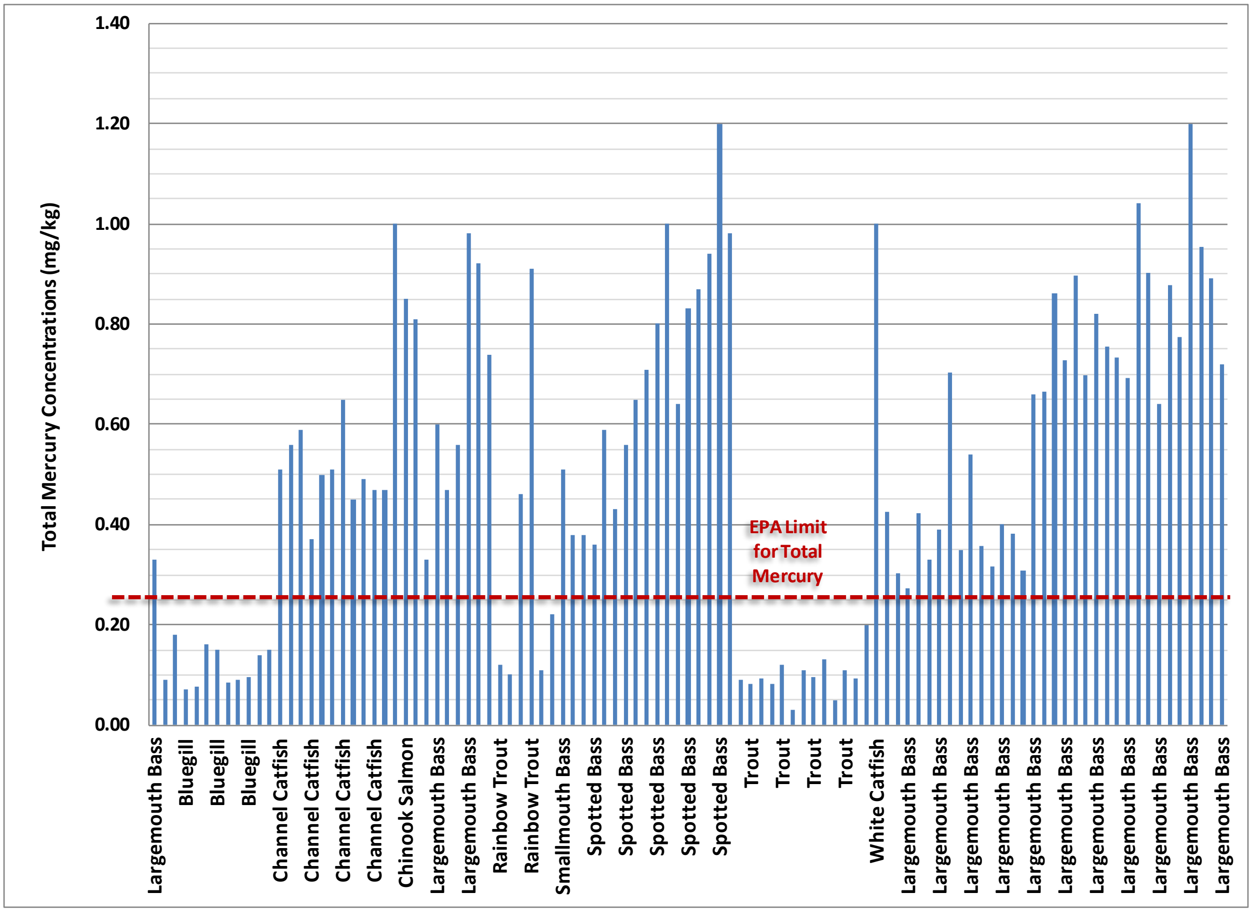


Figure 8. Chart of Folsom Lake Fish Mercury Concentrations

Source: CVRWQCB, Reclamation, and Davis et al. (2010

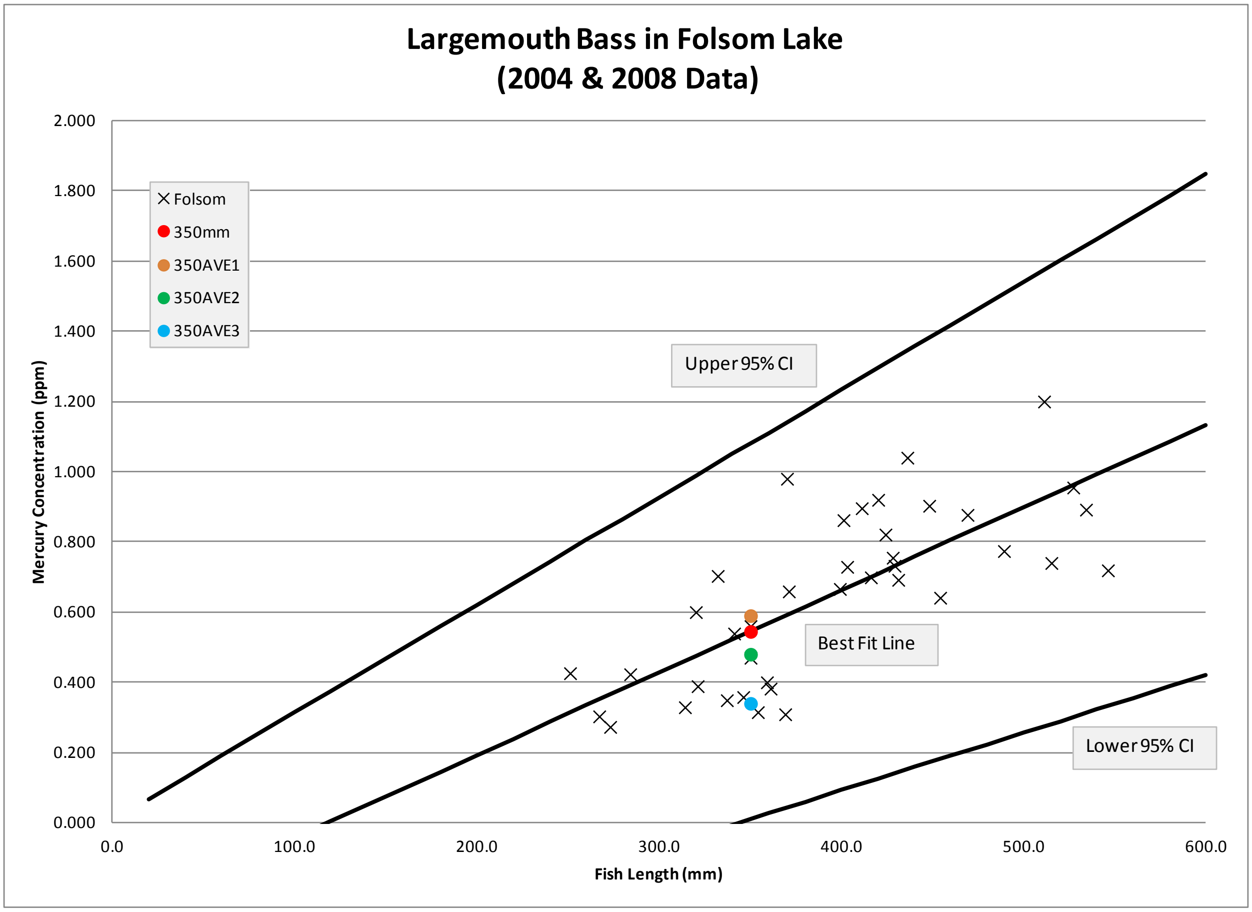


Figure 9. Correlation of Mercury Concentrations in Large Mouth Bass with Length

Dots labeled 350 AVE1, 350 AVE2, and 350 AVE3 represent best estimates for mercury concentrations in fish from three different locations within Folsom Reservoir. Red dot labeled 350 mm represents best estimate of mercury concentration in a 350 mm fish using entire data set of all three locations.

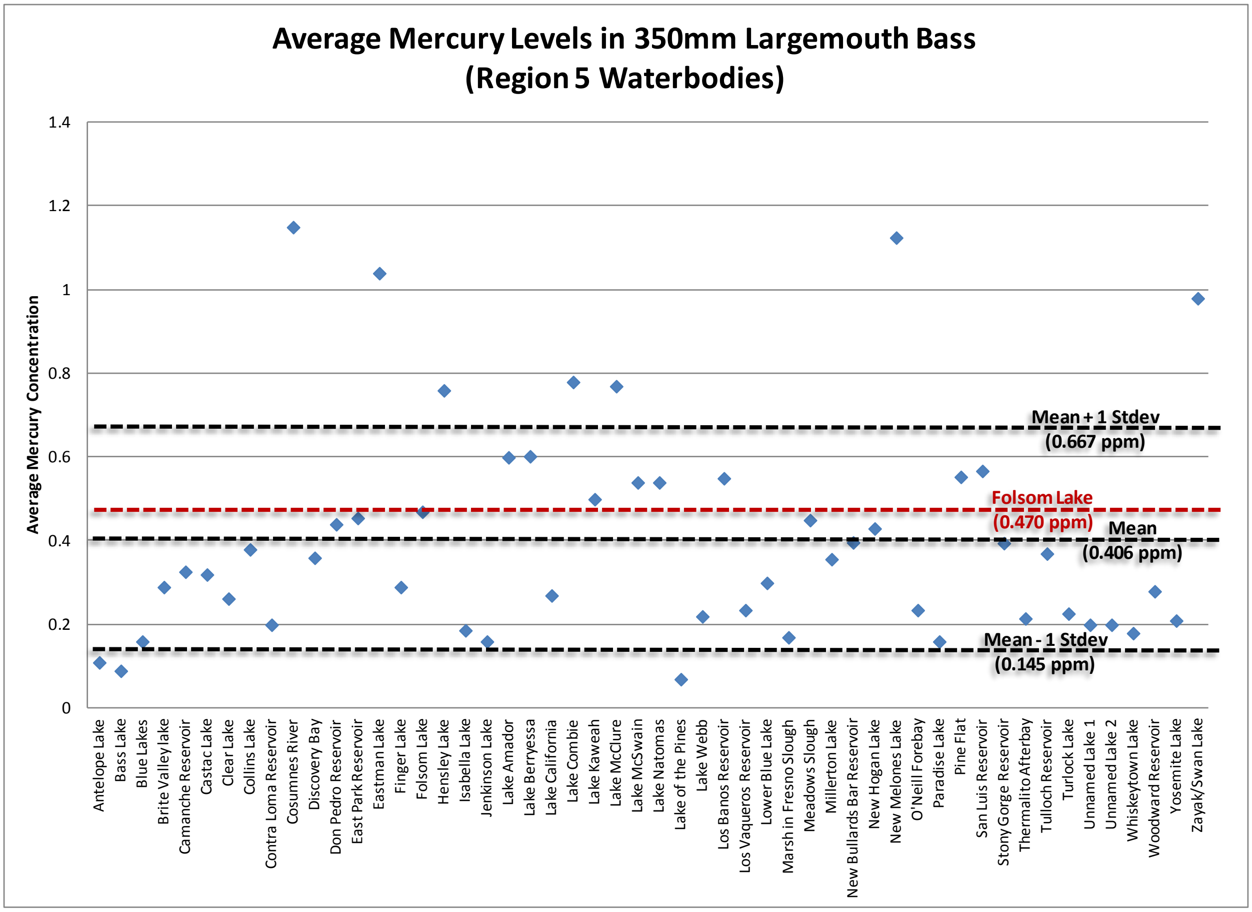


Figure 10. Comparison of Mercury Concentrations in Folsom Reservoir Large Mouth Bass with Other Lakes in the Central Valley.

Averages represent best estimates of mercury concentrations in 350 mm Large Mouth Bass.

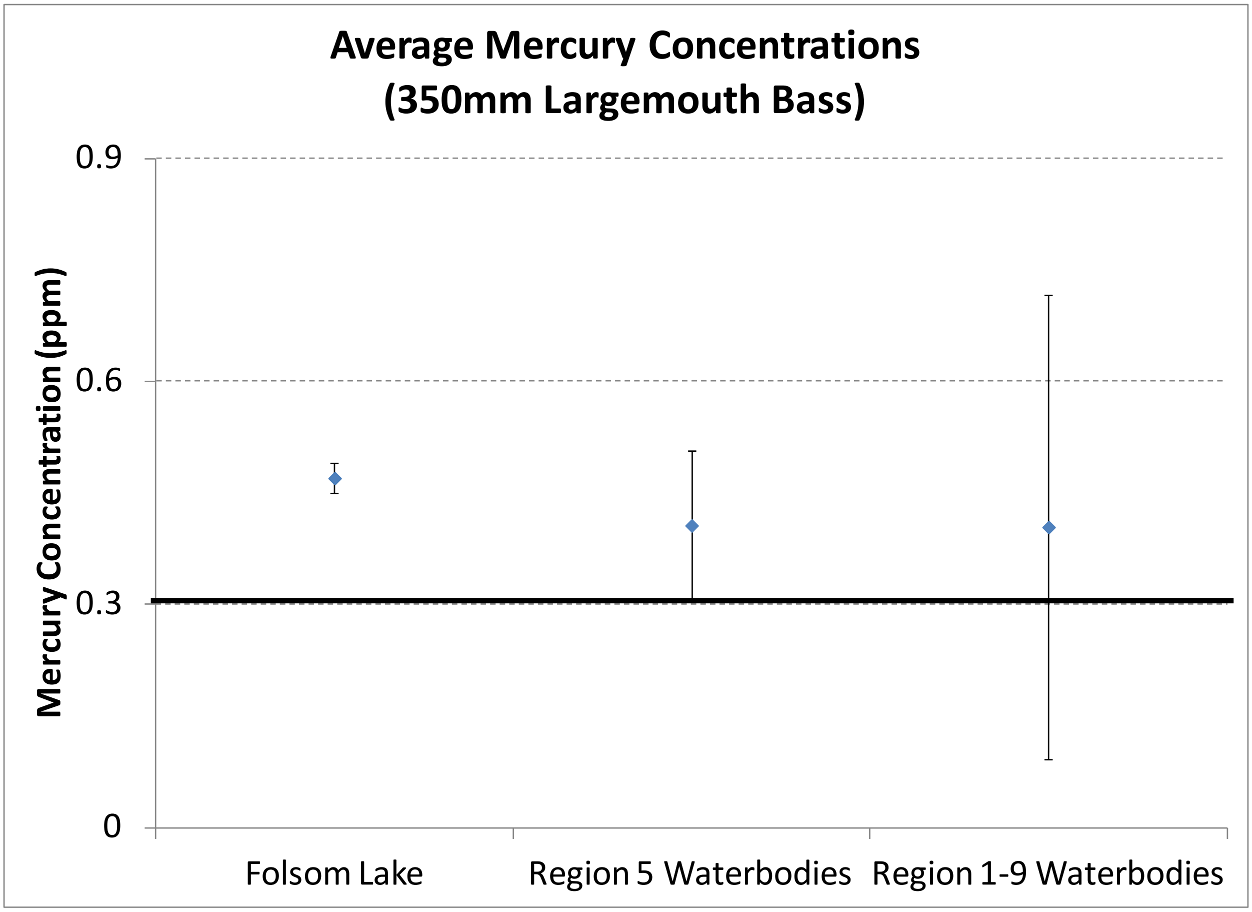


Figure 11. Mercury concentrations in Large Mouth Bass (standardized to 350 mm length) in Folsom Lake compared to waterbodies in the Central Valley (Region 5) and throughout the State (Region 1-9)

Data shown indicate the mean +/- one standard deviation. Bold gridline indicates the EPA threshold of 0.3 ppm. Data from Davis et al. (2010), based on the 2007 – 2008 survey of mercury in fish conducted by SWAMP.

3.3.2 Mercury in Folsom Reservoir Sediments

This section compares mercury concentrations in Folsom Reservoir sediments to thresholds of concern.

The SWRCB published in November 2006, the "Revision of the Clean Water Act Section 303(d) List of the Water Quality Limited Segments, Volume 1." The purpose of this staff report was to present the SWRCB section 303(d) listing methodology. The SWRCB recommended sediment quality guidelines based on published peer-reviewed literature or developed by state or federal agencies. Acceptable guidelines included selected values (e.g., effects range-median, probable effects level, probable effects concentration), and other sediment quality guidelines. Only those sediment guidelines that are predictive of sediment toxicity were used (i.e., those guidelines that have been shown in published studies to be predictive of sediment toxicity in 50 percent or more of the samples analyzed).

Numerical SQGs for freshwater ecosystems have been developed for a variety of federal, state, and local agencies using matching sediment chemistry and biological effects data. Sediment quality guidelines were developed by MacDonald, et al. (2000) in the document entitled, “Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems.” This document was an effort to develop standardized limits using various published SQGs, consensus-based SQGs were developed for 28 chemicals of concern in freshwater sediments (i.e., metals, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, and pesticides). For each contaminant of concern, two SQGs were developed from the published SQGs - a TEC and a PEC. TECs would indicate a reliable basis for predicting the absence of sediment toxicity. Similarly, PECs provide a reliable basis for predicting sediment toxicity.

All 29 sediment samples collected by Reclamation (2006) were below the mercury PEC objective of 1.06 mg/kg (Figure 12). This would indicate that the mercury contaminant concentration levels are below the amount in which harmful effects on sediment-dwelling organisms would be expected to occur on a frequent basis. More over, of the total 29 samples collected, only 2 samples exceeded the mercury TEC objective of 0.18 mg/kg. Therefore, for most of the sediment samples collected concentrations of mercury were below the level in which harmful effects to sediment dwelling organisms would be expected.

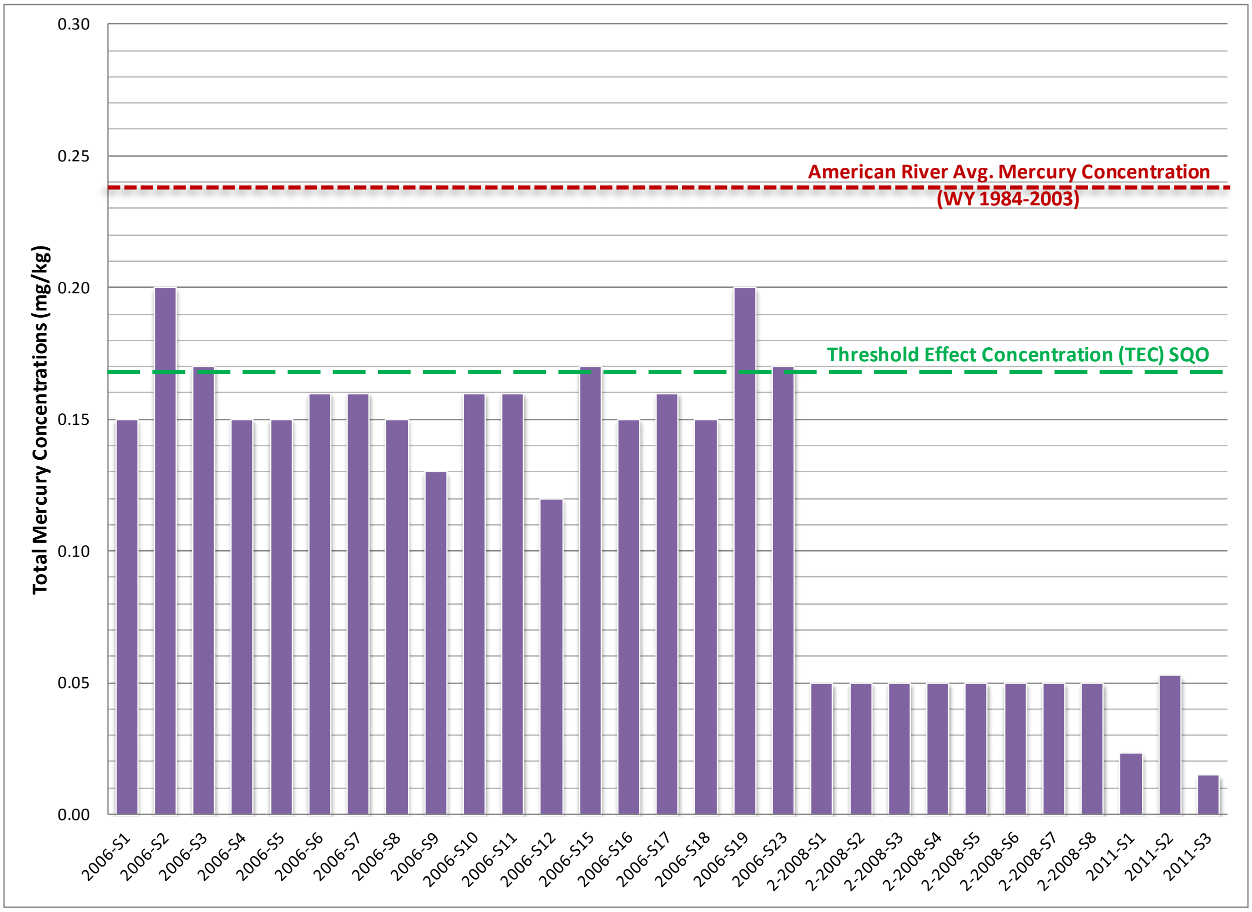


Figure 12. Total Mercury in Sediment Samples from the Project Area, 2006, 2008 and 2011

3.4 Project Impacts

3.4.1 Alternative 2

Installation of the cut-off wall

Before spillway excavation, a cut-off wall would be constructed within the rock plug portion of the approach channel area. The cut-off wall would consist of a reinforced concrete secant pile wall (or the slurry wall alternative) installed across the width of where the approach channel would be constructed. The total length of the cut-off wall would be approximately 1,000 feet. The wall would be socketed into the underlying highly weathered granitic rock. The cutoff wall construction would be conducted in-the-dry there is a negligible risk to increasing the bioaccumulation of mercury.

*This activity has a low potential for impact to the aquatic environment. Mitigation Measures identified to protect water quality would also protect the aquatic environment present in the adjacent lake area, **HWQ-1** and **HWQ-2** would reduce effects to a less than significant level.*

<u>Determination</u>: Less than significant with mitigation under CEQA, and negligible under NEPA.

<u>Construction of the haul road</u>

It will also be necessary to maintain the existing haul road's connection to the spillway. Approximately 165,000 cy of fill material would be placed east of the rock plug to maintain this. The fill will consist of 3 inch minus crushed rock (approximately 145,000 cy) and a slope protection consisting of two layers of 1/4 ton rock (approximately 20,000 cy). Material would be placed during the low lake period utilizing land based equipment. As the haul road construction will be conducted in-the-dry conditions, it should have little impact on water quality as long as appropriate BMPs are in place.

Since construction is primarily in-the-dry conditions, this activity has low potential to increase the bioaccumulation of mercury.

<u>Determination</u>: Less than significant under CEQA, and negligible under NEPA.

<u>Excavation in-the-dry</u>

Excavation in-the-dry for the approach channel slab and wall would require a combination of ripping and blasting to facilitate the rock excavation. Drilling would be performed in lifts and patterns to facilitate thorough pulverization of the granite material. Blasting would typically consist of approximately 15,000 cubic yards rock shots. Blasted rock would be excavated with shovels or loaders, placed in haul trucks, and hauled to the Mormon Island Auxiliary Dam (MIAD) disposal area, located approximately 1.5 to 2 miles from the excavation area.

*This has low potential for impact to the aquatic environment. Blasting activities could result in air deposition of sediments containing mercury and potentially affect the adjacent lake water quality. Mitigation measures contained in **HWQ-1**, **HWQ-5, and BP-1** would reduce the potential effects to a less than significant level.*

<u>Determination</u>: Less than significant with mitigation under CEQA, and negligible under NEPA.

<u>Excavation in-the-wet (dredge sediment, dredge granite, blasting, etc)</u>

Rock excavation under water would be accomplished by drill and blast methods. Barge platforms would be transported and assembled on-site to accommodate drilling and excavation equipment. Down-the-hole hammer drills would bore 5-inch holes and the holes would be charged with emulsified slurry explosives. Prior to detonations, the drill and fleeting barge would move 300 to 500 feet from the blast area. Each blast would produce approximately 2,000 cy of rock. The removal of material would be completed in two lifts when the rock depth exceeds 30 to 40 feet. To limit the blast over-pressures, all charges would be confined by rock burden and crushed stone stemming in amounts that are at least 20-charge diameters. A bubble curtain would reduce the blast-induced dynamic water pressure that could be transmitted to the lake.

Approximately 400,000 cy of material would be removed under the in-the-wet conditions of the project area. The excavation activities in-the-wet (dredging and blasting) have the potential to mobilize existing contaminants such as mercury.

> *This has a high potential for impact. Mitigation Measures **HWQ-1, HWQ-2, HWQ-3 HWQ-6, HWQ-7** and **HWQ-8** would reduce impacts to a less than significant level. Turbidity curtains, silt curtains and a thorough monitoring plan would be necessary to perform this construction and avoid impacting water quality and assist in mitigating bioaccumulation effects.*
>
> *In addition to the above, mitigation measure **BP-1**, this would consist of the implementation of an Adaptive Management Plan during construction. Samples for water quality, sediment quality, and toxicity tests from outside of the construction zone area would be collected to assess the effects of construction dredging and blasting to water quality and the aquatic environment.*
>
> <u>Determination</u>: Less than significant with mitigation under CEQA, and negligible under NEPA.

<u>*Cut-off Wall Removal will not increase the potential for bioaccumulation of mercury*</u>

After the conclusion of the in-the-dry spillway channel excavation and the approach channels slab has been placed, it will be necessary to remove the cut-off wall before starting construction in-the-wet. Cut-off wall removal should have negligible effect on water quality if proper BMPs are in place and maintained.

> *This activity has low potential to increase the potential for mercury to bioaccumulate. Mitigation Measure **HWQ-1** would reduce impacts to less than significant level.*
>
> <u>Determination</u>: Less than significant under CEQA, and negligible under NEPA.

Placement of concrete for the construction of the approach channel walls

The construction of the approach channel would require large quantities of temperature controlled concrete. This would necessitate the use of a contractor-provided, on-site concrete batch plant and deliveries of large quantities of concrete aggregate, concrete sand, and cement. Approximately 13,000 cy of concrete would be needed for the approach channel.

This has no potential for impact to the bioaccumulation of mercury.

Determination: Less than significant under CEQA, and negligible under NEPA.

3.4.2 Environmental Consequence/Impacts Common to Both Alternatives 2 and 3

Construction of the Spur Dike

Spur dike construction would be located directly to the northwest of the approach channel. The core of the spur dike would be constructed of a decomposed quartz diorite core, commonly known as decomposed granite. This would be followed by a compacted random rock fill followed by a stone riprap cap. In order to complete the spur dike, approximately 395,000 cy of material will be placed within the existing reservoir. Material for the spur dike construction would come from the excavation of the approach channel excavation, or MIAD. Placement of material within the existing reservoir has the potential to resuspend sediments and could result in the mobilization of existing contaminants in the sediments, including mercury.

*This has the potential to impact the bioaccumulation of mercury. Mitigation Measures **HWQ-1, HWQ-2, HWQ-3, HWQ-4, HWQ-6** and **HWQ-8** would reduce impacts to a less than significant level. It is essential that BMPs for sediment control be used, and that fill material for the spur dike be processed and analyzed prior to installation to ensure that no pollutants, such as mercury, would be introduced into the reservoir.*

Determination: Less than significant with mitigation under CEQA, and negligible under NEPA.

Construction of the Transload Facility

During transload facility construction, it would be necessary to place ramp material directly into the water. The quantity placed in the wet would be dependent on lake levels. The ramp would be constructed from approximately 30,000 to 230,000 250,000 cy of compacted 3 inch maximum graded fill with little or no fines. Approximately 20,000 cy of ¼ ton riprap would be placed on top of the main fill for protection from wave action. Dredging out an average of three feet of material under the footprint of the ramp (approximately 18,000 cy) may be required depending on the soils at the lake bottom. These activities have the potential to cause turbidity in Folsom Lake, thus increasing the potential for bioaccumulation of mercury.

*This has a potential to increase the potential for bioaccumulation effects to the aquatic environment. Mitigation Measures **HWQ-3, HWQ-4, HWQ-6, HWQ-7** and **HWQ-8** would reduce impacts to a less than significant level. Specifically, the fines content of the ramp material would be reduced as much as possible to limit water turbidity during placement of material. Full depth silt curtains would surround the ramp installation to control turbidity, the mobilization of mercury and silt movement into the greater lake body. Additionally, ramp material would be analyzed prior to installation to ensure that no pollutants that would harm water quality objectives would be introduced into the reservoir.*

Determination: Less than significant with mitigation under CEQA, and negligible under NEPA.

Disposal of Dredge Materials on Land

Dredged and excavated material that is not used for spur dike construction would be stockpiled in disposal sites D1 (22 acres) and D2 (71 acres) at MIAD disposal site, approximately 1.5 to 2 miles southeast of the approach channel. 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.

This activity has low potential to increase the potential for mercury to bioaccumulate in the aquatic environment.

Determination: Less than significant under CEQA, and negligible under NEPA.

<u>Folsom Dam Operations of the Control Structure and Auxiliary Spillway Upon Completion</u>

Long term operations of Folsom Dam would be performed by Reclamation. The Flood Management Operations Study is being completed in conjunction of the Joint Federal Project. The Flood Management Operations Study for Folsom Dam will develop, evaluate, and recommend changes to the flood control operations at Folsom Dam that will further reduce flood risks to the Sacramento, California area.

Folsom Dam would have four methods of releasing flows from the reservoir: three power penstocks, eight flood control outlets (four upper tier and four lower tier, all 5 ft x 9 ft), tainter/radial spillway gates set near the main spillway crest (five service and three emergency), and six submerged tainter gates in the proposed Auxiliary Spillway.

The JFP Auxiliary Spillway would allow the objective release of 115,000 cfs to be achieved sooner in a flood event, and would lessen peak flows fore large, infrequent hydrologic events. A maximum flood release of 160,000 cfs, which is the emergency downstream channel capacity, would be made through the Auxiliary Spillway when necessary based on observed and anticipated reservoir inflows. Emergency releases of 160,000 cfs or above would not be made any sooner with the JFP spillway features than under existing conditions.

Variations in releases utilizing the Folsom DS/FDR features would not be any larger than those allowed under existing conditions. Under this alternative, the amount of water that would ultimately be released would be the same as existing conditions (due to operational constraints), but operators would have the ability to release water sooner in a hydrologic event. Features of this alternative would be operated under existing operating criteria; therefore, would not have adverse impacts to downstream water quality or the potential to increase the bioaccumulation of mercury.

This activity has low potential to increase the potential for mercury pollutants to bioaccumulate within Folsom Lake. Additional studies will be determined under the Flood Management Operations Study along with the collaboration between Reclamation and the CVRWQCB in addressing the listing of Folsom Lake for mercury pollutants under the 2010 303(d) list.

<u>Determination</u>: Less than significant under CEQA, and negligible under NEPA.

3.4.3 **Alternative 3**

Construction of the Cofferdam (dredging for the footprint plus placement of cells and fill) could increase the potential for the bioaccumulation of mercury

Alternative 3, the small cofferdam, consists of a series of 84-foot diameter circular sheet pile cells constructed using 85-foot-long flat sheet piles. The construction of the cells requires sheet piles to be installed using a template. The template consists of two to three horizontally mounted ring wales provide support for the vertical flat sheets. The sheet piles are installed using a vibratory hammer, working progressively around the ring. Once erected, the cells would be filled with well-graded crushed rock. The same plan dimension is maintained throughout the cofferdam, allowing for one sheet pile installation template to be utilized for construction of all of the circular cells. A layer of riprap would be placed along the upstream toe of the cells for scour protection. The cells are founded directly on the decomposed granite. The cofferdam accommodates a high design lake level of elevation 468.34 feet.

Approach channel and spillway excavation associated with Alternative 3 from dredging operations, underwater blasting, and underwater excavation would mobilize the sediments into the water column, increasing the potential for mercury contaminants to bioaccumulate. For Alternative 3, construction would be conducted both in-the-wet and in-the-dry conditions.

To prepare the foundation for the cofferdam, lake sediments and other soft materials would be dredged until decomposed granite is reached. The following activities under this Alternative have the potential to resuspend sediments and could result in the mobilization of existing contaminants in the sediments:

- Removal of sediments via dredge (48,000 cy)
- Approach channel dredging (64,300 cy)
- Underwater blasting and excavation (171,500 cy)

The construction of the cofferdam has the potential for bioaccumulation effects due to the movement and transport of mercury that may be present within the lake sediments along with other water quality factors that affect net methylmercury production and bioaccumulation.

*The construction of the cofferdam has the potential to increase bioaccumulation of mercury within Folsom Lake's aquatic environment. Mitigation Measures that have been identified to protect water quality would also protect the aquatic environment, **HWQ-1, HWQ-2, HWQ-3, HWQ-6, HWQ-7** and **HWQ-8** would reduce impacts to a less than significant level. Specifically, a silt curtain placed around the perimeter of the excavation would be required to control turbidity or the mobilization of mercury in the lake, and stemming and bubble curtains would be used to reduce blast induced water pressures.*

*In addition to the above, mitigation measure **BP-1** will also be implemented**.** This would consist of the implementation of an Adaptive Management Plan during construction. Samples of water sediment, and biota would be collected and compared to water quality standards and other thresholds to assess the effects of construction dredging and blasting to water quality and mercury in the food web. If thresholds of significance are exceeded, corrective measures would be implemented.*

Determination: Less than significant with mitigation under CEQA, and negligible under NEPA.

The impoundment of water within the cofferdam may increase potential for the bioaccumulation of mercury

The cofferdam would have a provision for controlled but rapid flooding of the approach channel area to allow for quick equalization of hydraulic loads on both sides of the cofferdam. Rapid flooding of the approach channel excavation would be achieved by two or more flood gates installed in the connector cells. Each gate would consist of an approximately 100-foot-long, 4-foot diameter pipe mounted with a slide gate on the upstream side of the cofferdam. Two pipes would allow for infilling of the approach channel excavation area up to the high lake level at elevation 468.34 feet within about 6 hours.

*The flooding of the approach channel could affect water quality and increase the potential for the bioaccumulation of mercury onto downstream areas of the project. Implementation of mitigation measure **BP-1** will assist in evaluating the concentration of mercury present along the excavated area of the proposed auxiliary spillway approach channel and compared with the sediment quality guidelines for mercury.*

Determination: Less than significant with mitigation under CEQA, and negligible under NEPA.

Dewatering behind the Cofferdam

After the cofferdam is installed, the downstream area would be dewatered to create the in-the-dry excavation area. The dewatering system will be utilized to conduct an initial mass dewatering between the cofferdam and the rock plug/excavation area and subsequently address seepage from the lake to the excavation area.

*These activities may affect the potential for the bioaccumulation of mercury. Implementation of mitigation measures to protect water quality **HWQ-**1 and **HWQ-5,** would reduce impacts to less than signficant level* *and mitigation measure **BP-1** will assist in evaluating and controlling the concentration of mercury present in the lake water and the sediments.*

Determination: Less than significant with mitigation under CEQA, and negligible under NEPA.

Excavation and blasting in-the-dry (downstream of the cofferdam)

After the cofferdam is in place and dewatered, excavation and blasting of the spillway in-the-dry would occur. Approximately 800,000 cy of excavation in the dry would occur under Alternative 3. This includes 355,600 cy of sediment removal and 310,700 cy of sediment removed from blasting activities. This construction could create runoff with potentially high concentrations of TSS and mercury. The runoff could deposit sediments that may contain mercury concentrations that could affect the downstream receiving waters.

*This has a potential to impact the bioaccumulation potential of mercury to the downstream aquatic environment. Mitigation measures proposed for water quality contained in **HWQ-1** would also reduce the potential effects of mercury to a less than significant level. The use of silt curtains, water quality monitoring, and bioaccumulation monitoring should be effective control.*

Determination: Less than significant with mitigation under CEQA, and negligible under NEPA.

Placement of concrete for the construction of the approach channel walls

The construction of the approach channel would require large quantities of temperature controlled concrete. This would necessitate the use of a contractor-provided, on-site concrete batch plant and deliveries of large quantities of concrete aggregate, concrete sand, and cement. Approximately 13,000 cy of concrete would be needed for the approach channel.

This has a no potential for impact to the bioaccumulation of mercury.

Determination: Less than significant under CEQA, and negligible under NEPA.

Removal of the Cofferdam

After the conclusion of the in-the-dry spillway channel excavation and the approach channels slab has been placed, it will be necessary to remove the Cofferdam before starting construction in-the-wet. Cofferdam removal will require the filling system to convey water from the lake onto the approach channel to the control structure and could affect the resuspension of sediments from filling activities and removal of the cofferdam.

*Mitigation Measures developed to protect water quality, **HWQ-1,** would reduce impacts a less than significant level. In addition, mitigation measure **BP-1**, this would consist of the implementation of an Adaptive Management Plan, would assist in monitoring for bioaccumulation potential effects.*

Determination: Less than significant under CEQA, and negligible under NEPA.

Excavation in-the-wet (dredge sediment, dredge granite, blasting, etc)

Rock excavation under water would be accomplished by drill and blast methods. Barge platforms would be transported and assembled on-site to accommodate drilling and excavation equipment. Down-the-hole hammer drills would bore 5-inch holes and the holes would be charged with emulsified slurry explosives. Prior to detonations, the drill and fleeting barge would move 300 to 500 feet from the blast area. Each blast would produce approximately 2,000 cy of rock. The removal of material would be completed in two lifts when the rock depth exceeds 30 to 40 feet. To limit the blast over-pressures, all charges would be confined by rock burden and crushed stone stemming in amounts that are at least 20-charge diameters. A bubble curtain would reduce the blast-induced dynamic water pressure that could be transmitted to the lake.

Under Alternative 3, approximately 200,000 cy of material would be removed under the in-the-wet conditions of the project area. The excavation activities in-the-wet (dredging and blasting) have the potential to mobilize existing contaminants such as mercury.

*This has a high potential for impact. Mitigation Measures developed to protect water quality, **HWQ-1, HWQ-2, HWQ-3 HWQ-6, HWQ-7** and **HWQ-8** would reduce impacts to a less than significant level. Turbidity curtains, silt curtains and a thorough monitoring plan would be necessary to perform this construction and avoid impacting water quality and assist in mitigating bioaccumulation effects.*

*In addition to the above, mitigation measure **BP-1**, this would consist of the implementation of an Adaptive Management Plan during construction. Samples of water sediment, and biota would be collected and compared to water quality standards and other thresholds to assess the effects of construction dredging and blasting to water quality and mercury in the food web. If thresholds of significance are exceeded, corrective measures would be implemented.*

Determination: Less than significant with mitigation under CEQA, and negligible under NEPA.

3.5 Mitigation Measures

Implementation of Mitigation Measures, HWQ-1 through HWQ-8, has been referenced in this section and presented in detail in the Water Quality Section. In addition, Mitigation Measure **BP-1, Adaptive Management Plan** is presented below.

BP-1: An **Adaptive Management Plan** will be developed as a mitigation control measure to assist with the management of construction control BMPs and monitor the effects onto the aquatic environment. It is difficult to predict the precise effects construction activities would have on sedimentation and an increase on total mercury and methylation of mercury. Therefore, monitoring and adaptive management of construction controls are critical components of protecting against significant effects to bioaccumulation. The Adaptive Management Plan would consist of monitoring the environment outside of the construction zones as specified in the 401 Water Quality Permit, and would specify triggers for adaptive management actions to avoid exceeding significance thresholds for mercury.

The main trigger for adaptive management would be monitoring mercury concentrations in sentinel organisms. Sentinel organisms means organisms that are good indicators of mercury accumulation in the food web; these include benthic invertebrates (e.g., worms, fly larvae) crustaceans (e.g., crayfish), and small fish (e.g., minnows). Sentinel organisms are useful because mercury in their tissues increases more rapidly in response to increased methylmercury exposure, as compared to larger fish that are eaten by people and wildlife. Adaptive Management Plan monitoring could include methylmercury concentrations in water and sediments, as well as special studies of methylmercury production, degradation, and transport. Management actions would be triggered by changes in food web indicators.

Since thresholds are defined by tissue concentrations in predators (bird eggs, larger food fish for people, smaller prey fish for wildlife), the triggers should be concentrations in their prey (small fish, benthic invertebrates, zooplankton and algae). An early implementation action for the Adaptive Management Plan would be to develop a suite of sentinel species and associated desirable mercury concentrations that are based on a food web model.

Following development of sentinel species and trigger levels, baseline levels in sentinel species would be monitored so that changes in response to construction activities can be detected. It is important to note that the fish tissue samples in Folsom Lake indicate that these species are already impacted by mercury, so it would be expected that many sentinel species may already exceed desirable levels of mercury for a healthy ecosystem under baseline conditions.

Therefore, adaptive management actions should be triggered when sentinel species mercury concentrations increase substantially, regardless of whether they are over or under desirable levels. The goal of the Adaptive Management Plan for mercury is to ensure that over time Project actions do not cause or contribute to an increase of mercury in the food chain for the Project duration.

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Appendix D

JFP 404 (b)(1)

APPENDIX D

SECTION 404(b)(1) WATER QUALITY EVALUATION

FOLSOM DAM SAFETY AND FLOOD DAMAGE REDUCTION
FOLSOM DAM JOINT FEDERAL PROJECT

FOLSOM DAM MODIFICATION PROJECT
APPROACH CHANNEL

SACRAMENTO COUNTY, CALIFORNIA

This document constitutes the Statement of Findings, and review and compliance determination according to the Section 404(b)(1) guidelines for the proposed work (preferred alternative) described in the Draft EIS/EIR issued by the Sacramento District. This analysis has been prepared in accordance with 40 CFR Part 230- Section 404(b)(1) guidelines and USACE Planning Guidance Notebook, ER 1 105-2- 100.

I. Project Description

a. Proposed Project

Information on alternatives is taken from Section 2.0 of the Draft SEIS/EIR.

The Folsom Joint Federal Project (Folsom JFP) project is a cooperative effort by the U.S. Bureau of Reclamation (Reclamation), the U.S. Army Corps of Engineers (Corps) and the Corps' non-federal sponsors. The Corps have created a Draft Environmental Impact Statement/ Environmental Impact Report (EIS/EIR), dated July 2012. The Draft Supplemental Folsom Dam Modification Project Approach Channel Environmental Impact Statement/ Environmental Impact Report (SEIS/EIR) will be referenced throughout the document to describe the existing conditions near the project site, as well as, some potential impacts of the proposed project and the other alternatives.

The primary and permanent structures proposed consist of a 1,200 foot long excavated approach channel and a spur dike and the construction of a concrete secant pile cutoff wall to provide seepage control during approach channel excavation (Plate 2). A transload facility and concrete batch plant will be constructed as necessary temporary structures to facilitate the construction. Additional existing sites and facilities that would be utilized for the length of the project include the existing Folsom Overlook, the MIAD disposal area, Dike 7, and Dike 8. These sites and facilities are connected by an internal project haul road.

The proposed project requires discharges of dredged or fill material into waters of the U.S. under Section 404 of the Clean Water Act and includes the following proposed elements:

Approach Channel - To begin construction of an approach channel a temporary transload facility and a haul road embankment would be required to gain/ maintain access to the project area. Dredging the footprint of these structures is required to create a stable foundation prior to construction. In addition, the footprint of the approach channel would need to be dredged prior to excavation. The proposed approach channel including the transload facility and haul road embankment would involve the discharge of 180,000 cy of dredge material and 440,000 cy of rock material into 91.0 acres of waters of the U.S., including 88.5 acres of open waters, and 2.5 transitional wetlands.

Spur Dike - Construction of a spur dike is required to induce a free, even flow of water into the approach channel. Dredging the footprint of the spur dike is required to create a stable foundation prior to construction. The spur dike would involve the discharge of approximately 40,000 cy to 80,000 of dredge material and up to 1.4 million cy of rock material into 22 acres of open waters.

b. Location

Location information is taken from Section 1.3 of the Draft SEIS/EIR.

The project area is located in the city of Folsom at Folsom Dam, approximately 20 miles northeast of Sacramento. The "project area" consists of the ongoing auxiliary spillway construction area; the footprint of the approach channel, as described in the EIS/EIR; the existing project haul routes; the existing project staging areas at the Folsom Overlook and Folsom Prison sites; proposed new disposal sites at Dike 8 and in-reservoir; and the existing project disposal areas at MIAD and Dike 7. The project area can be seen on the map in Plate 1.

c. Purpose and need

The current spillway and outlets at the Folsom facility do not have sufficient discharge capacity for managing the predicted probable maximum flood (PMF) and lesser flood event inflows above a 100-year event (an event that has a 1% chance of occurring in any given year). Structural modifications associated with the Folsom JFP are proposed to address increasing discharge capability and/or increasing storage during extreme flood events above the 200-year event level.

An auxiliary spillway adjacent to Folsom Dam was selected in 2007 as the plan to safely pass part or the entire PMF event. The auxiliary spillway consists of a 1,000 foot long approach channel into Folsom reservoir, a grated control structure including six submerged retainer gates, a 3,000 foot long spillway chute, and a stilling basin. Construction of the auxiliary spillway began in 2008. Section 1.2 of the Draft SEIS/EIR includes additional description on the background of the Folsom Modification project.

This phase of the project addresses the construction of the approach channel and associated spur dike. The approach channel and its related features, as evaluated in the SEIS/EIR, are necessary functional features of the auxiliary spillway. Without the completion of these features, the auxiliary spillway would not be completed and the Folsom facility would remain unable to pass the PMF and provide a higher level of flood damage reduction. As a result, the 200-year level of protection would not be accomplished, and the Sacramento area would remain at risk for a more frequently occurring potential flood event.

d. Authority

The Folsom Dam Modifications Project was authorized by Section 101(a)(6) of the WRDA 1999 (1111 Stat. 274). Further authorization and guidance for the collaboration between the Corps and the USBR under the Folsom JFP was provided by the Energy and Water Development and Appropriations Act of 2006 (119 Stat. 2259). Formal authorization for the Folsom JFP was included in Section 3029(b) of WRDA 2007. The relevant text of these public laws is included in Section 1.2 of the Draft SEIS/EIR.

e. Alternatives [40 CFR 230.10]: Unless otherwise noted, the information is from the Draft SEIS/EIR.

(1) No action: The no action alternative would have no impacts to wetlands or other waters of the U.S., however, this would not achieve the dam safety and flood damage reduction improvements to the Sacramento area and enhanced public safety would not be realized. This alternative is not practicable, as it would not meet the purpose and need of the proposed project.

(2) Other project designs:

Alternative 2 - Approach Channel Construction with Cutoff Wall.
Alternative 2 includes a cutoff wall, concrete batch plant operations, spur dike and transload facility. The final phase of the Folsom Modification project is the completion of the approach channel and spur dike. The cutoff wall would provide seepage control to the spillway excavation between the rock plug and the Control Structure. A trans-load facility and concrete batch plant are necessary for construction. A full description of Alternative 2 is in Section 2.4 of the Draft SEIS/EIR.

This alternative has been retained as a potential alternative. Therefore, this alternative will be retained as a practicable alternative and an evaluation of the impacts of Alternative 2 will be discussed throughout this document.

Alternative 3 - Approach Channel Construction with Cofferdam.
Alternative 3 includes a cofferdam, concrete batch plant operations, spur dike and transload facility. The final phase of the Folsom Modification project is the completion of the approach channel and spur dike. A cofferdam would be utilized to maximize construction activities in-the-dry. A transload facility and concrete batch plant are necessary for construction. A full description of Alternative 3 is in Section 2.5 of the Draft SEIS/EIR.

Although this has a higher risk to maintaining dam safety during construction, it has been determined that this alternative is practicable. Therefore, this alternative will be retained as a practicable alternative and an evaluation of the impacts of

Alternative 3 will be discussed throughout this document in order to determine if it is the least environmentally damaging practicable alternative (LEDPA).

f. General Description of Dredged or Fill Material

(1) General Characteristics of Material

Fill is required below ordinary high water for the purpose of 1) construction of the spur dike 2) construction of the temporary features (transload facility and haul road embankment) and 3) disposal of dredge materials. Completion of these actions would require dredging of fines and excavation of the rock plug. Substrate is mostly fine sand and silt, and granitic rock.

Transload facility would be constructed from 3 inch maximum graded fill with less than five percent fines and ¼ ton riprap placed on top protection from wave action. Haul road embankment would be constructed from 6 inch minus crushed rock with slope protection consisting of two layers of 1/4 ton rock.

The proposed fill for other practicable build alternative would come from on-site construction or imported fill material. The no action/no project alternative would result in no changes.

(2) Quantity of Material

Approximately 260,000 cubic yards of material would be dredged and redistributed within the designated disposal areas. Approximately 1.4 million cubic yards of granitic material would be excavated from the approach channel (rock plug) area and used for the construction of the spur dike or disposed of within the designated disposal areas.

(3) Source of Material

Material for the transload facility and haul road embankment would be imported from a licensed, permitted facility that meets all Federal and State standards and requirements, or use onsite materials from Dike 7 or MIAD. The material would be transported along existing roadways and construction access roads. The spur dike would utilize the onsite material excavated from the approach channel.

g. Description of the Proposed Discharge Site

(1) Location

The location of the discharge sites would be in the designated lake disposal area, spur dike, adjacent to the rock plug, MIAD, Dike 7, or Dike 8 (Plate 1).

(2) Size

Table 1 shows the acreage of each disposal site and estimated capacity in cubic yards. In-water dredge disposal site is 85 acres, spur dike location is 22 acres, transload facility is 2.5 acres, haul road embankment is 1 acre. Dike 8 includes 3 acres of in-water disposal.

Upland disposal sites, if available, included 9 acres at Dike 7, and 93 acres at MIAD (D1, 22 acres and D2, 71 acres). These sites are previously disturbed and would not generate discharge into waters of the U.S. Dike 8 includes 13 acres of undisturbed upland and transitional wetlands.

Table 1. Estimated Acreage of Disturbance

Proposed Discharged Site	Estimated Capacity (cy)	Acres
In-reservoir	up to 220,000 cy	85
Spur Dike	up to 1.4 million cy	22
Transload Facility	40,000 cy	2.5
Haul Road Embankment	400,000 cy	1
Dike 8	up to 730,000 cy	16

The other practicable build alternative would encompass the same disposal sites. However, Alternative 3 would generate a larger amount disposal material due to the cofferdam. The cofferdam would be constructed over 2 acres of open water. The no action/no project alternative would have no have impacts to disposal sites.

(3) Type of Site

The type of disposal site is a lake bed, previously disturbed upland disposal sites, and reservoir shoreline fluctuation zone.

(4) Type of Habitat

The following habitat types were identified at and around the project area:

Open Water/ Reservoir Shoreline Fluctuation Zone
Approximately 175 acres of open water habitat is located within the project area from the Dike 8 staging area to Folsom Outlook Point. Open water habitat in the study area is largely unvegetated. The reservoir shoreline fluctuation zone at Dike 8 has scattered willows in low lying areas. Open water/ reservoir shoreline fluctuation zone habitat provides foraging habitat for waterfowl and other wetland species.

Transitional Wetland
This habitat type occurs primarily in low areas of the shoreline, in pools of shallow standing water or in saturated soil. This habitat occurs mostly during the high lake levels (about April through October) are defined as transitional wetland. Approximately 2.5 acres at Dike 8, are dominated by low sedges, water-tolerant grasses, and cottonwood. Emergent vegetation may occur in a continuous patch, or may exist in small areas of standing or slowly flowing water.

Upland

Upland areas beyond the floodplain, mostly ruderal and barren areas occur along the haul road and within the construction site. Also includes disturbed areas dominated by yellow star thistle, introduced pasture grasses, and other weedy forbs and grasses.

Oak Woodland and Savanna
This habitat is adjacent to the project area. Dominant vegetation included blueoak, and interior live oak. A herbaceous layer includes introduced pasture grasses, and a variety of other native or weedy forbs. Oak woodlands and savannas offer diverse, abundant, and valuable wildlife habitat.

Developed/Disturbed Areas

The greater project area is highly disturbed and largely devoid of vegetation, with the exception of small areas of annual grasses and forbs. These areas are categorized as developed/disturbed habitat areas. Various buildings, dams, water control facilities, and related facilities have been constructed near the project area. The lands surrounding these structures are often heavily disturbed during construction. The Folsom Overlook staging area and MIAD and Dike 7 disposal sites are previously disturbed areas of State and Federal land. These areas have been developed under previous actions of the Folsom JFP and are active construction zones. This area provides little to no habitat for wildlife and has little to no vegetation or ground cover.

(5) Timing and Duration of Discharge

Construction of the project would be conducted over four years, beginning in 2013 and continuing through fall 2017. Dredging and construction of the transload facility and haul road would begin in Summer 2013. Dredging and construction of the approach channel and spur dike would begin in 2015 and continue through 2017. Timing of construction would correspond to low lake levels, when feasible, to minimize impacts to water quality and to reduce the quantity of dredged materials. When lakes levels are low, more material would be removed and/or constructed in dry conditions. Revegetation would occur immediately after construction from October to December.

h. Description of Disposal Method

The description of the disposal methods within the proposed project area are taken from the Draft SEIS/EIR.

Hydraulic cutterhead dredging is proposed for dredge material that does not require blasting prior to excavation or dredging. Hydraulic cutterhead dredging is necessary for site preparation of the transload facility, spur dike, approach channel, and the haul road embankment. If mechanical clamshell dredging is utilized, dredged material will be placed on a barge by clamshell and transported to the transload facility. Dredged sediment will then be transferred to trucks and placed at the Morman Island Auxiliary Dam site.

The dredging equipment that could be utilized for the approach channel excavation and spur dike construction includes barges, excavators and airlifts. The dredging equipment that could be utilized for this project includes barges, excavators, and airlifts:

- A barge-mounted large long reach excavator, with an effective excavating depth of 90 to 95 feet, would be used. Different size buckets can be changed out for the various soil and rock materials to be encountered during construction. The excavator method is limited by its effective digging depth. Accordingly, a 3½ month (mid-November to end of February) low lake level window would be required to effectively dredge to the final grades.
- A 225-ton class barge-mounted crawler crane clam shell unit would supplement the hydraulic excavator to dredge shot rock and common material to grade in periods where the lake level is too high for the hydraulic excavator to dredge to final grade.
- An airlift or sweep would be set up on the drill barge to perform foundation clean up.

The long reach excavator, conventional clam shell, and other overwater equipment would be mounted on portable *"Flexifloat"* units, sized and assembled to maintain stability and manage the excavation sets. The size of the *"Flexifloat"* barges would be approximately 180 to 200 feet by 40 to 50 feet by 7 feet deep. The barges would be held in position by large winch controlled spuds, or in water over 50 feet deep, by a four-point mooring system using bottom founded anchors.

The cleanup of rock fragments would be removed from the channel by airlift systems. Following the use of airlifts, in-the-wet inspection of the lakebed would take place to identify areas where rock fragments remain and designate areas that have been cleared. The airlift and inspection divers would work iteratively until all grid areas have been verified to be free of rock fragments.

The other practicable build alternative would utilize similar disposal methods. The no action/no project alternative would not require the disposal of materials.

II. Factual Determinations

a. Physical Substrate Determinations (Sections 230.11 (a) and 230.20)

(1) Comparison of Existing Substrate and Fill

The description of the current substrate within the proposed project area is taken from Section 3.11.2 of the Draft SEIS/EIR.

The soils within the proposed project area are mapped as Andregg, Argonaut, Auburn, Inks, Xerolls, and Xerothents. Large areas of the project area have been graded and altered during the original construction of Folsom Dam and its supporting infrastructure, with further modifications performed as part of routine maintenance activities.

Fill material used during project construction would come from existing on-site substrate excavated as part of construction of the new auxiliary spillway and would be placed at locations both inside and outside of Folsom Reservoir. Fill material placed outside of Folsom Reservoir would be placed on Federal property. Fill material would be of granitic rock origin and lake sediment.

(2) Changes to Disposal Area Elevation

The description changes to the disposal sites within the proposed project area are taken from Section 2.4.3 and 4.4.4 of the Draft SEIS/EIR.

Dredge materials deposited in the lake disposal area would be discharged uniformly as to not significantly alter substrate elevation and create new features.

The spur dike would be a permanent expansion of the Folsom Overlook area. The construction of the spur dike would alter approximately 1% of Folsom Reservoir's 75-miles of shoreline. The spur dike would alter substrate elevation and reduce the surface area of the Folsom Reservoir by 9 acres. The spur dike is part of the project description to direct water into the approach channel. The overall circulation, depth, current pattern, and water fluctuation of the Folsom Reservoir would not change from the spur dike.

The disposal materials deposited on land would contrast with the existing landscape during temporary disposal activities, and would permanently alter the natural landscape after the completion of construction.

With the mitigation measures proposed to avoid and minimize impacts, the impacts of the proposed project would be minimal.

The other practicable build alternative would cause similar impacts to the disposal sites. The no action/no project alternative would not modify the substrate elevation or bottom contours.

(3) Migration of Fill

The description of materials and placement are taken from Section 2.4.2 and 4.4.4 of the Draft SEIS/EIR.

The proposed action would involve the removal of approximately one million cubic yards and the addition of 1.4 million cubic yards of material into Folsom Reservoir for the construction of the approach channel and spur dike. Because the reservoir is well regulated and because the fill material would consist of granitic material, as long as the contractor utilizes BMP's to prevent erosion during construction activities, the proposed project would have minimal effects on erosion and accretion patterns. Mitigation measures, including BMPs are in Section 4.4.6 of the Draft SEIS/EIR.

The other build alternative to the proposed project would have the same impacts on erosion and accretion patterns and would be minimized with the use of BMP's. Additional information on Alternative 3 is in Section 2.5.2 and Section 4.4.5 of the Draft SEIS/EIR.

The no action alternative would not result in any change to erosion and accretion patterns.

(4) Duration and Extent of Substrate Change

The proposed action would result in the removal of some native substrate as well as cause the soils at the site to become compacted and could reduce the water storage capacity of the soils. However, because the project is to provide for flood damage reduction and dam safety modifications, this impact to the soil would not reduce the flood storage capacity of the Folsom Reservoir.

The other practicable build alternative would cause similar impacts to substrate. The no action/no project alternative would not modify the substrate.

(5) Changes to Environmental Quality and Value

Folsom Reservoir is a regulated facility and the in water disposal site is devoid of vegetation. The proposed project would not adversely change the environmental value of the lake. Upland disposal sites at MIAD and Dike 7 are previously disturbed designated disposal area. Placement of material at these locations would be consistent with current land use. Disposal at Dike 8 would change the current land use and impact 2.5 acres of transitional wetlands. Additional information on vegetation and wildlife is in Section 3.12 of the Draft SEIS/EIR.

The other practicable build alternative would cause similar changes in environmental quality and value. The no action/no project alternative would not modify the environmental quality and value.

(6) Actions to Minimize Impacts

Construction would have minor, short-term impacts. Standard erosion prevention practices would be employed such as silt fences and silt curtains to contain turbidity. These BMPs would minimize erosion and transport of soils and substrate. Additional information on mitigation measures, including BMPS is in Section 4.4.6 of the Draft SEIS/EIR.

b. Water Circulation, Fluctuation, and Salinity Determinations

(1) Alteration of Current Patterns and Water Circulation

The Folsom Reservoir is located within the American River Basin, which covers an area of approximately 2,100 square miles and has an average annual unregulated runoff volume of 2,700,000 acre-feet, however, because Folsom Reservoir is managed as a flood control facility, the annual runoff volume has varied in the past from 900,000 acre-feet to 5,000,000 acre-feet. The Folsom Reservoir is fed by the North Fork American River and the Middle Fork American River, and the water is released on a regulated basis into Lake Natoma and the South Fork American River. Folsom Reservoir is the principal reservoir on the American River, impounding runoff from a drainage area of approximately 1,875 square miles.

Because the Folsom Dam and Reservoir is an already regulated system designed for flood protection, the impacts of the proposed project and all other practicable build alternatives would have minimal impact to current, circulation and drainage patterns.

The no action/no project alternative assumes no action would be taken. This would cause the currents, circulation and drainage patterns of Folsom Reservoir to remain the same.

(2) Interference with Water Level Fluctuation

Because the Folsom Facility is regulated to allow a specific amount of water to be released into Lake Natoma and the lower American River, the proposed project, the other practicable build alternative and the no action/no project alternative would not change water level fluctuation patterns.

(3) Salinity Gradients Alteration

Salinity gradients would not be affected.

(4) Effects on Water Quality

The description of the current water quality condition of the reservoir is taken from Section 3.4.2 of the Draft SEIS/EIR.

The water quality within Folsom Reservoir is currently good, with the water being utilized for: municipal and domestic water supply; irrigation; industrial power; water contact and non-contact recreation; warm and cold freshwater habitat, warm freshwater spawning habitat; and wildlife habitat.

(a) Water Chemistry

Project activities involving concrete and concrete wash water have the potential to affect pH, turbidity, and hexavalent chromium in receiving waters. Concrete wash water tends to have relatively high pH (between 10 and 14). Approved BMPs for managing concrete wash water include curing / air drying, off hauling for treatment, and active treatment onsite using carbon dioxide or a stronger acid such as sulfuric or acid. Hexavalent chromium is present in Portland Cement Concrete (PCC) and PCC grindings. Active treatment systems (ATS) targeting pH and turbidity may not remove hexavalent chromium, unless they are augmented with ferrous sulfate or some other chemical agent to reduce hexavalent chromium to trivalent chromium.

Mitigation measures proposed for pH and turbidity would be development and implementation of an approved Stormwater Pollution Prevention Plan (SWPPP), including an ATS if needed to attain water quality objectives. To mitigate for hexavalent chromium risks, the ATS plan would include monitoring and treatment measures to attain no significant increase of hexavalent chromium in receiving waters.

(b) Salinity

The project would not change salinity levels.

(c) Clarity

Excavation and placement of excavated material in the disposal area would temporarily reduce clarity due to an increase in total suspended solids. However, the reduction of clarity caused by construction activities would be short in duration and would return to pre-construction levels upon project completion.

(d) Color

Excavation and placement of excavated material in the disposal area would temporarily induce a color change due to an increase in turbidity. However, conditions would return to pre-construction levels upon completion of the project.

(e) Odor

The project would not affect odor.

(f) Taste

The project would not affect taste.

(g) Dissolved Gas Levels

The proposed project would have temporary impacts on dissolved gas levels. Dissolved gas levels would be affected by the release of dewatering discharges having high chemical oxygen demand (COD) or biochemical oxygen demand (BOD). Development and implementation of an approved SWPPP would avoid significant negative effects for these two parameters.

(h) Temperature

The excavation activities in-the-wet (dredging and blasting) have the potential to create substantial turbidity, thus affecting water temperature. Proposed mitigation measures, specifically, a silt curtain placed around the perimeter of the excavation would be required to control turbidity and the mobilization of pollutants that may be present in lake sediments.

(i) Nutrients

Release of suspended sediments from project activities could potentially cause turbidity thresholds to be exceeded. This could concurrently cause thresholds for metals and nutrients to be exceeded. Turbidity would be controlled outside the working area using a combination of BMPS, turbidity curtains, and active treatment as appropriate. An approved Active treatment systems plan would also include an assessment of the total residual TDS load in treated water in comparison to receiving water volumes to assure that TDS thresholds are not exceeded.

Development and implementation of an approved SWPPP, along with the initial dredging to remove sediments, would also prevent release of excess nutrients into the Lake.

(j) Eutrophication

The project would not input excess nutrients into the stream or promote excessive plant growth. The project would not contribute to eutrophication.

(5) Changes to Environmental Quality and Value

The proposed project could impact the water quality of the Folsom Reservoir during construction from earth moving operations, dredging operations, storage and handling of construction materials on site and the operation and maintenance of construction equipment on-site. Construction and associated materials, including solvents, paints, waste materials and oil and gas associated with operation and maintenance of construction equipment present on-site could introduce hazardous or toxic materials and silt and debris into surrounding waters and could cause degradation of the water quality within the Folsom Reservoir. Although there may be significant impacts to water quality during project construction, these impacts would be short term. The operation of the newly constructed project would not affect the water quality of the Folsom Reservoir.

(6) Actions to Minimize Impacts

Construction and excavation would be timed with low water levels to minimize impacts. The impacts to water quality due to construction activities would be minimized by the special conditions required by the Section 401 Water Quality Certification, issued by the Central Valley Regional Water Quality Control Board (CVRWQCB).

In addition, proposed mitigation measures would reduce the potential impacts of the proposed project on water quality. These mitigation measures are located in the Water Quality Section (4.4.7) of the Draft SEIS/EIR.

The contractor would be required to implement the proposed mitigation measures during project construction, therefore, impacts to the water quality within Folsom Reservoir from project construction would be minimal.

c. Suspended Particulate/Turbidity Determinations

(1) Alteration of Suspended Particulate Type and Concentration

According to the EIS/EIR, the runoff from the relatively undeveloped watershed is of very high quality, rarely exceeding the State of California's water quality objectives. In the past, however, occasional taste and odor problems have occurred in municipal water supplies diverted from Folsom Reservoir. Blue-green algal blooms that occasionally occur in the reservoir due to elevated water temperatures were identified as the cause of these problems.

Within Folsom Reservoir, turbidity should be less than or equal to 10 Nephelometric Turbidity Units (NTUs), except for periods of storm runoff, according to the CVRWQCB Basin Plan. The turbidity within the Folsom Reservoir, as tested between February 2001 and February 2002, ranged between a minimum of 1.0 NTU to a maximum of 126.9 NTU, with an average of 8.4 NTU. The turbidity within Lake Natoma between January 2001 through June 2002 range from 0.5 NTU to 5.0 NTU. It is likely that the maximum turbidity level within Folsom Reservoir occurred following a storm event.

During construction, there could be increased levels of turbidity as soils are exposed and during rain events, which may erode these soils into the reservoir. In addition, the dredging of material and placement of fill materials could cause a release of suspended sediments and increased turbidity into the reservoir. This exposed material could be eroded by wave action or storm runoff. The water could enter the Folsom Reservoir, and could migrate into Lake Natoma to the south. It is likely, however, that the suspended particulates would settle within Lake Natoma and it is unlikely that the lower American River would be affected. The use of best management practices (BMP's), such as utilizing erosion control devices (silt fencing, silt curtains) within the project area, and stabilizing the side slopes of all exposed fills until they can be revegetated would minimize any increases in suspended sediments or turbidity associated with the proposed project. Additional information on water quality is in Section 3.4 and 4.4 of the Draft SEIS/EIR.

The no action/no project alternative would result in the project not being completed, which would result in no impacts to suspended sediment and turbidity.

(2) Particulate Plumes Associated with Discharge

Temporary and local particulate plumes may occur during construction activities but would quickly dissipate after construction is complete.

(3) Changes to Environmental Quality and Value

Particulate plumes resulting from any construction activity are not expected to persist after project completion. Particulates suspended within the disposal area are not expected to differ in type from particulates currently within the project area.

(4) *Actions to Minimize Impacts*

Effects would be minimized by performing work during low lake level periods. The duration of construction would be limited to the shortest timeframe practicable. As a result of mitigation measures listed in Section 4.4.6 of the Draft SEIS/EIR, increases in sedimentation and turbidity would be minimized and temporary.

d. Contaminant Determinations

The potential biological hazard for sediments within Folsom Reservoir stems from mercury released into the American River and its tributaries from historic mining activities. Chemical testing of reservoir sediment has not identified concentrations of mercury above background in areas where in-reservoir work may occur. There may also be residual contaminants on the downstream side of the reservoir from the original construction of the Folsom Facility, likely as a result of spills of petroleum products during initial construction. The soil contamination is being handled through standard hazardous materials protocols and is not at risk of being released into the terrestrial or aquatic environments.

In order to ensure that there are no contaminants within the proposed borrow or fill material, BMPs listed in the Water Quality Section (Section 4.4.7) of the Draft SEIS/EIR would be implemented. Provided these mitigation measures are implemented by the contractor, there would be minimal impacts to aquatic resources from contaminants.

Because the other practicable build alternative involves the use of borrow material, the impacts from contaminants to the aquatic ecosystem would be similar. The no action alternative would result in no impacts due to potential contaminants.

e. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton

Plankton are drifting organisms that inhabit the pelagic zone of oceans, seas, or bodies of fresh water. Construction of the project would be temporary and short termed. Effects to plankton would be temporary and not significant.

(2) Effects on Benthos

Benthic organisms are found in the benthic zone which is the ecological region at the lowest level of a body of water such as an ocean or a lake, including the sediment surface and some sub-surface layers. Dredging may initially result in the complete removal of benthic organisms from the excavation site. However, recovery would occur relatively quickly since the discharge material is from the same parent source. Benthic organisms will be smothered by the discharge of excavated material at disposal areas; however, benthic organisms from adjacent habitat would recolonize substrate material in the disposal areas. Additional information on impacts to benthic organisms is in Section 4.4.4 of the Draft SEIS/EIR.

(3) Effects on Nekton

Nekton are of actively swimming aquatic organisms. Descriptions of fish and other aquatic resources are from Section 3.5 of the Draft EIS/EIR.

Folsom Reservoir inundates approximately 12,000 acres of the North Fork, South Fork, and main stem of the American River. Although the maximum depth of the reservoir is 266 feet just behind Folsom Dam, most of the reservoir is shallower, averaging 66 feet in depth. The reservoir has about 75 miles of shoreline. The waters of Folsom Reservoir stratify in the warmer months from April through November, with a layer of warmer water known as the epilimnion sitting on top of a bottom layer of cold water known as the hypolimnion.

Nimbus Dam is located about 6 miles downstream of Folsom Dam and inundates the American River for most of this reach, creating Lake Natoma. Anadromous fish, such as Chinook salmon and steelhead can access about 23 miles of the lower American River downstream of Nimbus Dam but do not ascend the river beyond Nimbus Dam. The Nimbus Hatchery was constructed as a mitigation hatchery for the original Folsom Dam project.

Habitat within Folsom Reservoir and Lake Natoma allow for a diverse assemblage of native and introduced fish species to coexist. Folsom Reservoir is managed as a ‘two-story’ fishery, with cold-water fishes such as trout inhabiting the hypolimnion and warm water fishes such as bass and sunfish inhabiting the epilimnion and shoreline areas. Two cold water fisheries for rainbow trout and Chinook salmon are actively maintained through a stocking program.

The Folsom Reservoir provides habitat for game fish such as: Rainbow trout (*Oncorhynchus mykiss*), Chinook Salmon (*Oncorhynchus tsawytcha*), Brown Trout (*Salmo trutta*), Bluegill (*Lepomis macrochirus*), Redear sunfish (*Lepomis microlophus*), Green sunfish (*Lepomis cyanellus*), White crappie (*Promoxis annularis*), Black crappie (*Promoxis nigromaculatus*), Largemouth bass *(Micropterus salmoides)*, Spotted bass *(Micropterus punctulatus)*, Brown bullhead *(Ameiurus nebulosus)*, White catfish *(Ictalurus catus)*, and Channel catfish *(Ictalurus punctatus)*. Native, non-game fishes present within the project area include: Hardhead *(Mylopharodon conocephalus)*, Sacramento pikeminnow *(Ptychocheilus grandis)*, California roach *(Lavinia symmetricus)*, Sacramento sucker *(Catostomus occidentalis),* and Riffle sculpin *(Cottus gulosus).* Introduced, non-game fishes common to the Folsom Reservoir include: Threadfin shad *(Dorosoma pretenense)* and Wakasagi smelt *(Hypomesus nipponensis),*

The proposed project would result in the permanent loss of approximately 11.5 acres of potential fish habitat. In addition, construction activities could result in adverse impacts to habitat from an increase in suspended sediments and turbidity associated with the proposed project. Impacts to habitat can be minimized through the use of BMP's and other mitigation measures proposed which are described in Section 4.4.7. Provided the proposed mitigation measures and compensatory mitigation are conducted, the proposed project would have minimal impacts on fish and aquatic wildlife habitat.

Due to the common footprints of the other practicable build alternative, the impacts to fish and other aquatic organisms would be the same as for the proposed project. The no-action alternative would result in no losses of habitat for fish and other aquatic organisms.

(4) Effects on Aquatic Food Web

Description of ecological effects is taken from Section 4.5 of the Draft EIS/EIR.

Excessive turbidity in aquatic systems can lead to light altered regimes that can directly affect primary productivity, species distribution, behavior, foraging, reproduction and survival of aquatic biota (Wilber and Clarke 2001). Aquatic system productivity can also be reduced. As an indirect effect, the suppression of aquatic productivity is not as apparent as direct effects on larger organisms. Sustained turbidity can cause the shading of primary phytoplankton, zooplankton and invertebrates which serve as food for smaller fish, and larval fish upon which game fish forage (Lloyd 1987). Sufficient turbidity can result in direct lethal or sublethal effects on fish (Newcombe and Jensen 1996). An increase of resuspended dissolved or particulate organic carbon from the sediment may decrease dissolved oxygen (DO) concentrations. Reduction in DO availability for aquatic species causes reduced oxygen uptake. Turbidity can clog fish and amphibian gills and cause physical abrasion to the level of sub-lethal or lethal effect. Settling of suspended sediment can coat fish and amphibian eggs, reducing or eliminating DO uptake required for development or survival.

Implementation of BMP's and other mitigation measures proposed (Section 4.5.6.) would result in minimal impacts on fish and aquatic wildlife habitat.

Due to the common footprints and similar construction methods of the other practicable build alternative, the impacts to fish and other aquatic organisms would be the same as for the proposed project.

The no-action alternative would result in no effect fish and other aquatic organisms.

(5) Effects on Special Aquatic Sites

(a) Sanctuaries and Refuges

No sanctuaries and refuges are within the project area.

(b) Wetlands

Wetland vegetative communities were mapped inside the reservoir-influenced zone. The wetland area within the project area is seasonal. These communities experience wetland hydrology for a limited period of time, although it may be for long enough duration to develop indicators of wetland soil and hydrology and to seasonally host hydric vegetation. Additionally, wetlands are found below the ordinary high water mark of 466 feet.

The proposed project would involve the discharge of material into approximately 2.5 acres of wetlands on the project site. This would cause the permanent loss of 2.5 acres of wetlands for the disposal of material.

(c) Mud Flats

No mud flats are within the project area.

(d) Vegetated Shallows

No vegetated shallows are within the project area.

(e) Coral Reefs

No coral reefs are within the project area.

(f) Riffle and Pool Complexes

No riffle and pool complexes are within the project area.

(6) Threatened and Endangered Species

The proposed activity may affect Federally-listed and California- listed endangered or threatened species or their critical habitat. Chapter 3 Section 13 and Chapter 4 Section 13 of the Draft SEIS/EIR discuss Federal and State listed species in detail. If the proposed Dike 8 disposal site would be used during project construction, formal consultation would be initiated with USFWS pursuant to Section 7 of the Endangered Species Act and with CDFG pursuant to the California Endangered Species Act. Habitat exists for the valley elderberry longhorn beetle and, white-tailed kites.

Use of the proposed Dike 8 disposal area would result in direct and indirect effects to the four elderberry shrubs. Direct effects would include removal or trimming of the shrubs. Indirect effects, if the shrubs are not removed, would include physical vibration and an increase in dust during disposal activities. These effects would be considered significant, unless the mitigation is implemented.

Use of the proposed Dike 8 disposal area could potentially result in direct and indirect effects to the white-tailed kite if they begin nesting in the area. Construction activities in the vicinity of a nest have the potential to result in forced fledging or nest abandonment by adult kites. Therefore, if present, the white-tailed kite could be adversely affected by use of the disposal site.

Prior to use of the proposed Dike 8 disposal area, preconstruction surveys would be conducted to determine if there are nests present within 1,000 feet of the disposal area. If the survey determines that there are active nests in the project area, CDFG would be contacted to determine the proper course of action. If necessary, a buffer would be delineated and the nests would be monitored during construction activities. With coordination and mitigation, as discussed below, it is anticipated that effects to white-tailed kite would be less than significant.

The no action alternative would not result in direct impacts to endangered and/or threatened species.

(7) Other Wildlife

The project could have short-term effects on resident mammals, birds, reptiles, and amphibians. Noise from construction equipment and increased human presence could temporarily displace some wildlife, and temporary alteration of riparian and aquatic habitat would occur.

Species utilizing the project area should be accustomed to the noise and activity of the area, due to the long-term nature of the Folsom JFP. The construction of the approach channel, transload facility, and spur dike would not increase disturbance to the area's wildlife species beyond current operations, with the exception of the increase of in-water work associated with the approach channel excavation, which has the potential to affect acquatic species.

To ensure that there would be no effect to migratory birds, preconstruction surveys would be conducted, if needed, in and around the project area. If any migratory birds are found, a protective buffer would be delineated, and USFWS and CDFG would be consulted for further actions. Recommendations proposed by the USFWS in their Fish and Wildlife Coordination Act Report are listed in Section 4.15.

The majority of the project area is previously disturbed due to ongoing Folsom JFP construction. The previously undisturbed areas include the in-reservoir disposal site and Dike 8. The in-reservoir disposal site has no vegetation associated with it, and consists of open water habitat.

The Dike 8 disposal area consists of up to 15.8 acres of currently undisturbed habitat. Use of the Dike 8 disposal area would result in the permanent loss of 6.1

acres of ruderal herbaceous, 4.2 acres of oak savannah, and 2.5 acres of transitional wetland habitats on the waterside of the dike. On the landside of the dike, 3.0 acres of primarily disturbed, non-native grasslands would be permanently lost and up to 30 trees may be removed. A detailed analysis of impacts to vegetation is in Section 4.12. The loss of vegetation habitat would be potentially significant, however, with the implementation of the proposed mitigation measures, impacts would be considered less than significant.

In order to preemptively avoid direct effects to amphibian and wetland species, the culvert under the haul route that allows the flooding of the Dike 8 area would be closed during low water levels prior to use of the Dike 8 area. As a result, this area would not flood, and the seasonal habitat would not be created for these species during the construction period. Since the flooding of this area fluctuates depending on reservoir levels, and does not annually flood, this would be considered a less than significant direct impact on these wildlife species. However, since the loss of the transitional wetland habitat would likely be permanent, this long-term habitat loss would be considered a significant indirect effect to these species, as they would no longer be able to seasonally access this habitat. As a result, mitigation for the permanent loss of transitional wetland habitat would be required.

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The other practicable build alternative would occupy similar footprints; therefore, result in similar impacts to wildlife. The no action alternative would result in nodirect impacts to endangered and/or threatened species.

(8) Actions to Minimize Impacts

Many mitigation measures to avoid and minimize impacts to the aquatic environment, as well as, compensatory mitigation measures in order to compensate for unavoidable impacts are proposed. Mitigation measures is listed in Section 4.4.7 of the Draft SEIS/EIR.

The Folsom Reservoir is a man-made facility that is well regulated. While many fish species currently inhabit the reservoir, a majority of them are either stocked in the reservoir and/or are non-native species. The proposed project would cause the placement of fill material into approximately 113.0 acres of waters of the U.S., including 110.5 acres of open water habitat.

Although it would result in the placement of fill material into 22 acres of open waters of the U.S, the spur dike would not cause the permanent loss of functions and/or values of the water. The net loss of functions and services of aquatic resources due to the spur dike is 9 acres of surface waters that would be converted to upland.

The proposed location of the spur dike is adjacent to previous fill placed by Reclamation. Reclamation is required to construct approximately 10 acres of riparian wetland habitat for compensatory mitigation to impacts to open water habitat. The compensatory mitigation required for the impacts by Reclamation is sufficient to compensate for the Corps' impacts from the construction of the spur dike. Compensatory mitigation has already been required to off-set those losses of functions at the Overlook. The additional fill from the spur dike will not result in additional acreage impacts or losses in functions that have not been already accounted for. The Corps will be required to assist Reclamation with their mitigation requirements to ensure the 10 acres of riparian wetlands would be initiated by 2013.

The discharge of dredge materials would temporarily impact approximately 85 acres of waters of the U.S. The haul road embankment and transload facility are temporary project elements and would be removed after three to four years. Through the incorporation of mitigation measures which would require the restoration of temporary impact zones, impacts would be minimal. However, the Corps would also assist Reclamation to create an additional 2 to 5 acres of riparian wetlands at Mississippi Bar to compensate for temporal losses from these elements.

It has been determined that the ordinary high water mark of the Folsom Reservoir is at 466’ elevation, which is the upper limit of the fluctuation zone for the Folsom Reservoir. However, Attachment 2 shows a graph showing the “Folsom Dam Reservoir Water Surface Elevations” between 1955 and 2005. This document shows the percentage of time that the Folsom Reservoir water levels are over a certain elevation. According to the table, the water level within the reservoir only reaches the 466’ elevation approximately 1.1% of the time. In addition, almost 50% of the time, the reservoir is above the 429’ elevation, and 100% of the time is above the 347’ elevation.

The proposed fill material at Dike 8 would generally be placed between the reservoir elevation of 420-feet and 460-feet. Based on Attachment 2, the fill material would be under water and suitable for fish habitat between approximately 1% and 68% of the time, with the majority of the fill material being suitable fish habitat less than 50% of the time. In addition, the proposed fill material, which would consist of primarily gravel and cobble material, and would have only minor impacts to aquatic wildlife habitat.

Therefore, a mitigation ratio of less than 1:1 for compensatory mitigation is appropriate to mitigate for losses to fish habitat function of the Folsom Reservoir. However, because the areas to be filled would provide suitable fish habitat for an average of 50% of the time, compensation for the loss of functions of the Folsom Reservoir related to fish habitat is required.

If Dike 8 is used as a disposal area then the Corps would purchase 2.5 acres of seasonal wetlands at an approved bank to compensate for the loss of fish habitat function. In the event that mitigation is not initiated within a two-year period, the mitigation ratios would increase by 0.5:1 if initiated within two to five years, and by 1:1 if mitigation is initiated more than five years after the impacts occur.

Although this mitigation is off-site and out-of-kind mitigation, it would compensate for losses at Folsom Reservoir, and would provide valuable fish and wildlife habitat at an alternate location. The off-site mitigation would provide fish and wildlife habitat within an area that is not heavily regulated for flood control and water supply, which would provide more benefits to fish and wildlife species than additional mitigation within the Folsom Reservoir. The proposed off-site mitigation would be sufficient to compensate for the losses of function at the Folsom Reservoir due to the proposed project.

In addition, 33 C.F.R. Part 332, Compensatory Mitigation for Losses of Aquatic Resources (Mitigation Rule) gives preference to the use of mitigation banks. Currently, there is one mitigation bank that has seasonal wetland credits available to compensate for the impacts associated with Dike 8.

The contractor will avoid impacts to native trees, shrubs, and aquatic vegetation to the greatest extent possible and that construction is implemented in a manner that minimizes disturbance of such areas to the extent feasible. Temporary fencing shall be used during construction to prevent disturbance of native trees that are located adjacent to construction areas but can be avoided. The contractor will coordinate with Corps Biologist prior to beginning work. Any native trees or shrubs removed at Dike 8 with a diameter at breast height of 2 inches or greater should be replaced on-site, in-kind with container plantings so that the combined diameter of the container plantings is equal to the combined diameter of the trees removed. These replacement plantings should be monitored for 5 years or until they are determined to be established and self-sustaining.

All revegetated or disturbed areas would be monitored annually by the Corps for invasive non-native plant species, particularly French broom and pampas grass, for five years following completion of construction, with the assistance of a qualified botanist. If invasive species are becoming established on areas disturbed by project activities during the five-year period, invasive species would be removed at times that preclude the plants from setting new seed.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Size Determination

The proposed project would involve placement of dredged material, which would be removed from the construction of the approach channel as well as the proposed dredge material disposal site, below the ordinary high water mark of the Folsom Reservoir. Some work may be conducted within open waters of the Folsom Reservoir. Because the excavated material would be granitic in nature, and appropriate BMP’s, including silt fencing and/or silt curtains, would be implemented these impacts would be minimal.

Alternative 3 would result in the excavation and placement of less dredge material than the proposed alternative, and therefore would cause fewer impacts to the mixing zone. Alternative 2, would involve the excavation and placement of more fill material than the proposed alternative, however, because the material that would be placed would be granitic in nature and because BMP's would be utilized, the impacts of these alternatives on the mixing zone would be minimal.

The no action/no project alternative would result in no impacts to the mixing zone.

(2) Determination of Compliance with Applicable Water Quality Standards

The fill material would not violate Environmental Protection Agency or State water quality standards or violate the primary drinking water standards of the Safe Drinking Water Act (42 USC 300f - 300j). Project design, standard construction and erosion practices would preclude the introduction of substances into surrounding waters.

The proposed project would not affect existing or potential water supplies, nor would the other alternatives, including the no-action alternative.

(3) Potential Effects on Human Use Characteristics

a) Municipal and Private Water Supplies

The fill material would not violate Environmental Protection Agency or State water quality standards or violate the primary drinking water standards of the Safe Drinking Water Act (42 USC 300f – 300j).

Project design, standard construction and erosion practices would preclude the introduction of substances into surrounding waters. Materials removed for disposal off-site would be disposed of in an appropriate landfill or other upland area.

b) Recreation and Commercial Fisheries

The Folsom Reservoir is heavily used for recreational fishing for both warm and cold water fish such as rainbow trout, brown trout, black bass, catfish, crappie, and bluegill. A description of these game fish was given in Fisheries, Section 3.5. The proposed project could affect recreational fisheries in the project area, as temporary access restriction may be necessary at some locations while construction is occurring. Proposed mitigation measures are located in Section 4.5.6 in the Draft SEIS/EIR, including providing advanced notification to the public of any closures, and directing the public to alternative lake access sites for recreational fisheries. The proposed mitigation measures for notifying recreational users of closures and to minimize impacts from suspended sediments and turbidity, as well as the proposed compensatory mitigation for the unavoidable loss of fish and habitat would reduce potential impacts to recreational fisheries to less than minimal.

The other practicable build alternative to the proposed project would result in similar impacts to recreational fisheries; although Alternatives 3 would likely cause a slight increase in these impacts, since the cofferdam has the potential to entrap a larger number of fish. The no-action alternative would result in no impacts to recreational fisheries.

c) Water-related recreation

In addition to recreational fishing, Folsom Reservoir is a popular location for picnicking, swimming and boating. Temporary access restrictions may be necessary at some locations while construction and excavation is occurring. The public will be notified in advance of any closures and will be directed to alternative lake access sites for recreational opportunities. The reservoir itself would not be closed during construction and the public would be allowed access to launch boats and are expected to continue recreational activities. Therefore, the impacts to other water related recreation from the proposed project would be less than minimal. Additional information on recreation is in Section 4.7 of the Draft SEIS/EIR.

All of the practicable build alternatives would have similar impacts to other water related recreation as the proposed alternative. The no-action alternative would result in no impacts to other water related recreation.

d) Aesthetics

The project site is within a reservoir that was created through the construction of 4 dams and 8 dikes. In addition, the area surrounding the Folsom Reservoir is a growing urban development with electric transmission facilities, industrial areas, and residential subdivisions and roadways.

Although the manmade reservoir was created for flood control, water supply and power generation, and there is a growing urban development near the site, the resulting waterfront setting gives a dramatic panorama of the water and the surrounding natural landscape. These resources include a combination of views in which the reservoir forms the dominant foreground element and the surrounding Sierra Foothills landscape forms the background, as well as distinctive landscape and built features. Because of the large fluctuations in the water level within the Folsom Reservoir (up to 70 feet in a year), the reservoir sides are void of vegetation. Therefore, as the water levels within the reservoir decrease during the dry season, so does the quality of the visual aesthetic along the 85 miles of coast within the Folsom Reservoir.

The proposed project would temporarily negatively affect the aesthetics of the area during construction. The proposed project site would consists of exposed piles of soil, gravel and rock, large amounts of construction equipment, a haul road within the reservoir, and excavation sites. In addition, there would be a loss of waters within the project site which could negatively affect the aesthetics of the Folsom Reservoir. Finally, the approach channel and spur dike would permanently alter the aesthetics of the site, as it would convert the area into open water and upland areas.

The impacts to the aesthetics within the project area due to construction activities would be temporary, and would mainly affect only those that live adjacent to the reservoir and visitors. However, because these impacts would be temporary and the site already consists of man-made structures, it is expected that these impacts would be minor. Although the approach channel would change the aesthetics of the area, the proposed project would convert a current construction area into an area of open water, which would not negatively affect the aesthetics of the area. Additional information on aesthetics is in Section 4.6 of the Draft SEIS/EIR.

The other practicable build alternative to the proposed project would cause similar impacts to the aesthetics of the area, while the no-action alternative would not alter the aesthetics and therefore would have no impacts.

e) Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves.

Folsom Lake State Recreation Area (FLSRA) is managed by the California Department of Parks and Recreation. This area attracts approximately a million visitors annually for boating, swimming, hiking, biking, equestrian activities, and picnicking. Additional information on recreation is in Section 3.7 of the Draft SEIS/EIR.

Proposed mitigation measures to avoid and minimize impacts of the proposed project on the state recreation area are located in Section 4.4.6 in the Draft SEIS/EIR. These mitigation measures would reduce the impacts of the proposed project on the state recreation area to minimal.

The other practicable build alternative would result in the potential for similar impacts, although Alternative 3 would likely cause slightly greater impacts, as it would involve the excavation of a larger quantity of material due to the removal of the cofferdam. The no action alternative would not affect the current state recreation area.

<u>g. Determination of Cumulative Effects on the Aquatic Ecosystem</u>

The proposed project would permanently impact approximately 11.5 acres of waters of the U.S., including the permanent loss of approximately 10.5 acres of open water and 2.5 acres of transitional wetlands. Impacts would be minimized to these waters through the use of BMP’s. In order to compensate for the loss of these waters, 2.5 acres of seasonal wetlands would be purchased at a USFWS approved mitigation site. In addition, in order to compensate for unavoidable impacts to waters of the U.S. the Corps is proposing to assist Reclamation in developing 10 acres of riparian habitat within the Folsom Reservoir. Because of the amount of waters of the U.S. existing within the analysis area and the proposed and completed mitigation measures, cumulative impacts of the proposed project are expected to be minor.

h. Determination of Secondary Effects on the Aquatic Ecosystem

Secondary impacts to the proposed project area could include: the discharge of fill material outside of the proposed project area, an increase in contaminants from vehicles parking at the Overlook, vehicles accessing the Folsom Reservoir via the haul roads, an increase in animal predation, and adverse impacts from future maintenance activities at the project site.

The proposed project could result in the unintentional placement of dredge and/or fill material outside of the proposed project area. This could result in additional adverse impacts to water quality, erosion and accretion patterns, aquatic and other wildlife habitat, recreation, aesthetics and air quality. In order to minimize impacts associated with the placement of fill material outside the proposed project area, a special condition would require that the contractor mark the project boundaries, and that all work be conducted either when the project area is dewatered or that the contractor install erosion control (i.e. silt fencing, silt curtains) within any standing waters.

At the spur dike location, fill material from the approach channel excavation, is proposed to to induce a free, even flow of water into the approach channel. The spur dike could have the indirect effect of causing an increase in runoff and contamination within Folsom Reservoir from vehicles parking at the Overlook. Although these activities may increase contamination in Folsom Reservoir from petroleum products, it is likely that these vehicles would be associated with the operation and maintenance of the Folsom Facility and would already be located at one of the additional parking areas and/or access points to Folsom Reservoir. Therefore, these impacts are expected to be minor and not significant.

The proposed project may also cause the indirect effect of increasing predation of animals. Because the proposed project would cause permanent impacts to approximately 11.5 acres of the 175 acres of waters of the U.S. that were identified within the project area, this would lead to the conversion of open water and wetlands that contain wildlife habitat, to areas cleared of vegetation. Therefore, any small mammals, avian species and other wildlife that use these cleared areas as transportation corridors may face a greater risk of predation from other animals. However, because these areas are a small percent of the overall project area, and because it is unlikely that wildlife would use these cleared areas as habitat, it is expected that these impacts would not be significant.

III. Findings of Compliance or Non-Compliance with the Restrictions on Discharge

(1) No significant adaptations of the guidelines were made relative to this evaluation.

(2) No practicable alternative exists which meets the study objectives that does not involve discharge of fill into waters of the United States.

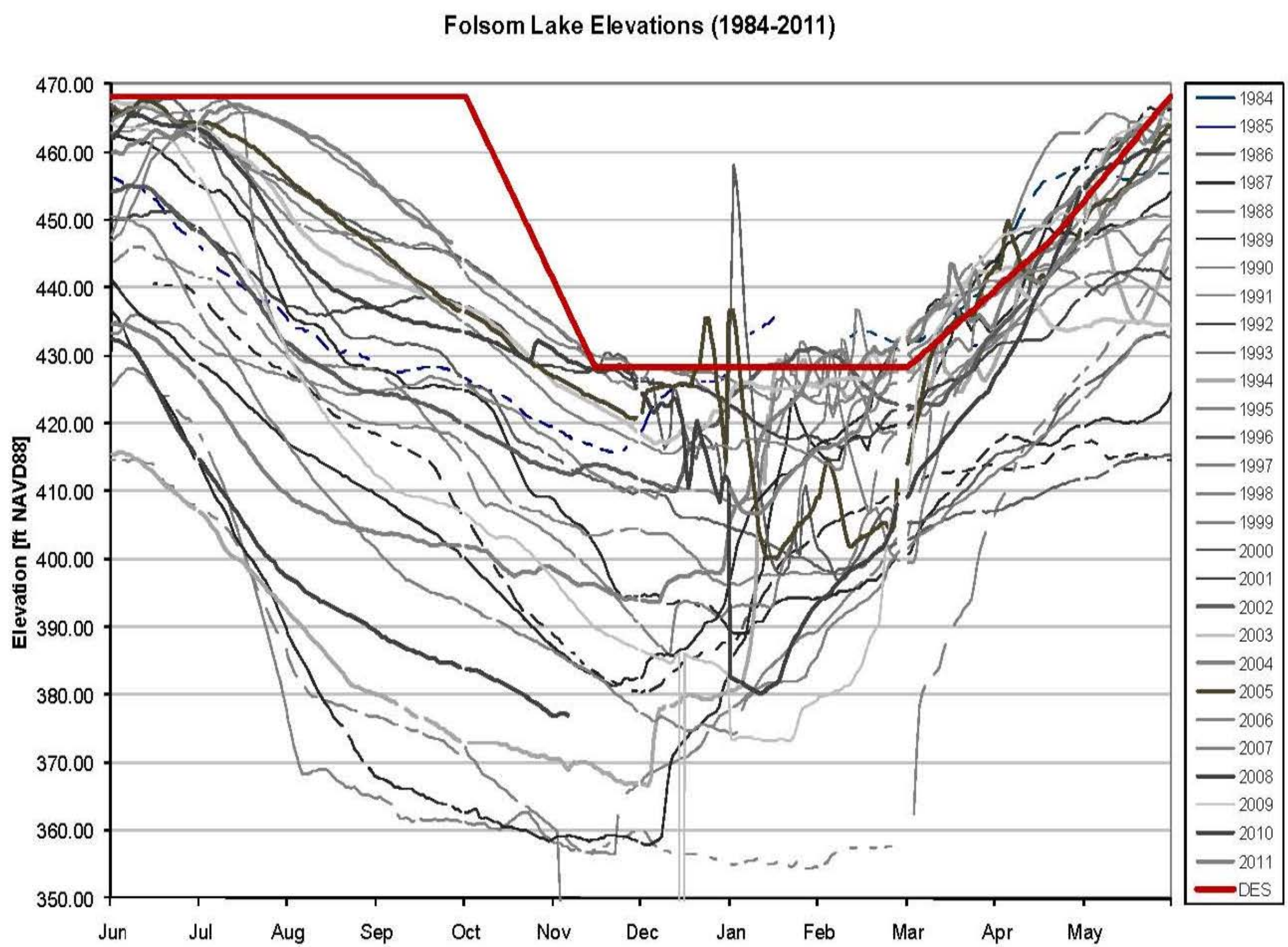
(3) The discharges of fill materials will not cause or contribute to, after consideration of disposal site dilution and dispersion, violation of any applicable State water quality standards for waters. The discharge operations will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

(4) The placement of fill materials in the project area(s) will not jeopardize the continued existence of any species listed as threatened or endangered or result in the likelihood of destruction or adverse modification of any critical habitat as specified by the Endangered Species Act of 1973.

(5) The placement of fill materials will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreational and commercial fishing, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic species and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values will not occur.

(6) Appropriate steps to minimize potential adverse impacts of the discharge on aquatic systems will be implemented.

(7) On the basis of the guidelines the proposed disposal site for the discharge of dredged material is specified as complying with the requirements of the guidelines with the inclusion of appropriate and practicable conditions to minimize pollution or adverse effects to the aquatic ecosystem.



Folsom Lake Elevations (1984-2011)
470.00
460.00
450.00
440.00
430.00
420.00
410.00
400.00
390.00
380.00
370.00
360.00
350.00
Elevation [ft NAVD88]
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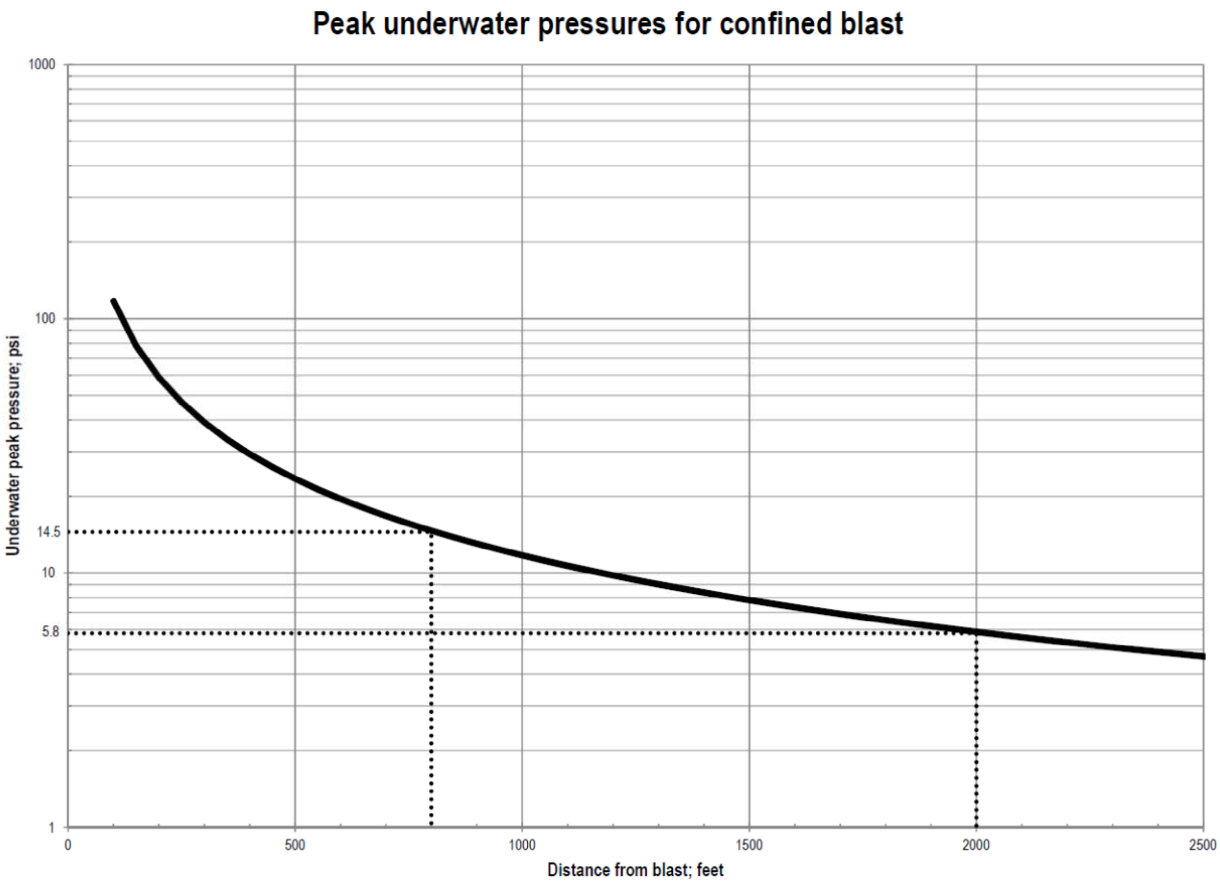
Appendix E

Peak Underwater Blast Pressures

MEMORANDUM FOR FILE 28 November 2012

Project: Folsom JFP – Phase IV
Subject: Peak underwater blast pressures

Overview
The Phase IV contractor will conduct a significant volume of excavation in-the-wet utilizing underwater blasting methodologies. Based on assumed but reasonable initial blast parameters and characteristics of what is expected to take place during the excavation of the approach channel, the attenuation of unmitigated peak pressures of a confined underwater blast can be estimated in the following chart.



As shown above, the recommended allowable maximum pressure for fish protection of 14.5 psi is reached at approximately 800 feet from the blast origin. Similarly, the recommended allowable maximum pressure for human protection of 5.8 psi is reached at approximately 2,000 feet from the blast origin. Both allowable pressures are Imperial unit equivalents of established Australian standards.

Conclusion

An underwater pressure of 14.5 psi at 800 feet from the blast origin is of greater distance than the previous assumption made of the same pressure at 350 feet used for fisheries assessment in the draft SEIS/EIR. However, the change in distance is not significant and will not affect the proposed mitigation for fisheries impacts: restocking of fish upon completion of the project (which will take place in Phase V).

Jeffrey B. Wisniewski, PE
Technical Lead
CESPK-ED-JF

References:

AS 2187.2-2006, “Explosives – Storage and use – Use of explosives”
Email correspondence with Greg Hempen re: Miami Harbor project

Appendix F

Preliminary Dredging Feasibility Memo

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U.S. Army Corps of Engineers - Sacramento District

Folsom Dam Joint Federal Project
Folsom Dam, CA

Approach Channel Excavation - Preliminary Engineering Assessment of Dredging Feasibility

1 Introduction

An auxiliary spillway adjacent to Folsom Dam has been selected to meet the objectives of the Folsom Modification authorized project. The proposed spillway consists of a 1,100-ft long approach channel into Folsom reservoir, a gated control structure including six submerged tainter gates, a 3,000-ft long spillway chute, and a stilling basin. Flows from the auxiliary spillway empty into the American River about 1,500-ft downstream of the main dam.

Both the U.S. Bureau of Reclamation (USBR) and the U.S. Army Corps of Engineers (USACE) are participating in this project. USBR is responsible for the excavation of the spillway chute and stilling basin and is doing a partial excavation for the control structure. The USACE is responsible for the final excavation for the gated control structure and the approach channel, as well as the construction of the concrete structures.

The project is being phased such that the excavation and construction of the gated control structure is done using the existing topography and natural rock formation as a natural dam or plug. After the control structure becomes operational, final excavation of the approach channel will be performed, which will include removal of soil and rock by excavation in the dry and dredging.

The present memorandum summarizes a preliminary feasibility assessment of dredging operations with emphasis on turbidity control. It also outlines additional turbidity analyses and evaluations that will be performed as it relates to dredging and in-lake disposal of dredged materials for the excavation of the Folsom Dam auxiliary spillway approach channel.

2 Dredging and Disposal Operations

Dredging would take place in connection with the construction of both permanent and temporary features of the project. Dredging is currently planned for the following project features:

- Auxiliary spillway approach channel

Document no.	2010-046-dredge01
Version	1.0
Date of issue	June 19, 2012
Prepared	CXB
Checked	MPJ
Approved	MKOS

- Temporary rock embankment foundation
- Spur dike foundation
- Transload facility at Dike 7.

The dredging methods envisioned include:

- Hydraulic dredging using small portable units
- Mechanical dredging using a water crane-operated clamshell and/or a barge-mounted long reach hydraulic excavator.

The rock formation in the approach channel prism will require underwater drilling and blasting prior to dredging the material for subsequent disposal. Disposal of dredged materials could be in-lake and upland, or a combination thereof.

In-lake disposal would be practical for the soft sediment/soil layer overlaying the rock formation and for the final clean-up of the final invert of the approach channel. The in-lake disposal area is planned to be located in the Dike 7 vicinity. If hydraulically dredged, the discharge line length would then be less than one mile. In addition, the final clean-up to remove rock fragments that remain following production dredging on the floor of the approach channel would be disposed of in-lake. It is anticipated the clean-up would be performed hydraulically.

Suitable dredged material may be placed in the prism of the Spur dike and north of the existing Overlook area. The placement in this area would be a combination of in-lake and upland operations.

3 Turbidity Control Measures

To limit the turbidity in the lake to acceptable levels, a series of silt curtains could be applied to encircle all dredging and disposal operations. Considering that the currents in the lake are low, full depth silt curtains would be an effective method to mitigate the migration of suspended solids.

From an operational standpoint the silt curtains would require deployment to permit marine equipment ingress and egress. The silt curtain system is anticipated to have movable gates. This system may consist of primary disposal gated containment and an access/transition zone gated containment. To quantify the effectiveness of plausible silt curtain layouts and material specification, a turbidity analysis/plume analysis would be performed to quantify the expected turbidity from dredging and marine operations.

4 Turbidity Analysis

A turbidity analysis would be performed that quantifies the turbidity intensity in zones within and outside of the silt curtain. The analysis would consider:

1. The nature of the dredged materials, grain size distribution and fines content.

2. Anticipated types of marine equipment used for dredging and disposal operations.

3. Anticipated method(s) of dredging and disposal.

4. Silt curtain containments with a series of encirclements to isolate the disposal, transition and entry zones.

5. Anticipated marine operations such as material transport/tows to facilitate dredging and disposal of dredged material.

5 Preliminary Dredging Feasibility Evaluation

From a constructability point of view, Ben C. Gerwick, Inc. finds that the planned approach channel excavation can be performed in compliance with environmental turbidity requirements by confining the zones where dredging and in-lake disposal of dredged materials would take place. The confinement of areas with higher turbidity would be achieved by deployment of fixed and moveable silt curtains during the dredging operations.

Appendix G

Traffic Technical Analysis

Joint Federal Project (JFP) at Folsom Dam, Approach Channel Excavation

Traffic Analysis Technical Memorandum

Sacramento, CA

Draft

February 2012

U.S Army Corps of Engineers, Sacramento District

U.S. Army Corps of Engineers
Sacramento District

Table of Contents

Acronyms

USACE	U.S. Army Corps of Engineers
ADT	Average Daily Traffic
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
EA	Environmental Assessment
EIR	Environmental Impact Report
HCM	Highway Capacity Manual
I-80	Interstate 80
LOS	Level of Service
NEPA	National Environmental Protection Act
Reclamation	U.S. Bureau of Reclamation
SACOG	Sacramento Area Council of Governments
SR	State Route

Tables

Figures

Executive Summary

URS Corporation has been contracted to evaluate the potential traffic effects associated with project alternatives for the construction of the Folsom Approach Channel Project or “the project” and recommend potential mitigation measures to reduce traffic effects. Based on the results of the traffic effect assessment, all project construction alternatives were determined to generate traffic below levels of significance. Since the project would not exceed the traffic effects thresholds, no traffic effects mitigations are explicitly proposed.

The following measures would be implemented not as a result of direct project action effects but rather as proactive measures customary to project construction activities. Due to the dynamic nature of the project construction environment, the following individual measures or combination of measures might need to be implemented in response to the needs of the construction activities at the project site.

- T-1: In conjunction with the development and review of more detailed project design and construction specifications, a peak hour capacity analysis would be performed on specific intersections to evaluate the need for changes to traffic signal timing, phasing modification, provision of additional turn lanes through restriping or physical improvements, as necessary and appropriate to reduce project-related effects to an acceptable level. In conjunction with that assessment, the potential need for roadway improvements or operation modifications (i.e., temporary restrictions on turning movements, on-street parking, etc.) to enhance roadway capacity in light of additional traffic from the project will be evaluated. The completion of these evaluations and the identification of specific traffic improvement measures, as deemed necessary and appropriate in light of the temporary nature of effects, will be coordinated with the transportation departments of the affected jurisdictions.

- T-2: Construction contractor will prepare a transportation management plan, outlining proposed routes to be approved by the appropriate local entity, and implement it. High collision intersections will be identified and avoided if possible. Drivers will be informed and trained on the various types of haul routes, and areas that are more sensitive (e.g., high level of residential or education centers, or narrow roadways).

- T-3: Construction contractor will develop and utilize appropriate signage to inform the general public of the haul routes and route changes, if applicable.

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1.0 INTRODUCTION

The purpose of this Traffic Impact Analysis (TIA) Report is to analyze traffic impacts associated with the Folsom Dam Approach Channel project. This study was prepared according to the County of Sacramento (County) and Caltrans traffic study guidelines. The final phase of the Folsom Modification project is the completion of the approach channel and spur dike. The preferred alternative for this phase is a cutoff wall that would provide seepage control to the spillway excavation between the rock plug and the control structure. The cutoff wall would be installed to maximize the in-the-dry excavation of the rock plug.

Folsom Dam is located in the City of Folsom (City) north of US Highway 50. **Figure 1** shows the project vicinity map in context to the regional circulation system.

The analysis focuses on the potential traffic effects to the surrounding roadway circulation system and the development of mitigation measures at affected locations.

The following scenarios were typically evaluated:

- Existing Conditions (2011) - Current year traffic volumes and peak hour LOS analysis of affected study roadway segments.

- Future 2013 Conditions (Existing Conditions Plus Growth Without Construction) - Peak hour LOS analysis used as Year 2013 baseline.

- Future 2013 Conditions with Construction (Alternatives B and C) – includes project rip generation, distribution, and assignment during Year 2013 when project Alternatives B and C are under construction.

- Future 2014 Conditions (Existing Conditions Plus Growth Without Construction) - Peak hour LOS analysis used as Year 2014 baseline.

- Future 2014 Conditions with Construction (Alternatives B and C) – includes project trip generation, distribution, and assignment during Year 2014 when project Alternatives B and C are under construction.

- Future 2015 Conditions (Existing Conditions Plus Growth Without Construction) - Peak hour LOS analysis used as Year 2015 baseline.

- Future 2015 Conditions with Construction (Alternatives B and C) – includes project trip generation, distribution, and assignment during the Year 2015 when project Alternatives B and C are under construction.

- Future 2016 Conditions (Existing Conditions Plus Growth Without Construction) - Peak hour LOS analysis used as Year 2016 baseline.

- Future 2016 Conditions with Construction (Alternatives B and C) – includes project trip generation, distribution, and assignment during Year 2016 when project Alternatives B and C are under construction.

- Future 2017 Conditions (Existing Conditions Plus Growth Without Construction) - Peak hour LOS analysis used as Year 2017 baseline.

- Future 2017 Conditions with Construction (Alternatives B and C) – includes project trip generation, distribution, and assignment during Year 2017 when project Alternatives B and C are under construction.

Figure 1. Regional Vicinity Map

ANALYSIS METHODOLOGY

Level of Service Description

The evaluation of transportation effects associated with the project focuses on capacity analysis. A primary result of capacity analysis is the assignment of levels of service to traffic facilities under various traffic flow conditions. The capacity analysis methodology is based on the concepts and procedures in the Highway Capacity Manual. The concept of level of service is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A level-of-service (LOS) definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety

Six levels of service are defined for each type of facility. They are assigned letter designations from A to F, with LOS A representing the best operating conditions and

LOS F the worst. Since the level of service of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of levels of service, depending on the time of day, day of week, or period of year.

A description of the operating condition under each level of service is provided

- LOS A describes conditions with little to no delay to motorists.
- LOS B represents a desirable level with relatively low delay to motorists.
- LOS C describes conditions with average delays to motorists.
- LOS D describes operations where the influence of congestion becomes more noticeable. Delays are still within an acceptable range.
- LOS E represents operating conditions with high delay values. This level is considered by many agencies to be the limit of acceptable delay.
- LOS F is considered to be unacceptable to most drivers with high delay values that often occur, when arrival flow rates exceed the capacity of the intersection.

Road Segment Level of Service Standards and Methodology

Fehr & Peers developed a listing of LOS thresholds based on daily volumes, number of lanes and facility type as presented in **Table 1** (from the Folsom Bridge EIS/EIR -Corps 2006b). These thresholds were calculated based on the HCM and will be used to evaluate roadway segment level of service for the purposes of this project.

Table 1. LOS Thresholds

Functional Class	Code	LOS Capacity Threshold (Total vehicles per day in both directions)				
		A	B	C	D	E
2-Lane Collector	2C	-	-	5,700	9,000	9,800
Minor 2-Lane Highway	MI2	900	2,000	6,800	14,100	17,400
Major 2-Lane Highway	MA2	1,200	2,900	7,900	16,000	20,500
4-Lane, Multilane Highway	MH4	10,700	17,600	25,300	32,800	36,500
2-Lane Arterial	2A	-	-	9,700	17,600	18,700
4-Lane Arterial, Undivided	4AU	-	-	17,500	27,400	28,900
4-Lane Arterial, Divided	4AD	-	-	19,200	35,400	37,400
6-Lane Arterial, Divided	6AD	-	-	27,100	53,200	56,000
8-Lane Arterial, Divided	8AD	-	-	37,200	71,100	74,700
2-Lane Arterial, moderate access control[1]	2AMD	10,800	12,600	14,400	16,200	18,000
4-Lane Arterial, moderate access control[1]	4AMD	21,600	25,200	28,800	32,400	36,000
6-Lane Arterial, moderate access control[1]	6AMD	32,400	37,800	43,200	48,600	54,000
4-Lane Arterial, high access control[1]	4AHD	24,000	28,000	32,000	36,000	40,000
6-Lane Arterial, high access control[1]	6AHD	36,000	42,000	48,000	54,000	60,000
4-Lane Freeway[2]	4F	22,200	40,200	57,600	71,400	80,200
4-Lane Freeway with Auxiliary Lanes[2]	4FA	28,200	51,000	72,800	89,800	100,700
6-Lane Freeway[2]	6F	33,300	60,300	86,400	107,100	120,300
6-Lane Freeway with Auxiliary Lanes[2]	6FA	42,300	76,500	109,200	134,700	151,050

Notes:

(1) Used to analyze roadways within County of Sacramento. LOS Capacity Thresholds from Traffic Impact Analysis Guidelines, County of Sacramento, July 2004

(2) Includes mixed flow lanes only. HOV lanes and volumes are excluded from the analysis because a review of existing HOV counts and forecasts showed the HOV lanes to be operating under capacity.

Assessment Criteria

Transportation effects associated with the project are evaluated in two ways; one regarding average daily traffic and the other in terms of specific time periods during the day (i.e., hourly basis, as needed). The analysis is based on the following criteria:

- Material hauling activity will occur during normal work hours, from 7am to 7pm.
- Equipment hauling activity will occur during normal work hours, from 7am to 7pm.

- The construction schedule would be 10 hrs a day, 6 days per week, except dredging and underwater drilling for which double shifts. The 24 hours shifts schedule may be requested under special requirements to meet the schedule, or other special circumstances; double shifts schedule would be temporary and short-term.

The first component of the traffic impact analysis is an evaluation of the increase in traffic volumes on a daily basis. Most of the thresholds in the area focus on whether the existing LOS along a roadway is degraded by one or more letter grades due to project-related traffic, (i.e., LOS C to LOS D or worse). However, when a facility is already experiencing a LOS F, the Sacramento County guidelines illustrate that an increase in the Volume to Capacity (V/C) ratio by more than 0.05 is also of concern. Therefore, only those roadways that are expected to experience LOS deterioration, or currently operate at LOS F and would experience an increase in the V/C ratio of more the 0.05 due to the project would typically be evaluated for hourly impacts, which is normally the second component of detailed traffic impact analysis conducted for a specific project.

Appendix G of the CEQA Guidelines provides general guidance that can be considered in determining whether a project would result in a significant impact related to transportation/traffic. Considerations identified therein include the following:

Would the project:

A. Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?
B. Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?
C. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?
D. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?
E. Result in inadequate emergency access?
F. Result in inadequate parking capacity?
G. Conflict with adopted policies, plans, and programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

Relative to the project, the CEQA considerations presented above, with the exception of Criterion C (i.e., none of the alternatives would have any influence on air traffic patterns), and the local significance thresholds presented earlier in **Table 1** were taken into account in evaluating whether the project’s traffic impacts are significant.

EXISTING CONDITIONS

This section describes the existing study area roadway circulation system, key study intersections and roadways segments, existing daily roadway and peak hour intersection traffic volume information and LOS analysis results for existing conditions.

Existing Roadway Network

Folsom Boulevard
Folsom Boulevard is functionally classified as a divided arterial and provides north-south access between the cities of Auburn to the north and Folsom to the south. Headed north from the US Highway 50 Interchange, Folsom Boulevard is a six-lane divided roadway to Iron Point Road. At Iron Point Road, the northbound side is reduced to two lanes while the southbound side maintains 3 lanes. At Natoma Station Drive, the southbound side of Folsom Boulevard also is reduced to two lanes. From Natoma Station Drive to Blue Ravine Road/Auburn-Folsom Road, Folsom Boulevard is a four-lane divided roadway. The speed limit is posted at 50 miles per hour (mph). Land use along much of the roadway is predominantly commercial.

Auburn-Folsom Road
Auburn-Folsom Road is functionally classified as an undivided arterial and provides north-south access between the cities of Auburn to the north and Folsom to the south. Beginning at the intersection of Greenback Lane/Riley Street/Folsom Boulevard, Auburn-Folsom Road is a four-lane divided roadway. Heading north, Auburn-Folsom Road continues with two lanes in each direction, becoming an undivided roadway outside of the City of Folsom limits, to its intersection with Folsom Dam Road. Continuing north, Auburn-Folsom Road narrows to one lane in each direction, crosses the Sacramento/Placer county line, and remains a two-lane undivided roadway to the Douglas Boulevard intersection. The speed limit is posted at 50 miles mph. Land use along Auburn-Folsom Road is mixed; commercial, residential and light industrial, however in downtown Folsom the land use becomes mainly commercial.

Douglas Boulevard
Douglas Boulevard is an east-west roadway and is functionally classified as a divided arterial. Between Sierra College Boulevard and Auburn-Folsom Road, Douglas Boulevard consists of two lanes in each direction. Continuing east, it further narrows to a two-lane undivided roadway. Land uses along much of the roadway are offices and commercial to Sierra College Boulevard; residential/vacant/open space with limited commercial between Sierra College Boulevard and Auburn-Folsom Road; and primarily residential east of Auburn-Folsom Road. Douglas Boulevard west of Interstate 80 is two lanes in each direction through heavily developed and densely populated areas.

Blue Ravine Road

Blue Ravine Road is an east-west roadway connecting Folsom Boulevard to East Natoma Street. It is classified as an arterial. Between Folsom Boulevard and Prairie City Road/Sibley Street, Blue Ravine Road consists of three lanes in each direction. East of Sibley Street, Blue Ravine Road narrows to two lanes in each direction to the intersection of Joerganson Road and then continues east varying between one-lane and two-lane configurations to East Natoma Street/Green Valley Road. Blue Ravine Road is classified as a divided arterial. The speed limit is 45 mph and the roadway is posted as a local truck route. Land uses along much of the roadway are mixed commercial/office with dense residential along its full length.

East Natoma Street

Natoma Street is an east-west roadway in the City of Folsom. It is classified as an undivided arterial. Natoma Street consists of one lane in each direction from Folsom Boulevard to Stafford Street. East of Stafford Street, Natoma Street widens to two lanes in each direction and continues as a four-lane undivided roadway to Fargo Way. At Fargo Way, Natoma Street becomes East Natoma Street and continues to Folsom Dam Road as a two-lane undivided roadway. At Folsom Dam Road, the eastbound side of the roadway increases to two lanes; it continues as a three-lane road to Green Valley Road/Blue Ravine Road. Natoma Street is posted at 35 mph through the City of Folsom and then increases to 45 mph at the Prison entrance and increases again to 50 mph at Briggs Ranch Drive. Within the downtown area, land use is mixed use residential/commercial/office; east of Fargo Way the land use changes to residential/recreational.

Green Valley Road

Green Valley Road is an east-west roadway that begins at the intersection with East Natoma/Blue Ravine Road and continues east into El Dorado County. Within the Folsom Dam area, Green Valley Road is a two-lane undivided roadway and is classified as an undivided arterial. The speed limit is posted at 45 mph. Green Valley Road does not have sidewalks or marked bicycle facilities. The land use along much of the roadway is primarily residential/recreational.

Folsom Dam Road

Folsom Dam Road was closed to the public in February 2003 by the U.S. Bureau of Reclamation (Reclamation) indefinitely for reasons of security and public safety. Subsequently a new Folsom Dam bridge and roadway alignment (Folsom Lake Crossing Road) was constructed downstream of the dam. In March of 2009, the construction of Folsom Lake Crossing Bridge was completed. The 1,000-foot bridge links Folsom-Auburn Road to East Natoma Street and the newer areas of Folsom to Old Folsom, along Folsom Lake Crossing Road.

Folsom Lake Crossing Road

Folsom Lake Crossing Road was formed as part of the new bridge and roadway alignment that bypasses and replaces the previous Folsom Dam road alignment that previously routed traffic directly over the Folsom Dam. The construction of this road involved the realignment of East Natoma Street to link with Folsom-Auburn Road via the new bridge just west of the dam. The balanced cantilever cast-in-place segmental bridge is approximately 1,000 feet in length with a 430-foot center span and two 270-foot connecting spans. The estimated project opening traffic was 26,000 vehicles per day as compared to the 18,000 vehicles per day that used to traverse the dam at the time of closure in 2003. The new bridge design and cross-section provides four travel lanes plus bicycle lanes and could accommodate up 40,000 vehicles per day.

East Bidwell Street

East Bidwell Street is a north-south roadway that connects Highway 50 with downtown Folsom. Within the project study area, East Bidwell Street varies between four and six divided lanes. A marked bicycle lane and sidewalks are present along some sections of East Bidwell Street. The roadway is classified as a divided arterial. The speed limit is posted at 45 mph. Land use along much of the roadway is predominantly commercial and residential.

Oak Avenue Parkway

Oak Avenue Parkway is a six-lane divided roadway. Within the project study area – between East Bidwell Street and Blue Ravine Road – there are no center left turn lanes for access to off-side driveways. All changes of direction are made at the intersections. Oak Avenue Parkway is classified as a divided arterial. The speed limit is posted at 45 mph. Land use along much of the roadway is predominantly residential with some small retail. Marked bicycle lanes and sidewalks are provided intermittently along the roadway.

Greenback Lane

Greenback Lane is a four-lane, divided roadway with center left turn lanes for cross street and driveway access. It runs predominantly in an east-west direction and connects the City of Folsom with Interstate 80 and points west. Sidewalks are present intermittently on both sides of the roadway; there are marked bicycle facilities from Auburn-Folsom Road to Madison Avenue. It is classified as a divided arterial. The posted speed limit is 45 mph. The land use along much of the roadway within the study area is predominantly residential and small commercial/retail.

Scenic Route 70

Scenic Route 70 is an east-west highway that connects Route 99 near Sacramento to Highway 395 north of Reno, Nevada. It is part of both the California Freeway and Expressway system and the Scenic Route system. The freeway section of Highway70 ends at the North Beale/Feather River Road exits and then continues east as a scenic route. Scenic Route 70 is classified as principal arterial with a posted speed limit of 65 mph. It is a four-lane divided highway from the North Beale/Feather River Road exit south to the junction with Highway 65.

Scenic Route 65

Scenic Route 65 is a north-south state highway composed of two sections connecting Bakersfield to Exeter and Roseville to Yuba City. A highway section to connect the two pieces has not been constructed. Highway 65 is part of the California Freeway and Expressway system. The section of Highway 65 used as a regional haul route – between Highway 70 and Interstate 80 – is classified as a principal arterial. It consists of two, undivided lanes with varying shoulder width. The posted speed limit varies along the route, from low 25-30 mph sections through higher population areas to 55-65 mph sections through the rural/agricultural areas.

Interstate 80

Interstate 80 is the second-longest interstate highway in the United States. The section of Interstate 80 located within the study area runs from Eureka Road to Sierra College Boulevard in a predominantly north-south direction within the analysis area, but, in general, is considered an east-west route. It is classified as a freeway. Interstate 80 consists of six lanes, divided by barriers, within the analysis area with acceleration/deceleration lanes at the interchanges.

Highway 50

Highway 50 is a U.S. highway that runs from coast to coast. The section of Highway 50 located within the study area runs from Hazel Avenue to El Dorado Hills Boulevard in a predominantly east-west direction within the analysis area. Highway 50 consists of four lanes with two carpool lanes, divided by barriers, within the analysis area with acceleration/deceleration lanes at the interchanges.

Existing Level of Service Analysis

The key study area roadway segments shown in **Table 2** have been identified for analysis in the traffic study.

The existing traffic data was obtained from the Control Structure EA/EIR (2010). Existing 2010 ADTs from the Control Structure Study were increased with an annual 2% growth rate per the methods described in Section 2.3.

LOS analyses under existing conditions were conducted using the methodologies described in Section 2.0. **Table 2** summarizes the results of the existing roadway segment analysis. As shown in the tables, the following roadway segments are currently operating at LOS E or F:

- Douglas Boulevard – Barton Rd to Folsom-Auburn Rd

- Folsom-Auburn Road – Douglas Blvd to Folsom Dam Rd
- Folsom Boulevard – Folsom Dam Rd to Greenback Ln
- Folsom Boulevard – Greenback Ln to Iron Point Rd
- East Natoma Street – Folsom Dam Rd to Green Valley Rd
- Green Valley Road – East Natoma St to Sophia Pwy
- U.S. 50 – Hazel Ave to Folsom Blvd
- U.S. 50 - Folsom Blvd to East Bidwell St
- U.S. 50 – East Bidwell St to County line
- SR-80 – north of Douglas Blvd
- SR-80 – Douglas Blvd to Greenback Ln
- SR-80 – south of Greenback Ln

Table 2. Existing LOS Results

Roadway Segment	Functional Class	Capacity (LOS C/D/E)	Year 2011 Traffic Volumes	
			Traffic Volumes	LOS
Douglas Boulevard – Barton Rd to Folsom-Auburn Rd	4AD	35,400	44,806	F
Folsom-Auburn Road – Douglas Blvd to Folsom Dam Rd	4AD	37,400	44,918	F
Folsom Boulevard – Folsom Dam Rd to Greenback Ln	4AD	37,400	36,335	E
Folsom Boulevard – Greenback Ln to Iron Point Rd	4AD	37,400	42,131	F
Greenback Lane - Hazel Ave to Madison Ave	4AMD	36,000	26,861	C
East Natoma Street – Cimmaron Cir to Folsom Dam Rd	4AU	28,900	18,502	D
East Natoma Street – Folsom Dam Rd to Green Valley Rd	4AU	28,900	30,205	F
Green Valley Road – East Natoma St to Sophia Pwy	4AU	28,900	35,667	F
Oak Avenue Parkway – Blue Ravine Rd to East Bidwell St	6AD	56,000	24,744	C
East Bidwell Street – Clarksville Rod to Iron Point Rd	6AD	56,000	43,803	D
Blue Ravine Road – Oak Avenue Pwy to Green Valley Rd	4AD	37,400	21,734	D
U.S. 50 – Hazel Ave to Folsom Blvd[1]	4FA	89,800	130,183	F
U.S. 50 - Folsom Blvd to East Bidwell St[1]	4F	71,400	110,344	F
U.S. 50 – East Bidwell St to County line[1]	4F	71,400	91,284	F
Folsom Lake Crossing Bridge	4AHD	40,000	29,425	C
SR-80 – north of Douglas Blvd[1]	6F	107,100	156,060	F
SR-80 – Douglas Blvd to Greenback Ln[1]	6F	107,100	182,580	F
SR-80 – south of Greenback Ln[1]	6F	107,100	190,000	F

PROJECT DESCRIPTION

The final phase of the Folsom Modification project is the completion of the approach channel and spur dike. A trans-load facility and concrete batch plant are necessary for construction and discussed in detail below. Two Approach Channel alternatives are proposed for this final phase of construction.

Alternative B

Alternative B consists of approach channel excavation with a cutoff wall. The propose cutoff wall would be located adjacent to Folsom Lake southeast of the Left Wing Dam and east of the Auxiliary Spillway chute excavation. The cutoff wall would provide seepage control to the spillway excavation between the rock plug and the Control Structure. The cutoff wall would consist of a reinforced concrete secant pile wall installed across the width of the future approach channel. The total length of the wall would be approximately 1,000 feet. The wall would be socketed into the underlying highly weathered granitic rock.

Alternative C

Alternative C consists of a medium size cofferdam located downstream, near the rock plug, at about Station 4+00. The location of the cofferdam is based on a trade-off between cofferdam size and the amount of in-the-wet excavation. To prepare the foundation for the cofferdam, soft materials would be dredged until the decomposed granite is reached. Once the foundation is set, the cofferdam would be constructed as described below. After the cofferdam is installed, the downstream area would be dewatered. Timing would be coordinated with the completion of the control structure. When the control structure is operational the rock plug would be excavated and the approach channel slab and walls would be installed. Once the approach channel is excavated to final grade the cofferdam would be removed. Any remaining materials would be dredged using a barge-mounted clam shell or hydraulic excavator dredge until elevation 350 is reached (that matches the slab).

Project Trips Generation and Distribution

Trip Generation
New trips have been determined by calculating the number of one-way trips (round trips multiplied by 2) generated by quantity of materials and equipment deliveries required for the project construction as well as trips generated by construction labor forces. **Table 3** below shows the trip generation estimates for both alternatives.

Table 3. Project Trip Generation

Construction Year	Alt B				Alt C			
	Worker	Aggregate	Delivery	Total	Worker	Aggregate	Delivery	Total
2013	0	265	0	*265*	12	256	0	*268*
2014	16	14	3	*33*	24	9	3	*36*
2015	40	14	3	*58*	40	10	3	*53*
2016	36	14	3	*53*	40	10	3	*53*
2017	40	256	2	*298*	48	256	2	*306*

Source: URS AQ Input parameters_v2 (January 12, 2012) Notes: Aggregate and Delivery truck traffic with 2.5 PCE.

The above trip generation assumptions were based from and consistent with the Air Quality analysis assumptions developed from data provided by the Corp's Equipment Estimates summary dated October 31, 2011 incorporating worker commute data, onsite vehicle movements (not included) and material and equipment delivery trips (included) along the project study roadway segments.

Trip Distribution

The project site will receive aggregate and batch plant materials from the Tiechert Prairie City Borrow Source located on Scott Road south of White Rock Road in Sacramento County. Offsite materials and equipment will be delivered to the site via US Highway 50.

Labor Force

Since 82% of the unemployed are located in Sacramento area, with 11% in Placer County and 7% in El Dorado County. **Table 4** presents the assumptions used on where the workers are expected to originate their trips.

Table 4. Distribution of Labor Force

Region	Worker Distribution
Rocklin area (Placer County to the north)	5%
Roseville area (Placer County to the west)	5%
Folsom	5%
El Dorado area (Green Valley Road)	2.5%
El Dorado area (US50)	2.5%
Sacramento area (I-80)	40%
Sacramento area (US50)	40%
Total	100%

Figure 2 outlines the project routes.

Figure 2. Proposed Project Routes

BASELINE CONDITIONS

This section will evaluate the performance of the baseline without project condition for Future Year 2013 to 2017.

Based on the review of the 8 cumulative projects identified in the Control Structure EA/EIR (2010), none of those projects will overlap with the proposed action under the 2013-2017 construction timeframe. Additionally, the 7 cumulative projects identified for this project were examined and the majority of the projects were found to be either completed, geographically distant, have low trip generation potential and non-concurrent with the exception to the Folsom DS/FDR project's ongoing construction activities which are adequately covered in the effects analysis. Since the dam construction site is a dynamic work environment in general with many concurrent and ongoing activities along with day-to-day dam operations, the Folsom approach channel project has the potential to cumulatively contribute traffic to the study roadway segments. In acknowledgement, a growth factor of 2% per year consistent with previous studies was applied for future baseline projections on all study roadway segments in the traffic effects analysis to account for potential cumulative activities as well as ambient traffic growth in the area. The aforementioned assumption is conservative given the recent economic downturn and the slow process of recovery that has generally lowered traffic activity statewide.

Should there be any concerns with potential cumulative effects; the Corps would coordinate the scheduling and sequencing of construction activities with Reclamation and DOT to reduce any potential cumulative effects to less than significant. Additionally, close coordination by the Corps with Reclamation, the City of Folsom and the County of Sacramento to monitor traffic conditions is necessary to ensure that the effects of potential cumulative construction activities will be minimized by deploying Pro-active Mitigation Measures T-1 through T-3 including staggering construction-related traffic, thereby reducing the potential for cumulative effects to the study roadway segments.

Table 5 below outlines the results of the analysis.

As shown in the table, all roadways segments operating at unsatisfactory LOS under existing conditions continue to operate at LOS E or F. No roadway segments deteriorate to LOS E or F from acceptable LOS C or D with growth in the area.

Table 5. Existing and Baseline LOS Results

Roadway Segment	Functional Class	Capacity (LOS C/D/E)	Year 2011 Traffic Volumes		Year 2013 Traffic Volumes		Year 2014 Traffic Volumes		Year 2015 Traffic Volumes		Year 2016 Traffic Volumes		Year 2017 Traffic Volumes	
			Trafic Volumes	LOS	Trafic Volumes	LOS	Trafic Volumes	LOS	Trafic Volumes	LOS	Trafic Volumes	LOS	Trafic Volumes	LOS
Douglas Boulevard – Barton Rd to Folsom-Auburn Rd	4AD	35,400	44,806	**F**	46,598	**F**	47,494	**F**	48,390	**F**	49,287	**F**	50,183	**F**
Folsom-Auburn Road – Douglas Blvd to Folsom Dam Rd	4AD	37,400	44,918	**F**	46,715	**F**	47,613	**F**	48,511	**F**	49,410	**F**	50,308	**F**
Folsom Boulevard – Folsom Dam Rd to Greenback Ln	4AD	37,400	36,335	**E**	37,788	**F**	38,515	**F**	39,242	**F**	39,969	**F**	40,695	**F**
Folsom Boulevard – Greenback Ln to Iron Point Rd	4AD	37,400	42,131	**F**	43,816	**F**	44,659	**F**	45,501	**F**	46,344	**F**	47,187	**F**
Greenback Lane - Hazel Ave to Madison Ave	4AMD	36,000	26,861	C	27,935	C	28,473	C	29,010	D	29,547	D	30,084	D
East Natoma Street – Cimmaron Cir to Folsom Dam Rd	4AU	28,900	18,502	D	19,242	D	19,612	D	19,982	D	20,352	D	20,722	D
East Natoma Street – Folsom Dam Rd to Green Valley Rd	4AU	28,900	30,205	**F**	31,413	**F**	32,017	**F**	32,621	**F**	33,226	**F**	33,830	**F**
Green Valley Road – East Natoma St to Sophia Pwy	4AU	28,900	35,667	**F**	37,094	**F**	37,807	**F**	38,520	**F**	39,234	**F**	39,947	**F**
Oak Avenue Parkway – Blue Ravine Rd to East Bidwell St	6AD	56,000	24,744	C	25,734	C	26,229	C	26,724	C	27,218	D	27,713	D
East Bidwell Street – Clarksville Rod to Iron Point Rd	6AD	56,000	43,803	D	45,555	D	46,431	D	47,307	D	48,183	D	49,059	D
Blue Ravine Road – Oak Avenue Pwy to Green Valley Rd	4AD	37,400	21,734	D	22,603	D	23,038	D	23,473	D	23,907	D	24,342	D
U.S. 50 – Hazel Ave to Folsom Blvd[1]	4FA	89,800	130,183	**F**	135,390	**F**	137,994	**F**	140,598	**F**	143,201	**F**	145,805	**F**
U.S. 50 - Folsom Blvd to East Bidwell St[1]	4F	71,400	110,344	**F**	114,758	**F**	116,965	**F**	119,172	**F**	121,378	**F**	123,585	**F**
U.S. 50 – East Bidwell St to County line[1]	4F	71,400	91,284	**F**	94,935	**F**	96,761	**F**	98,587	**F**	100,412	**F**	102,238	**F**
Folsom Lake Crossing Bridge	4AHD	40,000	29,425	C	30,602	C	31,191	C	31,779	C	32,368	D	32,956	D
SR-80 – north of Douglas Blvd[1]	6F	107,100	156,060	**F**	162,302	**F**	165,424	**F**	168,545	**F**	171,666	**F**	174,787	**F**
SR-80 – Douglas Blvd to Greenback Ln[1]	6F	107,100	182,580	**F**	189,883	**F**	193,535	**F**	197,186	**F**	200,838	**F**	204,490	**F**
SR-80 – south of Greenback Ln[1]	6F	107,100	190,000	**F**	197,600	**F**	201,400	**F**	205,200	**F**	209,000	**F**	212,800	**F**

Note : Year 2011 traffic volumes from Folsom Control Structure study - calculated from 2010 ADTs (Average Daily Traffic)with an annual 2% growth rate. Future year 2013-2017 volumes calculated using annual 2% growth rate.

* LOS E is the threshold for all roadway segments in Sacramento County while LOS C is applied to Caltrans and Placer County segments. Capacity is calculated as the maximum volume at satisfactory LOS C/E.

1) Data obtained from Caltrans Traffic Data Branch - calculated from 2010 ADTs with an annual 2% growth rate. Future year 2013-2017 volumes calcultated using annual 2% growth rate. Level of Service (LOS) evaluated using Caltrans V/C thresholds.

PROJECT ALTERNATIVES ANALYSIS

This section will evaluate the performance of the future with project condition for both Alternatives B and C for Future Year 2013 to 2017.

Alternative B

The Baseline plus Project analysis builds upon the Future Year 2013 to 2017 Base conditions and incorporates project Alternative B traffic.

Tables 6 through **10** present the traffic effects associated with Alternative B for each construction year from 2013 through 2017. The tables include the ADT, V/C ratio, and LOS rating for each key roadway in the study area, as estimated for the No Action/No Project Alternative and each action alternative. The basis of comparison for determining the significant effects of each action alternative is any deterioration in LOS rating or an increase in V/C of 0.05 for roadways with an existing LOS of F compared against the No Action/No Project Alternative.

No LOS deteriorations would occur in 2013, 2014, 2015, 2016, or 2017. In addition, there would be some roadways in certain years that would experience an increase in v/c however the increase is less than the 0.05 threshold. Therefore, the project construction activity would have no effect on the roadway network.

Table 6. 2013 Baseline and Alternative B Project LOS Results

Roadway Segment	Functional Class	Capacity (LOS C/D/E)	Year 2013 Traffic Volumes			Year 2013 + Project Traffic Volumes		
			Traffic Volumes	LOS	V/C	Traffic Volumes	LOS	V/C
Douglas Boulevard – Barton Rd to Folsom-Auburn Rd	4AD	35,400	46,598	**F**	1.32	46,598	**F**	1.32
Folsom-Auburn Road – Douglas Blvd to Folsom Dam Rd	4AD	37,400	46,715	**F**	1.25	46,715	**F**	1.25
Folsom Boulevard – Folsom Dam Rd to Greenback Ln	4AD	37,400	37,788	**F**	1.01	37,788	**F**	1.01
Folsom Boulevard – Greenback Ln to Iron Point Rd	4AD	37,400	43,816	**F**	1.17	43,816	**F**	1.17
Greenback Lane - Hazel Ave to Madison Ave	4AMD	36,000	27,935	C	0.78	27,935	C	0.78
East Natoma Street – Cimmaron Cir to Folsom Dam Rd	4AU	28,900	19,242	D	0.67	19,242	D	0.67
East Natoma Street – Folsom Dam Rd to Green Valley Rd	4AU	28,900	31,413	**F**	1.09	31,678	**F**	1.10
Green Valley Road – East Natoma St to Sophia Pwy	4AU	28,900	37,094	**F**	1.28	37,094	**F**	1.28
Oak Avenue Parkway – Blue Ravine Rd to East Bidwell St	6AD	56,000	25,734	C	0.46	25,999	C	0.46
East Bidwell Street – Clarksville Rod to Iron Point Rd	6AD	56,000	45,555	D	0.81	45,820	D	0.82
Blue Ravine Road – Oak Avenue Pwy to Green Valley Rd	4AD	37,400	22,603	D	0.60	22,869	D	0.61
U.S. 50 – Hazel Ave to Folsom Blvd[1]	4FA	89,800	135,390	**F**	1.51	135,390	**F**	1.51
U.S. 50 - Folsom Blvd to East Bidwell St[1]	4F	71,400	114,758	**F**	1.61	114,758	**F**	1.61
U.S. 50 – East Bidwell St to County line[1]	4F	71,400	94,935	**F**	1.33	94,935	**F**	1.33
Folsom Lake Crossing Bridge	4AHD	40,000	30,602	C	0.77	30,602	C	0.77
SR-80 – north of Douglas Blvd[1]	6F	107,100	162,302	**F**	1.52	162,302	**F**	1.52
SR-80 – Douglas Blvd to Greenback Ln[1]	6F	107,100	189,883	**F**	1.77	189,883	**F**	1.77
SR-80 – south of Greenback Ln[1]	6F	107,100	197,600	**F**	1.85	197,600	**F**	1.85

Table 7. 2014 Baseline and Alternative B Project LOS Results

Roadway Segment	Functional Class	Capacity (LOS C/D/E)	Year 2014 Traffic Volumes			Year 2014 + Project Traffic Volumes		
			Traffic Volumes	LOS	V/C	Traffic Volumes	LOS	V/C
Douglas Boulevard – Barton Rd to Folsom-Auburn Rd	4AD	35,400	47,494	**F**	1.34	47,499	**F**	1.34
Folsom-Auburn Road – Douglas Blvd to Folsom Dam Rd	4AD	37,400	47,613	**F**	1.27	47,618	**F**	1.27
Folsom Boulevard – Folsom Dam Rd to Greenback Ln	4AD	37,400	38,515	**F**	1.03	38,522	**F**	1.03
Folsom Boulevard – Greenback Ln to Iron Point Rd	4AD	37,400	44,659	**F**	1.19	44,662	**F**	1.19
Greenback Lane - Hazel Ave to Madison Ave	4AMD	36,000	28,473	C	0.79	28,476	C	0.79
East Natoma Street – Cimmaron Cir to Folsom Dam Rd	4AU	28,900	19,612	D	0.68	19,613	D	0.68
East Natoma Street – Folsom Dam Rd to Green Valley Rd	4AU	28,900	32,017	**F**	1.11	32,039	**F**	1.11
Green Valley Road – East Natoma St to Sophia Pwy	4AU	28,900	37,807	**F**	1.31	37,807	**F**	1.31
Oak Avenue Parkway – Blue Ravine Rd to East Bidwell St	6AD	56,000	26,229	C	0.47	26,249	C	0.47
East Bidwell Street – Clarksville Rod to Iron Point Rd	6AD	56,000	46,431	D	0.83	46,452	D	0.83
Blue Ravine Road – Oak Avenue Pwy to Green Valley Rd	4AD	37,400	23,038	D	0.62	23,059	D	0.62
U.S. 50 – Hazel Ave to Folsom Blvd[1]	4FA	89,800	137,994	**F**	1.54	138,002	**F**	1.54
U.S. 50 - Folsom Blvd to East Bidwell St[1]	4F	71,400	116,965	**F**	1.64	116,970	**F**	1.64
U.S. 50 – East Bidwell St to County line[1]	4F	71,400	96,761	**F**	1.36	96,762	**F**	1.36
Folsom Lake Crossing Bridge	4AHD	40,000	31,191	C	0.78	31,202	C	0.78
SR-80 – north of Douglas Blvd[1]	6F	107,100	165,424	**F**	1.54	165,424	**F**	1.54
SR-80 – Douglas Blvd to Greenback Ln[1]	6F	107,100	193,535	**F**	1.81	193,538	**F**	1.81
SR-80 – south of Greenback Ln[1]	6F	107,100	201,400	**F**	1.88	201,406	**F**	1.88

Table 8. 2015 Baseline and Alternative B Project LOS Results

Roadway Segment	Functional Class	Capacity (LOS C/D/E)	Year 2015 Traffic Volumes			Year 2015 + Project Traffic Volumes		
			Traffic Volumes	LOS	V/C	Traffic Volumes	LOS	V/C
Douglas Boulevard – Barton Rd to Folsom-Auburn Rd	4AD	35,400	48,390	**F**	1.37	48,402	**F**	1.37
Folsom-Auburn Road – Douglas Blvd to Folsom Dam Rd	4AD	37,400	48,511	**F**	1.30	48,523	**F**	1.30
Folsom Boulevard – Folsom Dam Rd to Greenback Ln	4AD	37,400	39,242	**F**	1.05	39,258	**F**	1.05
Folsom Boulevard – Greenback Ln to Iron Point Rd	4AD	37,400	45,501	**F**	1.22	45,509	**F**	1.22
Greenback Lane - Hazel Ave to Madison Ave	4AMD	36,000	29,010	D	0.81	29,018	D	0.81
East Natoma Street – Cimmaron Cir to Folsom Dam Rd	4AU	28,900	19,982	D	0.69	19,984	D	0.69
East Natoma Street – Folsom Dam Rd to Green Valley Rd	4AU	28,900	32,621	**F**	1.13	32,651	**F**	1.13
Green Valley Road – East Natoma St to Sophia Pwy	4AU	28,900	38,520	**F**	1.33	38,521	**F**	1.33
Oak Avenue Parkway – Blue Ravine Rd to East Bidwell St	6AD	56,000	26,724	C	0.48	26,750	C	0.48
East Bidwell Street – Clarksville Rod to Iron Point Rd	6AD	56,000	47,307	D	0.84	47,334	D	0.85
Blue Ravine Road – Oak Avenue Pwy to Green Valley Rd	4AD	37,400	23,473	D	0.63	23,499	D	0.63
U.S. 50 – Hazel Ave to Folsom Blvd[1]	4FA	89,800	140,598	**F**	1.57	140,616	**F**	1.57
U.S. 50 - Folsom Blvd to East Bidwell St[1]	4F	71,400	119,172	**F**	1.67	119,182	**F**	1.67
U.S. 50 – East Bidwell St to County line[1]	4F	71,400	98,587	**F**	1.38	98,589	**F**	1.38
Folsom Lake Crossing Bridge	4AHD	40,000	31,779	C	0.79	31,807	C	0.80
SR-80 – north of Douglas Blvd[1]	6F	107,100	168,545	**F**	1.57	168,547	**F**	1.57
SR-80 – Douglas Blvd to Greenback Ln[1]	6F	107,100	197,186	**F**	1.84	197,194	**F**	1.84
SR-80 – south of Greenback Ln[1]	6F	107,100	205,200	**F**	1.92	205,216	**F**	1.92

Table 9. 2016 Baseline and Alternative B Project LOS Results

Roadway Segment	Functional Class	Capacity (LOS C/D/E)	Year 2016 Traffic Volumes			Year 2016 + Project Traffic Volumes		
			Traffic Volumes	LOS	V/C	Traffic Volumes	LOS	V/C
Douglas Boulevard – Barton Rd to Folsom-Auburn Rd	4AD	35,400	49,287	F	1.39	49,297	F	1.39
Folsom-Auburn Road – Douglas Blvd to Folsom Dam Rd	4AD	37,400	49,410	F	1.32	49,421	F	1.32
Folsom Boulevard – Folsom Dam Rd to Greenback Ln	4AD	37,400	39,969	F	1.07	39,983	F	1.07
Folsom Boulevard – Greenback Ln to Iron Point Rd	4AD	37,400	46,344	F	1.24	46,351	F	1.24
Greenback Lane - Hazel Ave to Madison Ave	4AMD	36,000	29,547	D	0.82	29,554	D	0.82
East Natoma Street – Cimmaron Cir to Folsom Dam Rd	4AU	28,900	20,352	D	0.70	20,354	D	0.70
East Natoma Street – Folsom Dam Rd to Green Valley Rd	4AU	28,900	33,226	F	1.15	33,254	F	1.15
Green Valley Road – East Natoma St to Sophia Pwy	4AU	28,900	39,234	F	1.36	39,235	F	1.36
Oak Avenue Parkway – Blue Ravine Rd to East Bidwell St	6AD	56,000	27,218	D	0.49	27,244	D	0.49
East Bidwell Street – Clarksville Rod to Iron Point Rd	6AD	56,000	48,183	D	0.86	48,209	D	0.86
Blue Ravine Road – Oak Avenue Pwy to Green Valley Rd	4AD	37,400	23,907	D	0.64	23,933	D	0.64
U.S. 50 – Hazel Ave to Folsom Blvd[1]	4FA	89,800	143,201	F	1.59	143,218	F	1.59
U.S. 50 - Folsom Blvd to East Bidwell St[1]	4F	71,400	121,378	F	1.70	121,388	F	1.70
U.S. 50 – East Bidwell St to County line[1]	4F	71,400	100,412	F	1.41	100,414	F	1.41
Folsom Lake Crossing Bridge	4AHD	40,000	32,368	D	0.81	32,393	D	0.81
SR-80 – north of Douglas Blvd[1]	6F	107,100	171,666	**F**	1.60	171,668	**F**	1.60
SR-80 – Douglas Blvd to Greenback Ln[1]	6F	107,100	200,838	**F**	1.88	200,845	**F**	1.88
SR-80 – south of Greenback Ln[1]	6F	107,100	209,000	**F**	1.95	209,014	**F**	1.95

Table 10. 2017 Baseline and Project Alternative B LOS Results

Roadway Segment	Functional Class	Capacity (LOS C/D/E)	Year 2017 Traffic Volumes			Year 2017 + Project Traffic Volumes		
			Traffic Volumes	LOS	V/C	Traffic Volumes	LOS	V/C
Douglas Boulevard – Barton Rd to Folsom-Auburn Rd	4AD	35,400	50,183	**F**	1.42	50,195	**F**	1.42
Folsom-Auburn Road – Douglas Blvd to Folsom Dam Rd	4AD	37,400	50,308	**F**	1.35	50,320	**F**	1.35
Folsom Boulevard – Folsom Dam Rd to Greenback Ln	4AD	37,400	40,695	**F**	1.09	40,711	**F**	1.09
Folsom Boulevard – Greenback Ln to Iron Point Rd	4AD	37,400	47,187	**F**	1.26	47,195	**F**	1.26
Greenback Lane - Hazel Ave to Madison Ave	4AMD	36,000	30,084	D	0.84	30,092	D	0.84
East Natoma Street – Cimmaron Cir to Folsom Dam Rd	4AU	28,900	20,722	D	0.72	20,724	D	0.72
East Natoma Street – Folsom Dam Rd to Green Valley Rd	4AU	28,900	33,830	**F**	1.17	34,099	**F**	1.18
Green Valley Road – East Natoma St to Sophia Pwy	4AU	28,900	39,947	**F**	1.38	39,948	**F**	1.38
Oak Avenue Parkway – Blue Ravine Rd to East Bidwell St	6AD	56,000	27,713	D	0.49	27,980	D	0.50
East Bidwell Street – Clarksville Rod to Iron Point Rd	6AD	56,000	49,059	D	0.88	49,326	D	0.88
Blue Ravine Road – Oak Avenue Pwy to Green Valley Rd	4AD	37,400	24,342	D	0.65	24,609	D	0.66
U.S. 50 – Hazel Ave to Folsom Blvd[1]	4FA	89,800	145,805	**F**	1.62	145,822	**F**	1.62
U.S. 50 - Folsom Blvd to East Bidwell St[1]	4F	71,400	123,585	**F**	1.73	123,595	**F**	1.73
U.S. 50 – East Bidwell St to County line[1]	4F	71,400	102,238	**F**	1.43	102,240	**F**	1.43
Folsom Lake Crossing Bridge	4AHD	40,000	32,956	D	0.82	32,984	D	0.82
SR-80 – north of Douglas Blvd[1]	6F	107,100	174,787	**F**	1.63	174,789	**F**	1.63
SR-80 – Douglas Blvd to Greenback Ln[1]	6F	107,100	204,490	**F**	1.91	204,498	**F**	1.91
SR-80 – south of Greenback Ln[1]	6F	107,100	212,800	**F**	1.99	212,816	**F**	1.99

Alternative C

The Baseline plus Project analysis builds upon the Future Year 2013 to 2017 Base conditions and incorporates project Alternative C traffic.

Tables 11 through **15** present the traffic effects associated with Alternative C for each construction year from 2013 through 2017. The tables include the ADT, V/C ratio, and LOS rating for each key roadway in the study area, as estimated for the No Action/No Project Alternative and each action alternative. The basis of comparison for determining the significant effects of each action alternative is any deterioration in LOS rating or an increase in V/C of 0.05 for roadways with an existing LOS of F compared against the No Action/No Project Alternative.

No LOS deteriorations would occur in 2013, 2014, 2015, 2016, or 2017. In addition, there would be some roadways in certain years that would experience an increase in v/c however the increase is less than the 0.05 threshold. Therefore, the project construction activity would have no effect on the roadway network.

Table 11. 2013 Baseline and Project Alternative C LOS Results

Roadway Segment	Functional Class	Capacity (LOS C/D/E)	Year 2013 Traffic Volumes			Year 2013 + Project Traffic Volumes		
			Traffic Volumes	LOS	V/C	Traffic Volumes	LOS	V/C
Douglas Boulevard – Barton Rd to Folsom-Auburn Rd	4AD	35,400	46,598	**F**	1.32	46,602	**F**	1.32
Folsom-Auburn Road – Douglas Blvd to Folsom Dam Rd	4AD	37,400	46,715	**F**	1.25	46,718	**F**	1.25
Folsom Boulevard – Folsom Dam Rd to Greenback Ln	4AD	37,400	37,788	**F**	1.01	37,793	**F**	1.01
Folsom Boulevard – Greenback Ln to Iron Point Rd	4AD	37,400	43,816	**F**	1.17	43,819	**F**	1.17
Greenback Lane - Hazel Ave to Madison Ave	4AMD	36,000	27,935	C	0.78	27,938	C	0.78
East Natoma Street – Cimmaron Cir to Folsom Dam Rd	4AU	28,900	19,242	D	0.67	19,243	D	0.67
East Natoma Street – Folsom Dam Rd to Green Valley Rd	4AU	28,900	31,413	**F**	1.09	31,672	**F**	1.10
Green Valley Road – East Natoma St to Sophia Pwy	4AU	28,900	37,094	**F**	1.28	37,094	**F**	1.28
Oak Avenue Parkway – Blue Ravine Rd to East Bidwell St	6AD	56,000	25,734	C	0.46	25,992	C	0.46
East Bidwell Street – Clarksville Rod to Iron Point Rd	6AD	56,000	45,555	D	0.81	45,814	D	0.82
Blue Ravine Road – Oak Avenue Pwy to Green Valley Rd	4AD	37,400	22,603	D	0.60	22,862	D	0.61
U.S. 50 – Hazel Ave to Folsom Blvd[1]	4FA	89,800	135,390	**F**	1.51	135,395	**F**	1.51
U.S. 50 - Folsom Blvd to East Bidwell St[1]	4F	71,400	114,758	**F**	1.61	114,760	**F**	1.61
U.S. 50 – East Bidwell St to County line[1]	4F	71,400	94,935	**F**	1.33	94,936	**F**	1.33
Folsom Lake Crossing Bridge	4AHD	40,000	30,602	C	0.77	30,610	C	0.77
SR-80 – north of Douglas Blvd[1]	6F	107,100	162,302	**F**	1.52	162,303	**F**	1.52
SR-80 – Douglas Blvd to Greenback Ln[1]	6F	107,100	189,883	**F**	1.77	189,886	**F**	1.77
SR-80 – south of Greenback Ln[1]	6F	107,100	197,600	**F**	1.85	197,605	**F**	1.85

Table 12. 2014 Baseline and Project Alternative C LOS Results

Roadway Segment	Functional Class	Capacity (LOS C/D/E)	Year 2014 Traffic Volumes			Year 2014 + Project Traffic Volumes		
			Traffic Volumes	LOS	V/C	Traffic Volumes	LOS	V/C
Douglas Boulevard – Barton Rd to Folsom-Auburn Rd	4AD	35,400	47,494	**F**	1.34	47,502	**F**	1.34
Folsom-Auburn Road – Douglas Blvd to Folsom Dam Rd	4AD	37,400	47,613	**F**	1.27	47,620	**F**	1.27
Folsom Boulevard – Folsom Dam Rd to Greenback Ln	4AD	37,400	38,515	**F**	1.03	38,525	**F**	1.03
Folsom Boulevard – Greenback Ln to Iron Point Rd	4AD	37,400	44,659	**F**	1.19	44,664	**F**	1.19
Greenback Lane - Hazel Ave to Madison Ave	4AMD	36,000	28,473	C	0.79	28,477	C	0.79
East Natoma Street – Cimmaron Cir to Folsom Dam Rd	4AU	28,900	19,612	D	0.68	19,613	D	0.68
East Natoma Street – Folsom Dam Rd to Green Valley Rd	4AU	28,900	32,017	**F**	1.11	32,036	**F**	1.11
Green Valley Road – East Natoma St to Sophia Pwy	4AU	28,900	37,807	**F**	1.31	37,808	**F**	1.31
Oak Avenue Parkway – Blue Ravine Rd to East Bidwell St	6AD	56,000	26,229	C	0.47	26,246	C	0.47
East Bidwell Street – Clarksville Rod to Iron Point Rd	6AD	56,000	46,431	D	0.83	46,448	D	0.83
Blue Ravine Road – Oak Avenue Pwy to Green Valley Rd	4AD	37,400	23,038	D	0.62	23,055	D	0.62
U.S. 50 – Hazel Ave to Folsom Blvd[1]	4FA	89,800	137,994	**F**	1.54	138,006	**F**	1.54
U.S. 50 - Folsom Blvd to East Bidwell St[1]	4F	71,400	116,965	**F**	1.64	116,971	**F**	1.64
U.S. 50 – East Bidwell St to County line[1]	4F	71,400	96,761	**F**	1.36	96,763	**F**	1.36
Folsom Lake Crossing Bridge	4AHD	40,000	31,191	C	0.78	31,207	C	0.78
SR-80 – north of Douglas Blvd[1]	6F	107,100	165,424	**F**	1.54	165,425	**F**	1.54
SR-80 – Douglas Blvd to Greenback Ln[1]	6F	107,100	193,535	**F**	1.81	193,540	**F**	1.81
SR-80 – south of Greenback Ln[1]	6F	107,100	201,400	**F**	1.88	201,410	**F**	1.88

Table 13. 2015 Baseline and Project Alternative C LOS Results

Roadway Segment	Functional Class	Capacity (LOS C/D/E)	Year 2015 Traffic Volumes			Year 2015 + Project Traffic Volumes		
			Traffic Volumes	LOS	V/C	Traffic Volumes	LOS	V/C
Douglas Boulevard – Barton Rd to Folsom-Auburn Rd	4AD	35,400	48,390	**F**	1.37	48,402	**F**	1.37
Folsom-Auburn Road – Douglas Blvd to Folsom Dam Rd	4AD	37,400	48,511	**F**	1.30	48,523	**F**	1.30
Folsom Boulevard – Folsom Dam Rd to Greenback Ln	4AD	37,400	39,242	**F**	1.05	39,258	**F**	1.05
Folsom Boulevard – Greenback Ln to Iron Point Rd	4AD	37,400	45,501	**F**	1.22	45,509	**F**	1.22
Greenback Lane - Hazel Ave to Madison Ave	4AMD	36,000	29,010	D	0.81	29,018	D	0.81
East Natoma Street – Cimmaron Cir to Folsom Dam Rd	4AU	28,900	19,982	D	0.69	19,984	D	0.69
East Natoma Street – Folsom Dam Rd to Green Valley Rd	4AU	28,900	32,621	**F**	1.13	32,646	**F**	1.13
Green Valley Road – East Natoma St to Sophia Pwy	4AU	28,900	38,520	**F**	1.33	38,521	**F**	1.33
Oak Avenue Parkway – Blue Ravine Rd to East Bidwell St	6AD	56,000	26,724	C	0.48	26,745	C	0.48
East Bidwell Street – Clarksville Rod to Iron Point Rd	6AD	56,000	47,307	D	0.84	47,329	D	0.85
Blue Ravine Road – Oak Avenue Pwy to Green Valley Rd	4AD	37,400	23,473	D	0.63	23,495	D	0.63
U.S. 50 – Hazel Ave to Folsom Blvd[1]	4FA	89,800	140,598	**F**	1.57	140,616	**F**	1.57
U.S. 50 - Folsom Blvd to East Bidwell St[1]	4F	71,400	119,172	**F**	1.67	119,182	**F**	1.67
U.S. 50 – East Bidwell St to County line[1]	4F	71,400	98,587	**F**	1.38	98,589	**F**	1.38
Folsom Lake Crossing Bridge	4AHD	40,000	31,779	C	0.79	31,807	C	0.80
SR-80 – north of Douglas Blvd[1]	6F	107,100	168,545	**F**	1.57	168,547	**F**	1.57
SR-80 – Douglas Blvd to Greenback Ln[1]	6F	107,100	197,186	**F**	1.84	197,194	**F**	1.84
SR-80 – south of Greenback Ln[1]	6F	107,100	205,200	**F**	1.92	205,216	**F**	1.92

Table 14. 2016 Baseline and Project Alternative C LOS Results

Roadway Segment	Functional Class	Capacity (LOS C/D/E)	Year 2016 Traffic Volumes			Year 2016 + Project Traffic Volumes		
			Traffic Volumes	LOS	V/C	Traffic Volumes	LOS	V/C
Douglas Boulevard – Barton Rd to Folsom-Auburn Rd	4AD	35,400	49,287	**F**	1.39	49,299	**F**	1.39
Folsom-Auburn Road – Douglas Blvd to Folsom Dam Rd	4AD	37,400	49,410	**F**	1.32	49,422	**F**	1.32
Folsom Boulevard – Folsom Dam Rd to Greenback Ln	4AD	37,400	39,969	**F**	1.07	39,985	**F**	1.07
Folsom Boulevard – Greenback Ln to Iron Point Rd	4AD	37,400	46,344	**F**	1.24	46,352	**F**	1.24
Greenback Lane - Hazel Ave to Madison Ave	4AMD	36,000	29,547	D	0.82	29,555	D	0.82
East Natoma Street – Cimmaron Cir to Folsom Dam Rd	4AU	28,900	20,352	D	0.70	20,354	D	0.70
East Natoma Street – Folsom Dam Rd to Green Valley Rd	4AU	28,900	33,226	**F**	1.15	33,250	**F**	1.15
Green Valley Road – East Natoma St to Sophia Pwy	4AU	28,900	39,234	**F**	1.36	39,235	**F**	1.36
Oak Avenue Parkway – Blue Ravine Rd to East Bidwell St	6AD	56,000	27,218	D	0.49	27,240	D	0.49
East Bidwell Street – Clarksville Rod to Iron Point Rd	6AD	56,000	48,183	D	0.86	48,205	D	0.86
Blue Ravine Road – Oak Avenue Pwy to Green Valley Rd	4AD	37,400	23,907	D	0.64	23,929	D	0.64
U.S. 50 – Hazel Ave to Folsom Blvd[1]	4FA	89,800	143,201	**F**	1.59	143,220	**F**	1.59
U.S. 50 - Folsom Blvd to East Bidwell St[1]	4F	71,400	121,378	**F**	1.70	121,389	**F**	1.70
U.S. 50 – East Bidwell St to County line[1]	4F	71,400	100,412	**F**	1.41	100,414	**F**	1.41
Folsom Lake Crossing Bridge	4AHD	40,000	32,368	D	0.81	32,396	D	0.81
SR-80 – north of Douglas Blvd[1]	6F	107,100	171,666	**F**	1.60	171,668	**F**	1.60
SR-80 – Douglas Blvd to Greenback Ln[1]	6F	107,100	200,838	**F**	1.88	200,846	**F**	1.88
SR-80 – south of Greenback Ln[1]	6F	107,100	209,000	**F**	1.95	209,016	**F**	1.95

Table 15. 2017 Baseline and Project Alternative C LOS Results

Roadway Segment	Functional Class	Capacity (LOS C/D/E)	Year 2017 Traffic Volumes			Year 2017 + Project Traffic Volumes		
			Traffic Volumes	LOS	V/C	Traffic Volumes	LOS	V/C
Douglas Boulevard – Barton Rd to Folsom-Auburn Rd	4AD	35,400	50,183	**F**	1.42	50,197	**F**	1.42
Folsom-Auburn Road – Douglas Blvd to Folsom Dam Rd	4AD	37,400	50,308	**F**	1.35	50,323	**F**	1.35
Folsom Boulevard – Folsom Dam Rd to Greenback Ln	4AD	37,400	40,695	**F**	1.09	40,714	**F**	1.09
Folsom Boulevard – Greenback Ln to Iron Point Rd	4AD	37,400	47,187	**F**	1.26	47,196	**F**	1.26
Greenback Lane - Hazel Ave to Madison Ave	4AMD	36,000	30,084	D	0.84	30,094	D	0.84
East Natoma Street – Cimmaron Cir to Folsom Dam Rd	4AU	28,900	20,722	D	0.72	20,725	D	0.72
East Natoma Street – Folsom Dam Rd to Green Valley Rd	4AU	28,900	33,830	**F**	1.17	34,102	**F**	1.18
Green Valley Road – East Natoma St to Sophia Pwy	4AU	28,900	39,947	**F**	1.38	39,948	**F**	1.38
Oak Avenue Parkway – Blue Ravine Rd to East Bidwell St	6AD	56,000	27,713	D	0.49	27,982	D	0.50
East Bidwell Street – Clarksville Rod to Iron Point Rd	6AD	56,000	49,059	D	0.88	49,328	D	0.88
Blue Ravine Road – Oak Avenue Pwy to Green Valley Rd	4AD	37,400	24,342	D	0.65	24,611	D	0.66
U.S. 50 – Hazel Ave to Folsom Blvd[1]	4FA	89,800	145,805	**F**	1.62	145,826	**F**	1.62
U.S. 50 - Folsom Blvd to East Bidwell St[1]	4F	71,400	123,585	**F**	1.73	123,596	**F**	1.73
U.S. 50 – East Bidwell St to County line[1]	4F	71,400	102,238	**F**	1.43	102,240	**F**	1.43
Folsom Lake Crossing Bridge	4AHD	40,000	32,956	D	0.82	32,990	D	0.82
SR-80 – north of Douglas Blvd[1]	6F	107,100	174,787	**F**	1.63	174,790	**F**	1.63
SR-80 – Douglas Blvd to Greenback Ln[1]	6F	107,100	204,490	**F**	1.91	204,499	**F**	1.91
SR-80 – south of Greenback Ln[1]	6F	107,100	212,800	**F**	1.99	212,819	**F**	1.99

CONCLUSION

Mitigation measures would be required of the project whenever the effects of the project exceed the thresholds identified in Section 2.2. Since the proposed action would not exceed the traffic effect thresholds identified in Section 2.2, no project traffic effect mitigations are explicitly proposed.

The following measures would be implemented not as a result of direct project action effect but rather as proactive measures customary to project construction activities. Due to the dynamic nature of the project construction environment, the following individual measures or combination of measures might need to be implemented in response to the needs of the construction activities at the project site.

T-1: In conjunction with the development and review of more detailed project design and construction specifications, a peak hour capacity analysis would be performed on specific intersections to evaluate the need for changes to traffic signal timing, phasing modification, provision of additional turn lanes through restriping or physical improvements, as necessary and appropriate to reduce project-related effects to an acceptable level. In conjunction with that assessment, the potential need for roadway improvements or operation modifications (i.e., temporary restrictions on turning movements, on-street parking, etc.) to enhance roadway capacity in light of additional traffic from the project will be evaluated. The completion of these evaluations and the identification of specific traffic improvement measures, as deemed necessary and appropriate in light of the temporary nature of effects, will be coordinated with the transportation departments of the affected jurisdictions.

T-2: Construction contractor will prepare a transportation management plan, outlining proposed routes to be approved by the appropriate local entity, and implement it. High collision intersections will be identified and avoided if possible. Drivers will be informed and trained on the various types of haul routes, and areas that are more sensitive (e.g., high level of residential or education centers, or narrow roadways).

T-3: Construction contractor will develop and utilize appropriate signage to inform the general public of the haul routes and route changes, if applicable.

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Appendix H

Folsom JFP Noise Technical Report

Joint Federal Project (JFP) at Folsom Dam, Approach Channel Excavation

Noise Technical Memorandum

Sacramento, CA

Final

October 2012

U.S Army Corps of Engineers, Sacramento District

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Appendices

List of Abbreviations and Acronyms

ADT	Average Daily Traffic
ANSI	American National Standards Institute
Bio-x	Bio measurement site x (x = site number)
BNoise	Blast Noise
Cadna/A	Computer-Aided Noise Abatement
CEQA	California Environmental Quality Act
Cfm	Cubic Feet per Minute
CFR	Code of Federal Regulations
CNEL	Community Noise Equivalent Level
cy	Cubic yard
dB	decibels
dB(A)	decibel – A-Weighted
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
ISO	International Standard of Organization
Hz	hertz
JFP	Joint Federal Project
kHz	kilohertz
Ldn	day-night sound level
Leq	equivalent sound level
Lmax	maximum sound level
Lmin	minimum sound level
LORS	laws, ordinances, regulations and standards
Lxx	percentile-exceeded sound level
LT-x	long term measurement site x (x = site number)
MIAD	Mormon Island Auxiliary Dam
µPa	micro-Pascals
mph	miles per hour
MR-x	Modeled Receiver x (x = site number)
NAC	noise abatement criteria
NOAA	National Oceanic and Atmospheric Administration

List of Abbreviations and Acronyms (Con't)

NSR	Noise Study Report
OSHA	Occupational Safety and Health Administration
PWL	Sound Power Level
RCNM	Road Construction Noise Model
RMS	root-mean-square
ROD	Record of Decision
SEL	Sound exposure level
SPL	sound pressure level
ST-x	short term measurement site x (x = site number)
NAVD	North American Vertical Datum
TNM	Traffic Noise Model
USBR	United States Bureau of Reclamation
USDOT	US Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service

1.0 SETTINGS/AFFECTED ENVIRONMENT

1.1 Background

As part of the Folsom Dam Safety and Flood Damage Reduction Project, also referred to as the Joint Federal Project (JFP), an auxiliary spillway is under construction jointly by the U.S. Bureau of Reclamation (USBR) and the U.S. Army Corps of Engineers (USACE). The JFP is intended to provide increased flood damage reduction and mitigate dam safety issues related to a Probable Maximum Flood event. The new auxiliary spillway would be operated in concert with the existing spillway gates and river outlets on Folsom Dam to manage flood flows from Folsom Reservoir.

The final phase of the proposed project is the completion of the approach channel and spur dike. A trans-load facility and concrete batch plant are necessary for construction to be completed. The project would be phased such that maximum excavation of the approach channel, and construction of the spur dike, can be completed during low lake levels in the dry, to minimize both project costs and water quality and biological impacts. There are currently three potential alternatives for the proposed project: Alternative 1, Alternative 2 and Alternative 3. Alternative 1 is the no project Alternative. Alternative 2 includes approach channel excavation with the utilization of a cutoff wall while Alternative 3 includes approach channel excavation with the utilization of a cofferdam.

1.2 Purpose and Scope

This section presents the results of a noise impact analysis for the Folsom Dam JFP and includes relevant noise laws, ordinances, and regulations, the results of an ambient noise survey, and a quantitative analysis of noise environmental impacts during project activities. The analysis includes:

- Discussion of source terrestrial noise emissions from construction schedules and activities such as excavation, blasting, construction of the spur dike, material delivery, batch plant utilization and utilization of the on-site haul road
- Descriptions of the affected environment including identification of human and wildlife sensitive receptors
- Development and use of appropriate air and noise quantification models
- Potential noise impacts
- Qualitative discussion on impacts due to underwater excavation and blasting activities
- Mitigation measures
- Cumulative effects

1.3 Project Components Analyzed for Noise Impacts

The project involves the following aspects depending on whether Alternative 2 or 3 is selected: approach channel excavation, spur dike construction, transload facility construction, batch plant operations, cutoff wall construction and cofferdam construction.

Approach Channel Excavation

The approach channel concrete slab and walls would extend for approximately 100 feet upstream of the control structure. The concrete slab would be approximately 5 feet thick, and both the right and left sides would flare out five degrees to increase the width of the slab upstream. A 30-foot wide by 10-foot deep rock trap would be located immediately upstream of the approach slab so that rocks on the approach channel invert block debris from entering the auxiliary spillway. Approach channel walls would be constructed of concrete from the control structure extending approximately 100 feet upstream. All concrete work and placement in the approach channel would be conducted in-the-dry conditions; no concrete work would be conducted in-the-wet.

Land based rock excavation would be accomplished with conventional drilling and blasting methods and rock excavation underwater would be accomplished by drill and blast methods (URS, 2009). In dry holes, ANFO (ammonium nitrate-fuel oil) would be utilized and primed with cast boosters. Blasting would typically consist of approximately 15,000 cubic yards rock shots. Rock excavation under water would be accomplished by drill and blast methods (URS, 2009). Each blast would produce approximately 2,000 cubic yards of rock. Water-resistant emulsified slurry would be required since water intrusion is anticipated. Explosives would be stored off-site. The explosives storage facility is assumed to be located in Jamestown, California, approximately 80 miles from the site. Explosives would be trucked to the site on a daily basis.

Spur Dike Construction

A spur dike is an embankment designed to direct water into an opening; in this case the opening would be the approach channel. The proposed elliptical-shaped spur dike would be located directly to the northwest of the approach channel. The core of the spur dike would be constructed of a decomposed quartz diorite core, commonly known as decomposed granite. This would be followed by a compacted random rock fill followed by a stone riprap cap. The quantity of material estimated to complete the spur dike is 1,400,000 cubic yards. Material for the spur dike construction would come from the excavation of the approach channel excavation or Mormon Island Auxiliary Dam (MIAD) disposal area. The construction equipment needed to build the spur dike consists of normal scrapers, bulldozers, and sheep-foot rollers for the body of the spur dike, and backhoes, bulldozers, and smooth rollers for the bedding, riprap, and surfacing materials. The construction would take place over 24 months from 2015 to 2017.

Transload Facility Construction

A transload facility would be needed for mobilization/demobilization of marine equipment (e.g., sectional barges and heavy cranes), dredge spoil off-loading from barges to trucks, marine equipment fuel and explosives transfer to support barges, equipment maintenance, and marine crew deployment. The proposed trans-load facility would be comprised of a ramp, crane and crane pad, and a fuel transfer station. The transload facility would be located adjacent to Dike 7. The transload facility is temporary and would be removed after the completion of the approach channel project in 2017.

Ramp material would be removed with excavators and hauled for disposal at the MIAD disposal area.

Batch Plant and Staging Area Operations

Activities at each staging area have not been definitively determined. The four locations for the staging areas are the Folsom Prison staging area, MIAD staging area, Overlook staging area and Dike 7 staging area. The construction of the approach channel and cutoff wall would require large quantities of temperature controlled concrete. This would necessitate the use of a contractor-provided, on-site concrete batch plant and deliveries of large quantities of concrete aggregate, concrete sand, and cement. The batch plant would be powered by electricity from overhead Sacramento Municipal Utility District lines.

Disposal Areas

There is approximately 1.4 million cubic yards of disposal material associated with construction of the approach channel project. Five potential on-site disposal sites are proposed for use as a part of the proposed project. Disposal sites being considered for excavated materials include: 1) the spur dike, 2) an in-reservoir site around the transload facility; 3) the MIAD disposal site; and 4) Dike 8 (land based and in-reservoir). The in-reservoir, Dike 8 and the spur dike would serve as permanent disposal for excavated material. MIAD and Dike 7 would serve as temporary disposal sites, where excavation material will be eventually removed and used for other purposes.

Cutoff Wall Construction

A cutoff wall is proposed for Alternative 2. The proposed cutoff wall would be located adjacent to Folsom Lake southeast of the Left Wing Dam and east of the Auxiliary Spillway chute excavation. The cutoff wall would consist of a reinforced concrete secant pile wall installed across the width of the future approach channel. The total length of the wall would be approximately 1,000 feet. The wall would be socketed into the underlying highly weathered granitic rock.

The secant wall would be constructed by drilling 3-foot diameter holes for the primary piles on 4-foot centers. After the drilling, the hole would be filled with concrete and a reinforcing cage. The top section of the piles would be drilled with a steel casting used to support the layers of cobbles and boulders. The bottom section of the pile that penetrates the decomposed and highly weathered granite would not require casing. The casing would be removed as concrete is placed in the hole. The average pile length is estimated to be 85 ft.

Three-foot diameter holes for the secondary piles would then be drilled on 4-foot centers between the primary piles. The secondary piles would be reinforced and constructed with concrete and a reinforcing cage. Both primary and secondary piles would be filled with concrete. No impact or vibratory pile driving is anticipated under this alternative (Mike Forrest, pers com to R. Verity, Jan 3 2012).

Cofferdam Construction

A cofferdam is proposed for Alternative 3. The cofferdam consists of a series of 84-foot diameter circular sheet pile cells constructed using 85-foot-long flat sheet piles. The construction of the cells requires that sheet piles be installed using a template. The template consists of two to three horizontally mounted ring wales to provide support for the vertical flat sheets. The sheet piles are installed using a vibratory hammer, working progressively around the ring. Once erected, the cells would be filled with well-graded crushed rock. The same plan dimension is maintained throughout the cofferdam, allowing for one sheet pile installation template to be utilized for construction of all of the circular cells. A layer of riprap would be placed along the upstream toe of the cells for scour protection. The cells are founded directly on the decomposed granite. The cofferdam accommodates a high design lake level of elevation 468 feet.

The cofferdam would have a provision for controlled but rapid flooding of the approach channel area to allow for quick equalization of hydraulic loads on both sides of the cofferdam. Rapid flooding of the approach channel excavation would be achieved by two or more flood gates installed in the connector cells. Each gate would consist of an approximately 100-foot-long, 4-foot diameter pipes mounted with a slide gate on the upstream side of the cofferdam. Accounting for energy losses at the inlet, outlet, and friction along the pipe walls and at the slide gate, two pipes would allow for infilling of the approach channel excavation area up to the high lake level at elevation 468.34 feet within about 6 hours.

Prior to cofferdam construction, lake sediments and other soils would be dredged to expose decomposed granite. A silt curtain placed around the perimeter of the excavation will be required to control turbidity in the lake. The total estimated volume of cofferdam fill materials would be 149,600 cubic yards, almost all of which is cell fill.

Potential noise impacts were assessed at noise-sensitive human and wildlife receptors within the vicinity of the proposed project. All project activities with potential for off-site noise impacts were assessed. These activities includeapproach channel excavation and spur dike construction activities, blasting activities and project-related vehicular traffic. A qualitative discussion of potential effects on fish species residing in Folsom Lake in the vicinity of underwater approach channel excavation will be developed. Potential noise-sensitive human receptors within the City of Folsom, Sacramento County, Placer County and El Dorado County were considered. Potential noise-sensitive wildlife is assessed within a five-mile radius of the proposed approach channel excavation and spur dike construction area.

1.4 Fundamentals of Acoustics

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity and interferes with or disrupts normal activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to typical environmental noise exposure levels is annoyance. The responses of individuals to similar noise events are diverse and influenced by many factors including the type of noise, the perceived importance of the noise, its appropriateness to the setting, the time of day and the type of activity during which the noise occurs, and noise sensitivity of the individual.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, which are sensed by the human ear. Sound is generally characterized by several variables, including frequency and amplitude. Frequency describes the sound's pitch (tone) and is measured in cycles per second (Hertz [Hz]), while amplitude describes the sound's pressure (loudness). Because the range of sound pressures that occur in the environment is extremely large, it is convenient to express these pressures on a logarithmic scale that compresses the wide range of pressures into a more useful range of numbers. The standard unit of sound measurement is the decibel (dB).

Hz is a measure of how many times each second the crest of a sound pressure wave passes a fixed point. For example, when a drummer beats a drum, the skin of the drum vibrates a number of times per second. When the drum skin vibrates 100 times per second it generates a sound pressure wave that is oscillating at 100 Hz, and is perceived by the ear/brain as a tonal pitch of 100 Hz. Sound frequencies between 20 and 20,000 Hz are within the range of sensitivity of the healthy human ear.

Sound level is expressed by reference to a specified national/international standard. The Sound Pressure Level (SPL) is used to describe sound at a specified distance or specific receptor location. In expressing sound pressure level on a logarithmic scale, sound pressure is compared to a reference value of 20 micropascals (µPa). SPL depends not only on the power of the source, but also on the distance from the source and the acoustical characteristics of the transmission path (absorption, reflection, etc.).

Outdoor sound levels decrease logarithmically as the distance from the source increases. This is due to wave divergence, atmospheric absorption, and ground attenuation. Sound radiating from a source in a homogeneous and undisturbed manner travels in spherical waves. As the sound waves travel away from the source, the sound energy is dispersed over a greater area decreasing the sound pressure of the wave. Spherical spreading of the sound wave from a point source reduces the noise level at a rate of 6 dB per doubling of distance.

Atmospheric absorption also influences the sound levels received by an observer. The greater the distance traveled, the greater the influence of the atmosphere and the resultant fluctuations. Atmospheric absorption becomes important at distances greater than 1,000 feet. The degree of absorption varies depending on the frequency of the sound as well as the humidity and temperature of the air. For example, atmospheric absorption is lowest (i.e., sound carries further) at high humidity and high temperatures and lower frequencies are less readily absorbed (i.e., sound carries further) than higher frequencies. Over long distances, lower frequencies become dominant as the higher frequencies are more rapidly attenuated. Turbulence, gradients of wind and other atmospheric phenomena also play a significant role in determining the degree of attenuation. For example, certain conditions, such as temperature inversions can channel or focus the sound waves resulting in higher noise levels than would result from simple spherical spreading.

Most sounds consist of a broad band of many frequencies differing in sound level. Because of the broad range of audible frequencies, methods have been developed to quantify these values into a single number. The most common method used to quantify environmental sounds uses a weighting system that is reflective of human hearing. Human hearing is less sensitive at low frequencies and extremely high frequencies than at the mid-range frequencies. This process is termed “A weighting”, and the resulting dB level is termed the “A weighted” decibel (dBA). “A weighting" is widely used in local noise ordinances and state and federal guidelines. In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA weighting curve. Unless specifically noted, the use of A weighting is always assumed with respect to environmental sound and community noise even if the notation does not show the “A”. Underwater sound levels are not weighted and these measurements reflect the entire frequency range of interest.

A sound level of 0 dBA is approximately the threshold of human hearing and is barely audible by a healthy ear under extremely quiet listening conditions. This threshold is the reference level against which the amplitude of other sounds is compared. Normal speech has a sound level of approximately 60 dBA. Sound levels above about 120 dBA begin to be felt inside the human ear as discomfort, progressing to pain at higher levels. An increase (or decrease) in sound level of about 10 dBA is usually perceived by the average person as a doubling (or halving) of the sound’s loudness.

Because of the logarithmic nature of the dB unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. However, some simple rules are useful in dealing with sound levels. First, if a sound’s intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. Thus, for example: 60 dB + 60 dB = 63 dB, and 80 dB + 80 dB = 83 dB. Remember however, that it requires about a 10 dB increase to double the perceived intensity of a sound and it is interesting to note that a doubling of the acoustical energy (a 3 dB increase) is at the lower limit of readily perceived change.

Although dBA may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most ambient environmental noise includes a mixture of noise from nearby and distant sources that creates an ebb and flow of sound including some identifiable sources plus a relatively steady background noise in which no particular source is identifiable. A single descriptor called the equivalent sound level (L_{eq}) is used to describe sound that is constant or changing in level. L_{eq} is the energy-mean dBA during a measured time interval. It is the “equivalent” constant sound level that would have to be produced by a given constant source to equal the acoustic energy contained in the fluctuating sound level measured during the interval. In addition to the energy-average level, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the maximum L_{eq} (L_{max}) and minimum L_{eq} (L_{min}) indicators that represent the root-mean-square (RMS) maximum and minimum noise levels measured during the monitoring interval. The L_{min} value obtained for a particular monitoring location is often called the acoustic floor for that location.

To describe the time-varying character of environmental noise, the statistical or percentile noise descriptors L_{10}, L_{50}, and L_{90} may be used. These are the noise levels equaled or exceeded during 10 percent, 50 percent, and 90 percent of the measured time interval. Sound levels associated with L_{10} typically describe transient or short-term events. L_{50} represents the median sound level during the measurement interval, while L_{90} levels are typically used to describe background noise conditions.

The Day-Night Average Sound Level (L_{dn} or DNL) represents the average sound level for a 24-hour day and is calculated by adding a 10 dB penalty only to sound levels during the night period (10:00 p.m. to 7:00 a.m.). The L_{dn} is the descriptor of choice used by nearly all federal, state, and local agencies throughout the United States to define acceptable land use compatibility with respect to noise. Within the State of California, the Community Noise Equivalent Level (CNEL) is sometimes used. CNEL is very similar to L_{dn}, except that an additional 5 dB penalty is applied to the evening hours (7:00 p.m. to 10:00 p.m.). Because of the time-of-day penalties associated with the L_{dn} and CNEL descriptors, the L_{dn} or CNEL dBA value for a continuously operating sound source during a 24-hour period will be numerically greater than the dBA value of the 24-hour L_{eq}. Thus, for a continuously operating noise source producing a constant noise level operating for periods of 24 hours or more, the L_{dn} will be 6 dB higher than the 24-hour L_{eq} value. To provide a frame of reference, common sound levels are presented in Table 1, “Sound Levels of Typical Noise Sources and Noise Environments”.

Table 1: Sound Levels of Typical Noise Sources and Noise Environments (A-Weighted Sound Levels)

Noise Source (at Given Distance)	**Scale of A-Weighted Sound Level in Decibels**	**Noise Environment**	**Human Judgment of Noise Loudness (Relative to a Reference Loudness of 70 Decibels*)**
Military Jet Take-off with After-burner (50 ft)	140	Carrier Flight Deck	–
Civil Defense Siren (100 ft)	130	–	–
Commercial Jet Take-off (200 ft)	120	–	**Threshold of Pain** *32 times as loud
Pile Driver (50 ft)	110	Rock Music Concert	*16 times as loud
Ambulance Siren (100 ft) Newspaper Press (5 ft) Power Lawn Mower (3 ft)	100		**Very Loud** *8 times as loud
Propeller Plane Flyover (1,000 ft) Diesel Truck, 40 mph (50 ft)	90	Boiler Room Printing Press Plant	*4 times as loud

Table 1: Sound Levels of Typical Noise Sources and Noise Environments (A-Weighted Sound Levels)

Noise Source (at Given Distance)	Scale of A-Weighted Sound Level in Decibels	Noise Environment	Human Judgment of Noise Loudness (Relative to a Reference Loudness of 70 Decibels*)
Motorcycle (25 ft)			
Garbage Disposal (3 ft)	80	High Urban Ambient Sound	*2 times as loud
Passenger Car, 65 mph (25 ft) Living Room Stereo (15 ft) Vacuum Cleaner (3 ft)	70	–	**Moderately Loud** *70 decibels (Reference Loudness)
Air Conditioning Unit (100 ft) Normal Conversation (5 ft)	60	Data Processing Center Department Store	*1/2 as loud
Light Traffic (100 ft)	50	Private Business Office	*1/4 as loud
Bird Calls (distant)	40	Lower Limit of Urban Ambient Sound	**Quiet** *1/8 as loud
Soft Whisper (5 ft)	30	Quiet Bedroom	**Very Quiet**
	20	Recording Studio	
	10	–	**Extremely Quiet**
	0	–	**Threshold of Hearing**

Source: Compiled by URS Corporation from various published sources and widely-used references such as The Handbook of Acoustical Measurements and Noise Control, Third Edition, edited by C.M. Harris, 1991; Federal Agency Review of Selected Airport Noise Analysis Issues, 1992, Modified by The Louis Berger Group, Inc., 2004 and Noise and Vibration Control, Second Edition, edited by L.L. Beranek, 1988 Institute of Noise Control Engineering.

Figure 1. Project Site (CHANGE)

1.5 Applicable Noise Criteria

Federal and state governments do not provide any specific guidelines for construction noise other than OSHA guidelines for worker protection. The proposed project is located in the vicinity of four convergent jurisdictions: the City of Folsom, Sacramento County, Placer County, and El Dorado County. Construction noise from the project may impact noise sensitive receptors in each of these four jurisdictions. Noise sensitive receptors consist of both human receptors and wildlife receptors. The applicable noise ordinances for each of the four jurisdictions are discussed and summarized in this section.

Each jurisdiction has its own unique standards regarding noise and nuisance. These standards are set out in county or municipal codes and general plans. Each noise ordinance and/or noise element within a municipal/county code or general plan will address noise levels that create a nuisance on surrounding communities. Noise ordinances occasionally classify different districts within these communities based on zoning standards. Such zones can include residential areas (analyzed further based on the density of the population), industrial areas, commercial areas, agricultural areas and rural areas, among many more. The possible adverse effects of construction noise are included in municipal noise ordinances.

Noise levels, the ambient noise environment, the distance from the noise source to the receiver, the time of day, the duration of the noise and the zoning of the areas in question are all considered when considering the adverse effects of noise. All municipal codes categorize noise by decibel levels that are A-weighted (dBA). Most standards use a baseline originating from the L_{50}, which reflects the 50^{th} percentile of sound measured at one-second intervals throughout a given timeframe. This 50^{th} percentile means that half of the measured one-second noise levels within the given timeframe will fall below this number and half of the measured one-second noise levels will be above this number. Therefore, if a noise source is generating noise levels over a given timeframe, the 50^{th} percentile of the one-second noise levels that are being generated cannot exceed the L_{50} metric found in the noise standard. Alternatively some standards are expressed as hourly continuous noise equivalent levels (L_{eq}) in order to reflect the sound levels over a given timeframe, which is an hour in this case, as a measurement that would equal the same energy of the fluctuating sound level over the entire time that a measurement was taken. An hourly L_{eq} will be a higher level than an L_{50} because it is taking the top 50^{th} percentile into account while the L_{50} does not.

Noise generated by off-site vehicular traffic is related to construction activities. These activities are temporary in nature and have no operational noise impacts.

1.5.1 City of Folsom

The City of Folsom uses L_{50} as the baseline criterion noise metric. Construction noise is exempt from these regulations during the periods of 7:00 a.m. to 6:00 p.m. on weekdays and 8:00 a.m. to 5:00 p.m. on weekends. If construction were to occur outside of these periods, activities would be required to comply with exterior and interior noise limits at residential receptors, as summarized in Table 2. In the event the measured ambient noise level exceeds the applicable noise level standard in Table 2, the applicable standard shall be adjusted so as to equal the ambient noise level. For impulse noise (such as impact pile driving or blasting), the limits are reduced by 5 dBA.

Table 2: Noise Ordinance Standards (City of Folsom)*

			Noise Levels Not To Be Exceeded In Residential Zone (dBA)**	
Exterior Noise Standards	Maximum Time of Exposure	Noise Metric	7 a.m. to 10 p.m. (daytime)	10 p.m. to 7 a.m. (nighttime)
	30 Minutes/Hour	L_{50}	50	45
	15 Minutes/Hour	L_{25}	55	50
	5 Minutes/Hour	$L_{8.3}$	60	55
	1 Minute/Hour	$L_{1.7}$	65	60
	Any period of time	L_{max}	70	65
Interior Noise Standards				
	5 Minutes/Hour	$L_{8.3}$	45	35
	1 Minute/Hour	$L_{1.7}$	50	40
	Any period of time	L_{max}	55	45

*Construction Noise Exemption Times: 7:00 a.m. - 6:00 p.m. Weekdays
8:00 a.m. - 5:00 p.m. Weekends
**5 dBA reduction for impact noise during non-exempt times
SOURCE: City of Folsom, CA Municipal Code. Chapter 8.42, Table 8.42.040

1.5.2 Sacramento County

Like the City of Folsom, the Sacramento County Noise Ordinance specifies noise levels in terms of L_{50}. Construction noise levels are exempt from 6:00 a.m. to 8:00 p.m. on weekdays and 7:00 a.m. to 8:00 p.m. on weekends. If construction were to occur outside of these periods, activities would be required to comply with exterior and interior noise limits at residential receptors, as summarized in Table 3. For impulse noise (such as impact pile driving or blasting), the limits are reduced by 5 dBA.

Table 3: Noise Ordinance Standards (Sacramento County)*

			Noise Levels Not To Be Exceeded In Residential Zone (dBA)**	
Exterior Noise Standards	Maximum Time of Exposure	Noise Metric	7 a.m. to 10 p.m. (daytime)	10 p.m. to 7 a.m. (nighttime)
	30 Minutes/Hour	L_{50}	55	50
	15 Minutes/Hour	L_{25}	60	55
	5 Minutes/Hour	$L_{8.3}$	65	60
	1 Minute/Hour	$L_{1.7}$	70	65
	Any period of time	L_{max}	75	70
Interior Noise Standards				
	5 Minutes/Hour	$L_{8.3}$	-	-
	1 Minute/Hour	$L_{1.7}$	-	-
	Any period of time	L_{max}	-	-

*Construction Noise Exemption Times: 6:00 a.m. - 8:00 p.m. Weekdays
7:00 a.m. - 8:00 p.m. Weekends

**5 dBA reduction for impact noise during non-exempt times

SOURCE: Sacramento County Municipal Code, Chapter 6.68.070.

1.5.3 Placer County

Placer County, unlike Sacramento County and the City of Folsom, prescribes an hourly L_{eq} instead of an L_{50} standard and specifies that noise levels should be measured at the property line. Similar to Sacramento County and Folsom, construction noise is exempt from 6:00 a.m. to 8:00 p.m. on weekdays and 8:00 a.m. to 8:00 p.m. on weekends. If construction were to occur outside of these periods, activities would be required to comply with exterior and interior noise limits at residential receptors, as summarized in Table 4. For impulse noise (such as impact pile driving or blasting), the limits are reduced by 5 dBA. A variance may be applied for if noise levels are expected to exceed these limits.

Table 4: Noise Ordinance Standards (Placer County)*

Sound Level Descriptor	Noise Levels Not To Be Exceeded in Residential Zone (dBA)**	
	7 a.m. to 10 p.m. (daytime)	10 p.m. to 7 a.m. (nighttime)
Hourly L_{eq}	55	45
Any Period of Time (L_{max})	70	65

*Construction Noise Exemption Times: 6:00 a.m. – 8:00 p.m. Weekdays
8:00 a.m. – 8:00 p.m. Weekends

**5 dBA reduction for impact noise during non-exempt times

SOURCE: Placer County Code, Chapter 9.36.

1.5.4 El Dorado County

The County of El Dorado Noise Element is contained within Chapter 6.5 of the El Dorado County General Plan. El Dorado County uses hourly L_{eq} in order to categorize noise disturbance, but further regulates noise according to land use zone, and applies different noise standards to each zone. Construction noise exempt times include 7:00 a.m. to 7:00 p.m. on weekdays and 8:00 a.m. to 5:00 p.m. on weekends and holidays. If construction were to occur outside of these periods, activities would be required to comply with exterior noise limits at residential receptors, as summarized in Table 5. For impulse noise (such as impact pile driving or blasting), the limits are reduced by 5 dBA. A variance may be applied for of noise levels are expected to exceed these limits, and would require noise monitoring. El Dorado County adds an hourly evening L_{eq} between 7:00 p.m. to 10:00 p.m. As shown in Table 5, the evening L_{eq} takes the last three hours from the daytime L_{eq} and applies a different criterion. In addition to adding an evening standard, community and rural districts are split and given distinct criteria. A 5 dBA reduction in all noise level limits will be applied for impulse noise.

Tables 6, 7 and 8 categorize separate zones and the construction noise standards that apply to each of the regions and the planned land use in each region. Table 6 refers to areas that are community regions or adopted plan areas. Table 7 refers to areas that are designated as rural centers. Table 8 refers to areas that are rural regions. According to Policy 6.5.1.12 of the El Dorado County General Plan, at outdoor activity areas of residential use, if the existing or projected future traffic levels are less than 60 dBA L_{dn} and there is going to be more than a 5 dBA L_{dn} increase in level from new traffic, this is considered significant. If the levels are or will be between 60 and 65 dBA L_{dn}, a 3 dBA L_{dn} increase or more is considered significant, and, finally, if the levels are or will be greater than 65 dBA L_{dn}, an increase of 1.5 dBA L_{dn} or more is considered significant. Increases in the L_{dn} that are greater than this will pose a problem and construction will need to be reassessed. Ambient noise level increases of more than 5 dBA will be deemed a nuisance if the ambient noise level is in accordance to

Table 5. If the ambient noise level is not in accordance with Table 6, then only a 3 dBA increase is allowed.

Table 5. Noise Level Performance Protection Standards For Noise Sensitive Land Uses Affected by Non-Transportation Sources (El Dorado County)*

Noise Level Descriptor	Noise Levels Not To Be Exceeded in Residential Zones (dBA)**					
	7 a.m. - 7 p.m. (daytime)		7 p.m. - 10 p.m. (evening)		10 p.m. - 7 a.m. (nighttime)	
	Community	Rural	Community	Rural	Community	Rural
Hourly L_{eq}	55	50	50	45	45	40
Any Period of Time (L_{max})	70	60	60	55	55	50

*Construction Noise Exemption Times: 7:00 a.m. – 7:00 p.m. Weekdays
8:00 a.m. – 5:00 p.m. Weekends/Holidays
**5 dBA reduction for impact noise during non-exempt times
SOURCE: El Dorado County General Plan, Chapter 6.5.

Table 6. Maximum Allowable Noise Exposure For Non-Transportation Noise Sources In Community Regions and Adopted Plan Areas - Construction Noise (El Dorado County)**

Land Use Designation	Time Period	Noise Level (dBA)**	
		L_{eq}	L_{max}
Higher-Density Residential	7 a.m. - 7 p.m.	55	75
	7 p.m. - 10 p.m.	50	65
	10 p.m. - 7 a.m.	45	60
Commercial and Public Facilities	7 a.m. - 7 p.m.	70	90
	7 p.m. - 7 a.m.	65	75
Industrial	Any Time	80	90

Table 7. Maximum Allowable Noise Exposure For Non-Transportation Noise Sources In Rural Centers - Construction Noise (El Dorado County)*

Land Use Designation	Time Period	Noise Level (dBA)**	
		L_{eq}	L_{max}
All Residential	7 a.m. - 7 p.m.	55	75
	7 p.m. - 10 p.m.	50	65
	10 p.m. - 7 a.m.	40	55
Commercial, Recreation, and Public Facilities	7 a.m. - 7 p.m.	65	75
	7 p.m. - 7 a.m.	60	70
Industrial	Any Time	70	80
Open Space	7 a.m. - 7 p.m.	55	75
	7 p.m. - 7 a.m.	50	65

Table 8. Maximum Allowable Noise Exposure For Non-Transportation Noise Sources In Rural Regions - Construction Noise (El Dorado County)*

Land Use Designation	Time Period	Noise Level (dBA)**	
		L_{eq}	L_{max}
All Residential	7 a.m. - 7 p.m.	55	75
	7 p.m. - 10 p.m.	50	6
	10 p.m. - 7 a.m.	40	55
Commercial, Recreation, and Public Facilities	7 a.m. - 7 p.m.	65	75
	7 p.m. - 7 a.m.	60	70
Rural Land, Natural Resources, Open Space and Agricultural Land	7 a.m. - 7 p.m.	70	80
	7 p.m. - 7 a.m.	55	75

1.5.5 Wildlife Noise Criteria

Potential noise-sensitive biological receptors were identified by project biologists within a five-mile radius of the project site (Figure 2). Eight potential sites were identified: all are nesting or rookery habitat for four bird species. These include the tri-colored blackbird (*Agelaius tricolor*), great egret (*Casmerodius albus*), great blue heron (*Ardea herodias*), and white-tailed kite (*Elanus leucurus*).

Noise criteria for these species have not been designated. The Draft Comprehensive Species Management Plan for the least Bell's vireo evaluated the potential for masking of least Bell's vireo (*Vireo bellii pusillus*) song by traffic noise and recommended that continuous noise levels above 60 dBA L_{eq} within habitat areas may affect the suitability of habitat use by least Bell's vireo (SANDAG 1988). Since then, many regulatory agencies recommend the use of 60 dBA L_{eq} hourly levels to be considered a significant impact for sensitive avian species at the edge of suitable habitat.

In the absence of species specific criteria, the 60 dBA L_{eq} will be used to determine noise impacts on wildlife.

The National Oceanic and Atmospheric Administration (NOAA) Fisheries and U.S. Fish and Wildlife Service (USFWS) have agreed upon the use of interim criteria for injury to fish from pile driving or blasting. The current thresholds for injury are 206 dB peak, 187 dB cumulative SEL for fish greater than 2 grams, and 183 dB cumulative SEL for fish less than 2 grams. The current threshold for disturbance is 150 dB RMS.

1.5.6 Assessment Criteria

In order to determine the noise effects of the project, the closest jurisdiction with the most restrictive noise level guidelines will be used as the construction noise level criterion threshold for most project-related activities on human sensitive receptors. For the purpose of this project, the City of Folsom’s noise standards will be followed as Folsom is the closest jurisdiction and has the most restrictive noise ordinance. Project compliance with City of Folsom standards will guarantee project compliance with all relevant ordinances.

Where construction activities would be conducted outside of the City of Folsom construction noise exempt times, then the exterior noise standards limits are used to determine impact significance. In the event the measured ambient noise level exceeds the applicable noise level standard in Table 2, the applicable standard shall be adjusted so as to equal the ambient noise level. If the ambient noise level is above 50 dBA, then this becomes the new standard at each individual noise-sensitive receptor.

The 60 dBA L_{eq} will be used to determine noise impacts on birds and the noise impacts on fish will be addressed qualitatively.

Figure 2. Ambient Noise Level Measurement and Modeling Locations

1.6 Existing Noise Environment

The proposed project would be located in City of Folsom on the south side of Folsom Lake. The proposed project area would be located southeast of the Folsom Dam, east of American River and northwest of Folsom Point Park (See Figure 2). As shown in Figure 2, there are four proposed staging areas:

- the MIAD disposal area
- the Dike 7 staging area northeast of the intersection of Folsom Lake Crossing and East Natoma Street
- the Overlook staging area located directly west of the proposed spur dike
- the Prison staging area located southeast of Folsom Lake Crossing and north of Folsom Prison Road and just east of the American River.

Folsom State Prison is located south of the proposed project area, on the far side of Lamb Chop Hill. The haul road, which would be used to transport material from the approach channel to disposal areas, extends east from the proposed project area along the edge of Folsom Lake to the disposal sites located on the northwest side of the intersection of East Natoma Street and Green Valley Road. The proximity of the haul road to noise-sensitive receivers is less than 1,000 feet along sections of Mountain View Drive and Elvie Lane and runs just south of Folsom Point Park. Several residential areas within the project vicinity may be affected by noise from approach channel excavation, spur dike construction, transload facility construction and removal, staging area operations, blasting and traffic.

1.6.1 Noise-Sensitive Receptors

Noise-sensitive receptors are defined as areas where there is a reasonable expectation of quiet and correspondingly high degree of sensitivity to noise. These areas include human dwellings, hospitals, schools, churches,libraries and recreational areas. Wildlife may also be sensitive to noise, and certain types of habitat, such as nesting areas for migratory or special status birds, may be considered noise-sensitive receptors. Figure 2 depicts site locations for all measured human and wildlife sensitive receptors.

There are several areas within the City of Folsom that are classified as noise-sensitive receptors (See Figure 2). By jurisdiction, these include:

- Folsom State Prison. The prison is located approximately 2,700 feet south of proposed approach channel excavation activities, 2,300 feet west of the proposed Dike 7 staging area, and is considered a residential area.
- A residential neighborhood located approximately 5,700 feet west of proposed approach channel excavation activities and the Overlook staging area. The residential community is an apartment complex located west of American River and east of the Folsom Auburn Road and Pierpoint Circle intersection.
- A large neighborhood that stretches from the western intersection of Briggs Ranch Drive and East Natoma Street to the intersection of Green Valley Road and East Natoma Street. Residences in this neighborhood

are located approximately 3,700 feet south of proposed approach channel excavation activities, 1,000 feet south of the Dike 7 staging area, and approximately 600 feet south of the MIAD disposal and staging areas.

- Several residences scattered throughout the area located immediately west of Folsom Point Park and Folsom Lake Crossing. These single-family residences are located within 500 feet of the haul road and 400 feet of the Dike 7 Staging Area. The closest residences to the proposed approach channel excavation activities are located at the western end of Mountain View Drive and the western end of Lorena Lane. These residences are located approximately 3,300 feet southeast of proposed approach channel excavation activities.
- Folsom Point Park. The park is located approximately 4,800 feet southeast of proposed approach channel excavation activities and within 500 feet of the proposed Dike 7 staging area and MIAD disposal area.
- The Folsom Point Church of Christ, which is located directly south of the boundary of the proposed Dike 8 disposal area. The church is located at the northwest corner of the intersection of East Natoma Street and Briggs Ranch Drive and is approximately 300 feet south of the Dike 8 disposal area and 800 feet west of the MIAD disposal and staging areas.
- A residential community located approximately 8,000 feet southeast of proposed approach channel excavation activities and across the street from the MIAD disposal and staging areas. This community is located at the northeast corner of Green Valley Road and East Natoma Street.
- Two residences located directly southwest of the boundary of the proposed MIAD staging area. These homes are located at the northeast corner of Briggs Ranch Drive and East Natoma Street. The nearest residence is located approximately 300 feet southwest of the MIAD staging area.

Within Placer County, the Beals Point campground is located about 8,600 feet northwest of proposed approach channel excavation activities. This park is located east of where State Rec Area Road and Beals Point intersect.

The only sensitive receptors in El Dorado County that could be affected by construction noise are located in a community along Agora Way, Shadowfax Lane and Shadowfax Court. This community is approximately 2,500 feet east from the MIAD disposal and staging areas and 10,500 feet from proposed approach channel excavation activities.

Wildlife Receptors. As discussed in section 1.5.5, eight potential sensitive sites for wildlife were identified within five miles of proposed approach channel excavation activities; all are protected habitat for nesting birds (Figure X, Bio-1 through Bio 8). Habitats for the tri-colored blackbird are found at three locations (Bio-4, Bio-6, and Bio-8), that are over 2 miles from proposed approach channel excavation activities to the south, southeast, and northwest, respectively. The great egret habitat (Bio-1) is located over 4 miles southwest of proposed approach channel excavation activities. Habitat for the great blue heron (Bio-2) is found approximately 5,000 feet west of proposed approach channel excavation activities and approximately 1,500 feet west of the proposed Prison staging area. This is the closest sensitive bio-receptor. White-tailed kite habitats (Bio-3, Bio-5, and Bio-7) are located over 1.8 miles to the southwest and southeast from proposed approach channel excavation activities.

1.6.2 Ambient Noise Survey

An ambient noise level survey was conducted between March 24 and March 26, 2009 in the project area to characterize existing noise conditions. The survey consisted of short-term (10 minutes) and long-term measurements (24-hours) at noise-sensitive receptors and wildlife habitats. Weather conditions were consistent over the three days of noise monitoring. The temperature ranged from 55 degrees Fahrenheit at night to 75 degrees Fahrenheit during the day. Winds were mild to 6 or 7 miles per hour during noise monitoring. Long-term measurements were conducted using three Larson Davis Model 820 ANSI (American National Standards Institute) Type 1 Integrating Sound Level Meters (Serial Numbers 1527, 1528 and 1598). The sound level meters were bolted to trees, telephone poles or fences approximately five feet above the ground in order to approximate the height of the human ear. Short-term monitoring was conducted using a Bruel and Kjaer Model 2250 ANSI Type 1 Integrating Sound Level Meter (Serial Number 2672071). All sound level meters were calibrated before and after the measurement periods with a Larson Davis Model CAL200 calibrator (Serial Number 2794). All sound level measurements conducted by URS were in accordance with ISO 1996a, b, c.

The long-term and short-term measurement sites for human noise-sensitive receptors are summarized in Table 9 and Table 10, respectively. All long-term and short-term measurement sites are representative of single-family homes or communities near the project site. Table 11 shows measurement sites for wildlife receptors. Figure 2 illustrates the locations of all ambient noise measurement locations. Additional modeling locations can be found in Figure 2. These modeling locations were necessary for noise modeling purposes due to the residences being near proposed construction activities.

Table 9. Long-Term Measurement Sites

Site ID	Location
LT-2	Tacana Drive and East Natoma Street
LT-3	Mountain View Drive
LT-4	East Natoma Street and Green Valley Road
LT-5	Shadowfax Court
LT-6	East of Folsom Auburn Road and Pierpoint Circle

Table 10. Short-Term Measurement Sites

Site ID	Location
ST-2	Tacana Drive and East Natoma Street
ST-3	Mountain View Drive

ST-4	East Natoma Street and Green Valley Road
ST-5	Shadowfax Court
ST-6	East of Folsom Auburn Road and Pierpoint Circle
ST-7	Beals Point
ST-8	Folsom Point

Table 11. Noise Sensitive Wildlife Receptor Sites

Site ID	Location	Relevant Specie
Bio-1	Main Avenue and Sunset Avenue	Great Egret
Bio-2	5,000 Feet West of Proposed Excavation Site (near American River)	Great Blue Heron
Bio-3	Erwin Avenue and Snipes Boulevard (Snipes-Pershing Park)	White-Tailed Kite
Bio-4	South Lexington Drive and Oak Avenue Parkway	Tri-Colored Blackbird
Bio-5	Willow Bend Road and Grey Fox Court	White-Tailed Kite
Bio-6	Haddington Drive and East Natoma Street	Tri-Colored Blackbird
Bio-7	Sturbridge Drive and Stonemill Drive	White-Tailed Kite
Bio-8	Wellington Way and Grizzly Way	Tri-Colored Blackbird

1.6.3 Long-Term Site Monitoring

Five long-term measurements were conducted. Long-term data was not collected at the Folsom State Prison (LT-1) as prison security did not allow access to Prison property. In place of monitoring data for LT-1, construction noise levels were modeled at the prison on both the north and east sides of the prison in order to account for noise levels due to construction. Table 12 summarizes the long-term measurement site data for all other LT sites. The raw data for each long-term measurement site is provided in Appendix A-Noise.

Table 12. Long-Term Measurement Site Data

Site ID	Location	Start Date	Start Time	Hourly L_{eq} Range (dBA)	CNEL (dBA)
LT-2	Tacana Drive and E. Natoma	3/25/2009	17:00:00	51.5 - 69.4	71

	St.				
LT-3	Mountain View Dr.	3/25/2009	15:00:00	32.8 - 50.9	50
LT-4	E. Natoma St. and Green Valley Rd.	3/24/2009	14:00:00	58.0 - 75.2	76
LT-5	Shadowfax Court	3/24/2009	13:00:00	34.1 - 57.5	51
LT-6	East of Folsom Auburn Rd. and Pierpoint Circle	3/24/2009	15:00:00	31.7 - 56.8	50

Hourly L_{eq}s ranged from 31.7 to 75.2 dBA and from 50 to 76 dBA CNEL depending on the location of the long-term measurement location.

1.6.4 Short-Term Site Monitoring

Eight short-term measurements were conducted during the day (7:00 a.m.-7:00 p.m.), evening (7:00 p.m.-10:00 p.m.) and night (10:00 p.m.-7:00 a.m.) periods for all of the corresponding long-term measurement sites except for LT-1, or Folsom State Prison, where no measurements were completed due to security concerns. Each measurement lasted a total of 10 minutes. Short-term measurement Site 7 (ST-7) is located at Beals Point Campground. Beals Point Campground is located 8,600 feet northwest of the proposed Project area. Only daytime measurements could be completed here due to campground closure during the evening and nighttime periods. The campground is located on the west side of Lake Folsom. ST-8 is the measurement site located at Folsom Point Park. The haul road runs just south of Folsom Point Park. The proposed MIAD disposal and staging areas and Dike 8 disposal area are located directly south of Folsom Point Park as well. The park is located approximately 4,800 feet southeast of proposed approach channel excavation activities. Daytime and evening measurements were conducted. Nighttime measurements were not conducted as the park is closed after 10:00 p.m. The data for all short-term measurements can be found in Appendix B.

1.6.5 Sensitive Wildlife Receptor Monitoring

Short-term day, evening, and night ambient noise level measurements were completed at eight noise-sensitive wildlife locations. Table 11 identifies the species as well as the location of each wildlife receptor site. The data for these locations can be found in Appendix C.

2.0 IMPACTS

2.1 Noise Prediction Model

Potential noise impacts for the proposed project are predicted using Cadna/A for approach channel excavation, spur dike construction, transload facility construction and removal, disposal area, and staging area activities. BNoise2 is used to model noise impacts from blasting. Cadna/A is a Windows-based computer software modeling program that allows for the input of sound sources and their corresponding noise source output levels. Cadna/A takes both topography and attenuation due to sound wave divergence into account in order to produce accurate results. BNoise2 is a computer software program that allows for the user to model blast noise sound levels over a specified range. BNoise2 generates results by taking both the type and amount of charge used when blasting is taking place.

Noise impacts due to proposed construction activities from Alternatives 2 and 3 are analyzed separately. The Microsoft Excel spreadsheet titled “Equipment Estimate Summary” provided by the USACE, dated October 24, 2011, is used in order to estimate the worst-case noise impact scenarios at human and wildlife noise-sensitive receivers during the year in which the noisiest construction activities would presumably occur for both Alternatives 2 and 3. A condensed version of the Equipment Estimate Summary for both Alternatives 2 and 3 can be found in Appendix D.

Due to the vast amount of construction equipment and the indefinite construction phasing schedule listed in the Equipment Estimate Summary spreadsheet, if any individual construction activity that is listed to occur at all during any particular year, it is assumed that that particular construction activity could possibly occur at the same time as all other construction activities that may be conducted during that year. This methodology provides the annual worst-case noise impact scenario that would occur sometime in between the years 2013 and 2017. Non-exempt hour construction activities are analyzed separately. The noisiest activities for Alternative 2 would occur in 2017 and the noisiest construction activities for Alternative 3 would occur in 2013.

2.1.1 Construction Noise Levels

Construction noise levels are analyzed at the noise-sensitive receivers. Table 13 displays the equipment levels found in the Federal Highway Administration’s Roadway Construction Noise Model’s (RCNM) User Guide (FHWA RCNM, Version 1.0 User’s Guide). The reference noise sources are presented in order of descending loudness from an impact pile driver, to a refrigerator unit. The column on the right indicates the distance at which the noise level from the referenced equipment will fall to the criterion level. The “Actual Measured L_{max} at 50 feet” is used to calculate this distance unless it reads “N/A”. If the table indicates “N/A”, the specifications (Spec. 721.560) taken from the “Big Dig” in Boston are used. The “Big Dig” was a large Central Artery/Tunnel Project that utilized many types of construction equipment. During the construction of the project, noise measurements were conducted to quantify equipment noise levels..

Table 13. RCNM Default Noise Emission Reference Levels and Usage Factors

Equipment Description	Acoustical Usage Factor	Spec. 721.560 Lmax @ 50ft (dBA, slow)	Actual Measured Lmax @ 50ft (dBA, slow) samples avg.	Number of Actual Data Samples (Count)	Distance At Which Level = 50 dBA (45 dBA impact) (in feet)	Distance At Which Level = 45 dBA (40 dBA impact) (in feet)
Impact Pile Driver**	20	95	101	11	31,548	56,101
Vibratory Pile Driver	20	95	101	44	17,741	31,548
Sand Blasting (single nozzle)	20	85	96	9	9,976	17,741
Sheers (on backhoe)	40	85	96	5	9,976	17,741
Hydra Break Ram**	10	90	N/A	0	8,891	15,811
Mounted Impact Hammer (hoe ram)**	20	90	90	212	8,891	15,811
Jackhammer**	20	85	89	133	7,924	14,092
Clam Shovel (dropping)**	20	93	87	4	6,295	11,194
Blasting**	50	85	N/A	0	5,000	8,891
Concrete Saw	20	90	90	55	5,000	8,891
Pavement Scarifier	20	85	90	2	5,000	8,891
Vibrating Hopper	50	85	87	1	3,540	6,295
All Other Equipment > 5 HP	50	85	N/A	0	2,812	5,000
Compressor (air)	50	85	N/A	0	2,812	5,000
Generator(<25KVA, VMS Signs)	50	85	N/A	0	2,812	5,000
Grader	40	85	N/A	0	2,812	5,000
Horizontal Boring Hydraulic Jack	50	85	N/A	0	2,812	5,000
Pneumatic Tools	50	85	85	90	2,812	5,000
Vacuum Excavator (Vac-Truck)	40	85	85	149	2,812	5,000
Auger Drill Rig	20	85	84	36	2,506	4,456
Chain Saw	20	85	84	46	2,506	4,456
Flat Bed Truck	40	84	N/A	0	2,506	4,456
Rivet Buster/Chipping Gun**	20	85	79	19	2,506	4,456

Table 13. RCNM Default Noise Emission Reference Levels and Usage Factors

Equipment Description	Acoustical Usage Factor	Spec. 721.560 Lmax @ 50ft (dBA, slow)	Actual Measured Lmax @ 50ft (dBA, slow) samples avg.	Number of Actual Data Samples (Count)	Distance At Which Level = 50 dBA (45 dBA impact) (in feet)	Distance At Which Level = 45 dBA (40 dBA impact) (in feet)
Scraper	40	85	84	12	2,506	4,456
Tractor	40	84	N/A	0	2,506	4,456
Boring Jack Power Unit	50	80	83	1	2,233	3,972
Concrete Batch Plant	15	83	N/A	0	2,233	3,972
Gradall	40	85	83	70	2,233	3,972
Warning Horn	5	85	83	12	2,233	3,972
Dozer	40	85	82	55	1,991	3,540
Grapple (on backhoe)	25	80	82	6	1,991	3,540
Vacuum Street Sweeper	10	80	82	19	1,991	3,540
Concrete Pump Truck	20	82	81	30	1,774	3,155
Crane	16	85	81	405	1,774	3,155
Excavator	40	85	81	170	1,774	3,155
Generator	50	82	81	19	1,774	3,155
Pumps	50	77	81	17	1,774	3,155
Rock Drill	20	85	81	3	1,774	3,155
Bar Bender	20	80	N/A	0	1,581	2,812
Drum Mixer	50	80	80	1	1,581	2,812
Roller	20	85	80	16	1,581	2,812
Slurry Trenching Machine	50	82	80	75	1,581	2,812
Soil Mix Drill Rig	50	80	N/A	0	1,581	2,812
Vibratory Concrete Mixer	20	80	80	1	1,581	2,812
Concrete Mixer Truck	40	85	79	40	1,409	2,506
Drill Rig Truck	20	84	79	22	1,409	2,506
Front End Loader	40	80	79	96	1,409	2,506
Ventilation Fan	100	85	79	13	1,409	2,506
Backhoe	40	80	78	372	1,256	2,233

Table 13. RCNM Default Noise Emission Reference Levels and Usage Factors

Equipment Description	Acoustical Usage Factor	Spec. 721.560 Lmax @ 50ft (dBA, slow)	Actual Measured Lmax @ 50ft (dBA, slow) samples avg.	Number of Actual Data Samples (Count)	Distance At Which Level = 50 dBA (45 dBA impact) (in feet)	Distance At Which Level = 45 dBA (40 dBA impact) (in feet)
Compactor (ground)	40	80	78	18	1,256	2,233
Slurry Plant	100	78	78	1	1,256	2,233
Paver	50	85	77	9	1,119	1,991
Dump Truck	40	84	76	31	998	1,774
Man Lift	20	85	75	23	889	1,581
Pickup Truck	40	55	75	1	889	1,581
Welder/Torch	40	73	74	5	792	1,409
Refrigerator Unit	100	82	73	3	706	1,256

Several assumptions are made regarding construction activities, not including blasting, and they include:

- Normal staging area construction operations include 2 dozers, 2 dump trucks and a batch plant at all four proposed staging areas for both Alternatives 2 and 3.
- For both Alternatives 2 and 3, rock crushing activities would occur at either the MIAD staging area or at the overlook staging area and would not occur during non-exempt construction noise activities.
- Normal disposal area construction operations include 2 dozers and 2 dump trucks for both Alternatives 2 and 3.
- For Alternative 2, the worst case annual noise construction level year is 2017, and there would be approximately 13,167 annual truck round-trips along the on-site haul road going to and from the MIAD, Dike 7, and Dike 8 areas and the spur dike construction area.
- For Alternative 3, the worst case annual noise construction level year is 2013, and there would be approximately 8,960 annual truck round-trips along the on-site haul road going to and from the Dike 8 and MIAD disposal areas and the approach channel excavation area; 900 annual truck round-trips going to and from the transload facility and the MIAD. Dike 7, and Dike 8 areas, and 3,740 annual truck round-trips to move cofferdam cell fill material that would be assumed to be coming from Dike 8 and the MIAD areas. The total annual truck round-trips along the on-site haul road in 2013 is 13,600.

- Using the total number of annual truck round-trips along the on-site haul road for both Alternatives 2 and 3, there would be approximately 4.5 truck round-trips per day that will be used for modeling purposes.

2.1.2 Construction Schedules and Durations for Alternatives 2 and 3

Construction of both Alternatives 2 and 3 would begin in mid-2013 and end in late 2017. Tables 14 and 15 provide the schedule for all construction activities listed in the Equipment Estimate Summary for Alternatives 2 and 3, respectively. The tables list construction activities and the year(s) in which they may occur. Additional construction activities listed in the table, but not listed on the original provided Equipment Estimate Summary, include all five staging and/or disposal area construction activities; and on-site haul road usage going to and from the MIAD and Project site during approach channel excavation and spur dike construction; and on-site haul road usage going to and from the MIAD and transload facility during construction of the transload facility.

There would only be one batch plant located at one of the four proposed staging areas. Batch plant operations have the potential to be conducted during non-exempt construction noise hours. All potential non-exempt construction noise activities are marked with an asterisk. Rock crushing activities would be conducted at either the MIAD staging area or Overlook staging area. In Tables 14 and 15, for each year, every construction activity is marked if it would occur at some time during that year.

For both Alternatives 2 and 3, blasting would take place in between February 2014 and August 2017. Blasting activities are not listed in Tables 14 and 15. Potential noise impacts from blasting activities are analyzed separately.

Table 14. Alternative 2 Proposed Construction Activities by Year

Construction Activity	2013	2014	2015	2016	2017
Site Prep / Haul Road Prep	X				
Construct Transload Facility*	X				
Haul Road Embankment*	X	X			
Cutoff Wall Concrete Placement*	X	X			
Common Excavation to Disposal*	X	X	X	X	X
MIAD Staging Area w/ Rock Crusher	X	X	X	X	X
MIAD Staging Area w/ Batch Plant*	X	X	X	X	X
MIAD Disposal and Staging Area*	X	X	X	X	X
Overlook Staging Area w/ Rock Crusher	X	X	X	X	X
Overlook Staging Area w/ Batch Plant*	X	X	X	X	X
Overlook Staging Area*	X	X	X	X	X
Prison Staging Area w/ Batch Plant*	X	X	X	X	X
Prison Staging Area*	X	X	X	X	X
Dike 7 Staging Area*	X	X	X	X	X
Dike 8 Disposal Area*	X	X	X	X	X
On-Site Haul Road Usage to and From	X	X	X	X	X

Construction Activity	2013	2014	2015	2016	2017
Excavation Site and MIAD*					
On-Site Haul Road Usage for Construction of Transload Facility*	X				
Rock Excavation In-the-Dry*	X	X	X	X	X
Mobilization for Approach Walls*		X	X		
Intake Approach Walls and Slab Construction*		X	X	X	
Set up and Operate Silt Curtain/ possible Bubble Curtain**	X	X	X	X	X
Import of Construction Material*	X	X	X		
Dredge Common Material to Rock*	X	X	X	X	
Drill and Blast / Dredge Rock In-the-Wet***			X	X	X
Spur Dike Riprap***			X	X	X
Transfer Excavated Material to Disposal Site***	X	X	X	X	X
Teardown, Clean Up, and Site Restoration***				X	X
Remove Transload Facility***					X
On-Site Haul Road Usage for Removal of Transload Facility*					X

*potential nighttime construction activity

**potential nighttime construction activity (four 1500 CFM compressors only), if needed;

***nighttime activity with exception of blasting

Table 15. Alternative 3 Proposed Construction Activities by Year

Construction Activity	2013	2014	2015	2016	2017
Mobilization for Cofferdam	X	X			
Construct Transload Facility*	X				
Common Excavation Below Cofferdam*	X				
Common Dredge Below Cofferdam*	X				
Construction of Sheet Pile Cells*	X	X			
Fill Cells*	X	X			
Set up and Operate Silt Curtain**	X	X	X	X	X
MIAD Staging Area w/ Rock Crusher	X	X	X	X	X
MIAD Staging Area w/ Batch Plant*	X	X	X	X	X
MIAD Disposal and Staging Area*	X	X	X	X	X
Overlook Staging Area w/ Rock Crusher	X	X	X	X	X
Overlook Staging Area w/ Batch Plant*	X	X	X	X	X

Construction Activity	2013	2014	2015	2016	2017
Overlook Staging Area*	X	X	X	X	X
Prison Staging Area w/ Batch Plant*	X	X	X	X	X
Prison Staging Area*	X	X	X	X	X
Dike 7 Staging Area*	X	X	X	X	X
Dike 8 Disposal Area*	X	X	X	X	X
On-Site Haul Road Usage to and From Excavation Site and MIAD*	X	X	X	X	X
On-Site Haul Road Usage for Construction of Transload Facility*	X				
Dewater Behind Cofferdam*		X			
Mobilization for Approach Walls*			X		
Intake Approach Walls and Slab*			X	X	X
Import of Construction Material*	X	X	X		
Rock Excavation In-the-Dry*	X	X	X	X	X
Spur Dike Riprap*				X	
Transfer Excavation Material to Disposal Site*	X	X	X	X	X
Remove Cell Rubble Fill*					X
Remove Sheets*					X
Dredge Common Material to Rock*	X	X	X	X	X
Drill and Blast / Dredge Rock In-the-Wet*			X	X	X
Teardown, Clean Up, and Site Restoration*				X	X
Remove Transload Facility*					X

*potential nighttime construction activity

**potential nighttime construction activity (four 1500 CFM compressors only), if needed;

***nighttime activity with exception of blasting

2.1.3 Areas of Construction Activity and Associated Noise Source Levels for Alternatives 2 and 3

Tables 14 and 15 list all of the construction activities contained in the Equipment Estimate Summary provided by the USACE for Alternatives 2 and 3. Appendix D provides a detailed breakdown of the equipment required for each activity. In Appendix D, under each construction activity, the quantity; horsepower; hours per day; duty cycle; total sound pressure levels (SPL) at 50 feet and sound power levels (PWL) for the quantity of individual types of equipment; and total SPLs at 50 feet and PWLs for all of the equipment combined for each construction activity are listed. Tables 16 and 17, below, present areas where the individual construction activities occur, along with the total combined SPL (at 50 feet) and PWL for all of the required construction equipment. The areas of designation for the construction activities are significant because these designated areas indicate where each individual construction activity is modeled. On-site haul road truck usage has been combined into one activity in order to generate a worst case annual haul road round-trip SPL at 50 feet for all trips.

Table 16. Alternative 2 Areas of Construction Activity and Associated Noise Source Levels

Construction Activity	Area of Construction								Total SPL @ 50 Feet per Construction Activity (dBA Leq)	Total PWL per Construction Activity (dBA Leq)
	Approach Channel / Spur Dike	Transload Facility	MIAD Staging and Disposal Area	Dike 7 Staging Area	Overlook Staging Area	Prison Staging Area	Dike 8 Disposal Area	Haul Road		
Drill and Blast / Dredge Rock In-the-Wet***	X								96.4	131.0
Dredge Common Material to Rock*	X								96.0	130.6
Teardown, Clean Up, and Site Restoration***	X								96.0	130.6
Set up and Operate Silt Curtain/ possible Bubble Curtain**	X								93.1	127.7
Site Prep / Haul Road Prep	X								93.0	127.6
Transfer Excavation Material to Disposal Site*	X								92.7	127.3
Remove Transload Facility***		X							91.6	126.2
Construct Transload Facility*		X							91.6	126.2
Rock Excavation In-the-Dry*	X								91.2	125.8
Common Excavation to Disposal*	X								90.5	125.1
Cutoff Wall Concrete Placement*	X								89.9	124.5
Mobilization for Approach Walls*	X								89.7	124.3

Construction Activity	Area of Construction								Total SPL @ 50 Feet per Construction Activity (dBA Leq)	Total PWL per Construction Activity (dBA Leq)
	Approach Channel / Spur Dike	Transload Facility	MIAD Staging and Disposal Area	Dike 7 Staging Area	Overlook Staging Area	Prison Staging Area	Dike 8 Disposal Area	Haul Road		
Spur Dike Riprap***	X								89.3	123.9
Haul Road Embankment*	X								89.3	123.9
MIAD Staging Area w/ Rock Crusher and Batch Plant			X						88.0	122.6
Overlook Staging Area w/ Rock Crusher and Batch Plant					X				88.0	122.6
MIAD Staging Area w/ Batch Plant*			X						86.4	121.0
Overlook Staging Area w/ Batch Plant*					X				86.4	121.0
Prison Staging Area w/ Batch Plant*						X			86.4	121.0
Intake Approach Walls and Slab Construction*	X								84.9	119.5
MIAD Disposal and Staging Area*			X						83.8	118.4
Overlook Staging Area*					X				83.8	118.4
Prison Staging Area*						X			83.8	118.4
Dike 7 Staging Area*				X					83.8	118.4
Dike 8 Disposal Area*							X		83.8	118.4
Import of Construction Material* [a]								X	52.6	n/a

Construction Activity	Area of Construction								Total SPL @ 50 Feet per Construction Activity (dBA Leq)	Total PWL per Construction Activity (dBA Leq)
	Approach Channel / Spur Dike	Transload Facility	MIAD Staging and Disposal Area	Dike 7 Staging Area	Overlook Staging Area	Prison Staging Area	Dike 8 Disposal Area	Haul Road		
On-Site Haul Road Usage to and From Excavation Site and MIAD* [a]								X	52.6	n/a
On-Site Haul Road Usage for Construction of Transload Facility* [a]								X	52.6	n/a
On-Site Haul Road Usage for Removal of Transload Facility* [a]								X	52.6	n/a

*potential nighttime activity
**potential nighttime activity (four 1500 CFM compressors only)
***nighttime activity with exception of blasting
[a] total SPL is 52.6 dBA Leq from 4.5 haul truck round-trips along haul road per hour

Table 17. Alternative 3 Areas of Construction Activity and Associated Noise Source Levels

Construction Activity	Area of Construction								Total SPL @ 50 Feet per Construction Activity (dBA Leq)	Total PWL per Construction Activity (dBA Leq)
	Approach Channel / Spur Dike	Transload Facility	MIAD Staging and Disposal Area	Dike 7 Staging Area	Overlook Staging Area	Prison Staging Area	Dike 8 Disposal Area	Haul Road		
Fill Cells*	X								102.2	136.8
Construction of Sheet Pile Cells*	X								101.7	136.3

Construction Activity	Area of Construction								Total SPL @ 50 Feet per Construction Activity (dBA Leq)	Total PWL per Construction Activity (dBA Leq)
	Approach Channel / Spur Dike	Transload Facility	MIAD Staging and Disposal Area	Dike 7 Staging Area	Overlook Staging Area	Prison Staging Area	Dike 8 Disposal Area	Haul Road		
Common Dredge Below Cofferdam*	X								96.8	131.4
Drill and Blast / Dredge Rock In-the-Wet***	X								96.3	130.9
Dredge Common Material to Rock*	X								96.0	130.6
Teardown, Clean Up, and Site Restoration***	X								96.0	130.6
Dewater Behind Cofferdam*	X								95.9	130.4
Remove Sheets*	X								94.4	128.9
Mobilization for Cofferdam	X								93.2	127.8
Set up and Operate Silt Curtain**	X								92.8	127.4
Transfer Excavation Material to Disposal Site*	X								92.7	127.3
Construct Transload Facility*		X							91.6	126.2
Remove Transload Facility***		X							91.2	125.8
Rock Excavation In-the-Dry*	X								91.1	125.7
Common Excavation Below Cofferdam*	X								90.4	124.9
Mobilization for Approach Walls*	X								89.7	124.3

Construction Activity	Area of Construction								Total SPL @ 50 Feet per Construction Activity (dBA Leq)	Total PWL per Construction Activity (dBA Leq)
	Approach Channel / Spur Dike	Transload Facility	MIAD Staging and Disposal Area	Dike 7 Staging Area	Overlook Staging Area	Prison Staging Area	Dike 8 Disposal Area	Haul Road		
Spur Dike Riprap***	X								89.3	123.9
MIAD Staging Area w/ Rock Crusher			X						88.0	122.6
Overlook Staging Area w/ Rock Crusher					X				88.0	122.6
Remove Cell Rubble Fill*	X								87.7	122.3
MIAD Staging Area w/ Batch Plant*			X						86.4	121.0
Overlook Staging Area w/ Batch Plant*					X				86.4	121.0
Prison Staging Area w/ Batch Plant*						X			86.4	121.0
Intake Approach Walls and Slab*	X								84.9	119.5
MIAD Disposal and Staging Area*			X						83.8	118.4
Overlook Staging Area*					X				83.8	118.4
Prison Staging Area*						X			83.8	118.4
Dike 7 Staging Area*				X					83.8	118.4
Dike 8 Disposal Area*							X		83.8	118.4
On-Site Haul Road Usage to and From Excavation Site and MIAD* [a]								X	52.6	n/a

Construction Activity	Area of Construction								Total SPL @ 50 Feet per Construction Activity (dBA Leq)	Total PWL per Construction Activity (dBA Leq)
	Approach Channel / Spur Dike	Transload Facility	MIAD Staging and Disposal Area	Dike 7 Staging Area	Overlook Staging Area	Prison Staging Area	Dike 8 Disposal Area	Haul Road		
On-Site Haul Road Usage for Construction of Transload Facility* [a]								X	52.6	n/a
Import of Construction Material* [a]								X	52.6	n/a
On-Site Haul Road Usage for Removal of Transload Facility* [a]								X	52.6	n/a

*potential nighttime construction activity

**potential nighttime construction activity (four 1500 CFM compressors only)

***nighttime activity with exception of blasting

[a] total SPL is 52.6 dBA Leq from 4.5 haul truck round-trips along haul road per hour

For both alternatives, the noisiest construction activities are being conducted at the approach channel excavation and spur dike construction areas. Noise generated by haul road trips is the construction activity that generates the least amount of noise because the trucks are going at a relatively low speed and they only briefly pass by noise-sensitive receptors.

2.2 Noise Prediction Model Method for Construction Activities

Tables 14 through 17 are used to calculate total combined sound power levels for all of the construction activities that are taking place in distinct areas of the overall proposed Project area. These total combined sound power levels for distinct areas are incorporated in the Cadna/A model as a worst case year construction noise level scenario. For example, Table 14 identifies the years in which all construction activities would be conducted for Alternative 2. Table 15 identifies the specific areas where the construction activities for Alternative 2 would be conducted along with the combined total sound pressure levels (SPLs) at 50 feet and sound power levels (PWLs) for each construction activity. By cross-referencing Tables 14 and 16, the sound power levels for each area of construction for each year are summed up in order to generate a total potential sound power level. In 2017, and for Alternative 2, the acoustic power level for all construction activities being conducted at the approach channel excavation and spur dike construction area is 136.4 dBA PWL and, in 2016, it is 137.1 dBA PWL. This process is carried out for both Alternatives 2 and 3 for the following designated construction areas in order find the year with the worst-case noise generating scenario due to construction:

- Approach Channel Excavation and Spur Dike Construction Area
- Transload Facility Construction and Removal Area
- MIAD Disposal and Staging Areas
- Dike 7 Staging Area
- Overlook Staging Area
- Prison Staging Area
- Dike 8 Disposal Area
- Haul Road

Blast noise and off-site traffic noise due to construction is analyzed separately from the on-site construction activities listed in Tables 14 through 17.

2.2.1 Noise Prediction Model Inputs for Construction Activities Conducted During Construction Noise Exempt Hours for Alternatives 2 and 3

Table 18 and Table 19 list the combined PWLs for all of the construction equipment for activities being conducted during daytime hours at each respective construction area by year. Construction activities would be conducted from year 2013 through 2017 at the approach channel excavation and spur dike construction area. Transload facility construction occurs in 2013 and removal of the transload facility occurs in 2017. Rock crushing would only occur at either the MIAD or Overlook staging area, but not at both. Haul road round-trips cannot be assigned a PWL because traffic noise is measured by the sound pressure level (SPL) at 50 feet.

Table 18. Alternative 2 Total Combined PWL for Each Area of Construction by Year (dBA)

Area of Construction	2013	2014	2015	2016	2017
Approach Channel / Spur Dike	135.5	132.4	136.3	137.1	136.4
Transload Facility	126.2	0.0	0.0	0.0	126.2
MIAD Disposal and Staging Area w/ Rock Crusher and Batch Plant	122.6	122.6	122.6	122.6	122.6
Dike 7 Staging Area	118.4	118.4	118.4	118.4	118.4
Overlook Staging Area w/ Rock Crusher and Batch Plant	122.6	122.6	122.6	122.6	122.6
Prison Staging Area w/ Batch Plant	121.0	121.0	121.0	121.0	121.0
Dike 8 Disposal Area	118.4	118.4	118.4	118.4	118.4
Haul Road*	n/a	n/a	n/a	n/a	n/a

*noise due to on-site haul road round-trips is analyzed using FHWA Model that generated SPLs

Table 19. Alternative 3 Total Combined PWL for Each Area of Construction by Year (dBA)

Area of Construction	2013	2014	2015	2016	2017
Approach Channel / Spur Dike	141.4	141.3	136.2	137.2	138.1
Transload Facility	126.2	0.0	0.0	0.0	126.2
MIAD Disposal and Staging Area w/ Rock Crusher and Batch Plant	122.6	122.6	122.6	122.6	122.6
Dike 7 Staging Area	118.4	118.4	118.4	118.4	118.4
Overlook Staging Area w/ Rock Crusher and Batch Plant	122.6	122.6	122.6	122.6	122.6
Prison Staging Area w/ Batch Plant	121.0	121.0	121.0	121.0	121.0
Dike 8 Disposal Area	118.4	118.4	118.4	118.4	118.4
Haul Road*	n/a	n/a	n/a	n/a	n/a

*noise due to on-site haul road round-trips is analyzed using FHWA Model that generated SPLs

Table 18 confirms that construction activities during year 2017 would generate the highest levels of noise associated with Alternative 2, and Table 19 confirms that construction activities during year 2013 would generate the highest levels of noise associated with Alternative 3. For Alternative 2, year 2017 is a worst-case scenario for noise generated by construction activities rather than year 2016 as transload facility construction activities are conducted in 2017 while they are absent in 2016. Construction activities conducted outside of construction noise exempt hours are analyzed and modeled separately..

In the Cadna/A model, "area noise sources" are placed near the general vicinity of where the proposed area of construction would be conducted. The area sources are input into the Cadna/A model with the overall PWL found under the year 2017 column for each respective construction activity in order to generate a worst-case scenario from noise due to construction. Using Alternative 2, for example, in the vicinity of the approach channel excavation and spur dike construction area, an area source is input into the Cadna/A model that has a PWL of 136.4 dBA and an area source with a PWL of 126.2 dBA is input into the model where the transload facility would be located. The same goes for the five staging and/or disposal areas and their respective PWLs.

Table 20 displays the general octave band spectrum for diesel engines that is used to input area sources in the Cadna/A model. This octave band spectrum originates from the octave band spectrum for an articulated 40 ton truck found in the 2009 Early Approach Channel Excavation EIS (URS, 2009).

Table 20. PWL for Area Sources Input into the Cadna/A Model (dBA)

	Sound Power Levels (dB)								
Noise Source	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	Overall Level (dBA)
40 TN Articulated Trucks*	102	108	106	101	100	97	91	82	105

*octave band levels are increased for area sources in order to make up for differences in overall PWLs

There is also a haul road that extends from the approach channel excavation and spur dike construction area to the MIAD staging and disposal areas. Inputs for roadways into the Cadna/A model are different than area sources. A road source is input into the Cadna/A model using nine trucks going at a speed of 10 mph; and then the road source is calibrated to match the output of the FHWA of the FHWA model. This results in a calculated SPL of 52.6 dBA L_{eq} at a distance of 50 feet.

2.2.2 Noise Prediction Model Inputs for Construction Activities Conducted During Non-Exempt Hours for Alternative 2

Many of the construction activities have the potential to be conducted during non-exempt hours. These activities are marked with an asterisk in Tables 14-17 for both alternatives. Rock crushing and blasting activities would not be conducted during non-exempt hours. Only one batch plant would be in operation and the location has yet to be determined. For modeling purposes, a worst-case scenario was established assuming that the batch plant would be operating during nighttime hours at the Prison, Overlook, or MIAD staging areas. As shown in Table 16, during non-exempt hours at the Approach Channel/Spur Dike Area, the loudest individual construction activity that would potentially be conducted is “drill and blast and dredging rock in-the-wet” and the quietest individual construction activity would potentially be “intake approach walls and slab construction”. Table 16 lists the sound power levels associated with each non-exempt hour construction activity. Many of the construction activities listed in Table 16 would have the potential to be conducted simultaneously and there is no definitive time and place where construction activities would be conducted during non-exempt construction hours. This results in a large number of potential combinations of construction activities during non-exempt hours.

For Alternative 2, the worst-case scenario non-exempt hour construction activities at each respective construction area were modeled with “drill and blast and dredging rock in-the-wet” and “intake approach walls and slab” construction activities being conducted individually at the Approach Channel/Spur Dike Area. By generating these two individual noise models, the loudest and quietest activities that would be conducted at the Approach Channel/Spur Dike Area are taken into account in order to generate two potential combinations for non-exempt construction hour activities during non-exempt hours. Tables 21 and 22 list the calculated PWLs that were used in each noise model for each respective specific construction area.

Table 21. Alternative 2 –Total PWLs for Each Area of Construction during Simultaneous Non-Exempt Hour Construction Activities (w/ Drill and Blast and Dredging Rock In-the-Wet Activities) (dBA)

Area of Construction	PWL (dBA)
Approach Channel / Spur Dike (Drill and Blast and Dredging Rock In-the-Wet Activities ONLY)	131.0
Transload Facility Construction/Removal	126.2
MIAD Disposal and Staging Area w/ Batch Plant	121.0
Dike 7 Staging Area	118.4
Overlook Staging Area w/ Batch Plant	121.0
Prison Staging Area w/ Batch Plant	121.0
Dike 8 Disposal Area	118.4
Haul Road*	n/a

*noise due to on-site haul road round-trips is analyzed using FHWA Model that generated SPLs

Table 22. Alternative 2 – Total PWLs for Each Area of Construction during Simultaneous Non-Exempt Hour Construction Activities (w/ Intake Approach Walls and Slab Activities) (dBA)

Area of Construction	PWL (dBA)
Approach Channel / Spur Dike (Intake Approach Walls and Slab Activities ONLY)	119.5
Transload Facility Construction/Removal	126.2
MIAD Disposal and Staging Area w/ Batch Plant	121.0
Dike 7 Staging Area	118.4
Overlook Staging Area w/ Batch Plant	121.0
Prison Staging Area w/ Batch Plant	121.0
Dike 8 Disposal Area	118.4
Haul Road*	n/a

*noise due to on-site haul road round-trips is analyzed using FHWA Model that generated SPLs

2.2.3 Noise Prediction Model Inputs for Construction Activities Conducted During Non-Exempt Hours for Alternative 3

Table 17 indicates the loudest individual construction activity that would potentially be conducted for Alternative 3 at the Approach Channel/Spur Dike Area is “fill cells” during non-exempt hours. The quietest individual construction activity would potentially be “intake approach walls and slab construction” during non-exempt hours at the Approach Channel/Spur Dike Area. Table 17 lists the sound power levels associated with each non-exempt hour construction activity. Similar to Alternative 2, many of the construction activities listed in Table 17 would have the potential to be conducted simultaneously and there is no definitive time and place where construction activities would be conducted during non-exempt construction hours. This results in an large number of potential combinations of construction activities during non-exempt hours. For Alternative 3, the worst-case scenario non-exempt hour construction activities at each respective construction area were modeled with “fill cells” and “intake approach walls and slab” construction activities being conducted individually at the Approach Channel/Spur Dike Area. By generating these two individual noise models, the loudest and quietest activities that would be conducted at the Approach Channel/Spur Dike Area are taken into account in order to generate two potential combinations for non-exempt construction hour activities during non-exempt hours. Tables 23 and 24 list the calculated PWLs that were input into each noise model for each respective specific construction area.

Table 23. Alternative 3 –Total PWLs for Each Area of Construction during Simultaneous Non-Exempt Hour Construction Activities (w/ Drill and Blast and Dredging Rock In-the-Wet Activities) (dBA)

Area of Construction	PWL (dBA)
Approach Channel / Spur Dike (Fill Cells Activities	136.8

ONLY)	
Transload Facility Construction/Removal	126.2
MIAD Disposal and Staging Area w/ Batch Plant	121.0
Dike 7 Staging Area	118.4
Overlook Staging Area w/ Batch Plant	121.0
Prison Staging Area w/ Batch Plant	121.0
Dike 8 Disposal Area	118.4
Haul Road*	n/a

*noise due to on-site haul road round-trips is analyzed using FHWA Model that generated SPLs

Table 24. Alternative 3 – Total PWLs for Each Area of Construction during Simultaneous Non-Exempt Hour Construction Activities (w/ Intake Approach Walls and Slab Activities) (dBA)

Area of Construction	PWL (dBA)
Approach Channel / Spur Dike (Intake Approach Walls and Slab Activities ONLY)	119.5
Transload Facility Construction/Removal	126.2
MIAD Disposal and Staging Area w/ Batch Plant	121.0
Dike 7 Staging Area	118.4
Overlook Staging Area w/ Batch Plant	121.0
Prison Staging Area w/ Batch Plant	121.0
Dike 8 Disposal Area	118.4
Haul Road*	n/a

*noise due to on-site haul road round-trips is analyzed using FHWA Model that generated SPLs

2.3 Noise Prediction Model Results

For both Alternatives 2 and 3, worst-case scenarios due to construction activities during construction noise exempt hours were input into the noise model in order to obtain noise levels at long-term (LT-X), short-term (ST-X), modeled (MR-X), and wildlife receivers (Bio-X). MR-1a, MR1b, MR-9, MR-10, and MR-11 are modeled noise-sensitive receivers. MR-1a is a modeled noise-sensitive receiver located on the north end of Folsom Prison and MR-1b is a modeled noise-sensitive receiver located on the east end of Folsom Prison. MR-9 is located at the eastern-most single-family residence that is located immediately southwest of the MIAD disposal and staging area and north of the intersection of Briggs Ranch Drive and East Natoma Street. MR-10 is located at the western end of Lorena Lane and immediately southeast of the Dike 7 staging area. MR-11 is the Folsom Point Church of Christ that is located on the northwest corner of East Natoma Street and Briggs Ranch Drive and is located immediately south of the Dike 8 disposal area. These noise modeling locations are utilized because ambient noise level measurements were not conducted at these locations and, due to the activities at the Dike 7 staging area, Dike 8 disposal area, and MIAD disposal and staging areas, it is important to know what type of noise would be generated by construction equipment at the noise modeling locations. Figure 2 illustrates the location of all noise measurement and noise modeling locations. The noise levels at the noise-sensitive receivers have been compared to the measured ambient noise levels to see if there would be noise impacts. The same process was also conducted for blasting and construction activities conducted outside of construction noise exempt hours for both Alternatives 2 and 3.

2.3.1 Noise Prediction Model Results for Alternative 2 during Construction Noise Exempt Hours

Under Alternative 2, the worst-case scenario is 2017 as the result of noise levels generated by construction activities during exempt hours. The area sources, and their respective PWLs, found in Table 18, are input into the Cadna/A model to generate noise levels at ST, LT, MR, and Bio noise-sensitive sites. Table 25 displays the resulting L_{eq} values at each noise-sensitive receiver. The City of Folsom uses the L_{50} metric as its baseline noise criterion, but comparing the L_{eq} with the L_{50} results is a conservative model because L_{eq} values are always higher than L_{50} values.

Table 25. Measured Ambient Noise Levels and Noise Levels Due to Construction Activities for Alternative 2 in 2017

Site ID	Modeled Noise Level Due to Construction Activities (dBA L_{eq})	L_{50} (ambient noise level in dBA from 7:00 to 18:00 for LTs and daytime L_{50} for Bio and ST)
MR-1a	50	n/a
MR-1b	48	n/a
LT-2	54	66
LT-3	63	46
LT-4	62	73
LT-5	46	45
LT-6	51	47
ST-7	52	43
ST-8	61	40
MR-9	57	n/a
MR-10	57	n/a
MR-11	56	n/a
Bio-1	30	42
Bio-2	47	49

Site ID	Modeled Noise Level Due to Construction Activities (dBA	L_{50} (ambient noise level in dBA from 7:00 to 18:00 for LTs and daytime L_{50} for Bio
Bio-3	35	42
Bio-4	41	51
Bio-5	44	49
Bio-6	46	51
Bio-7	37	41
Bio-8	33	57

2.3.2 Noise Prediction Model Analysis for Alternative 2 during Construction Noise Exempt Hours

Construction activities that would be conducted during construction noise exempt hours in the year 2017 for Alternative 2 of the Project will generate exterior noise levels which exceed significance criteria established by the City of Folsom at several noise-sensitive receivers. The 50 dBA daytime L_{50} noise standard is exceeded at MR-1a, LT-2, LT-3, LT-4, LT-6, ST-7, ST-8, MR-9, MR-10 and MR-11. At LT-2 and LT-4, the modeled L_{eq} is below the measured daytime L_{50} and therefore, there would be no noise impacts at these noise-sensitive receivers. Although the modeled noise levels due to daytime construction activities for Alternative 2 would exceed the L_{50} noise standard and existing ambient daytime L_{50}s at MR-1a, MR-1b, LT-3, LT-6, ST-7, ST-8, MR-9, MR-10, and MR-11, construction noise is exempt from local standards from 7:00 a.m. to 6:00 p.m. during weekdays and from 8:00 a.m. to 5:00 p.m. on weekends. The will be no significant noise impacts if construction activities are conducted within these construction noise exempt times.

If construction activities are conducted in between 6:00 p.m. and 10:00 p.m., then mitigation would be necessary in order to meet the daytime noise standard of 50 dBA L_{50} at all respective noise-sensitive receivers where the modeled L_{eq} is above 50 dBA L_{eq}. If construction activities are conducted in between 10:00 p.m. and 7:00 a.m., then mitigation would be necessary in order to meet the nighttime noise standard of 45 dBA L_{50} at all respective noise-sensitive receivers where the modeled L_{eq} is above 45 dBA L_{eq}.

Noise levels would not exceed 60 dBA L_{eq} at any wildlife receptor site, therefore there are no expected impacts to wildlife habitat.

2.3.3 Noise Prediction Model Results for Alternative 3 during Construction Noise Exempt Hours

Under Alternative 3, the worst-case scenario is 2013 as the result of noise levels generated by construction activities during exempt hours. The area sources, and their respective PWLs, found in Table 19, are input into the Cadna/A model to generate noise levels at ST, LT, MR, and Bio noise-sensitive sites. Table 26 displays the resulting L_{eq} values at each noise-sensitive receiver.

Table 26. Measured Ambient Noise Levels and Noise Levels Due to Construction Activities for Alternative 3 in 2013

Site ID	Modeled Noise Level Due to Construction Activities (dBA L_{eq})	L_{50} (ambient noise level in dBA from 7:00 to 18:00 for LTs and daytime L_{50} for Bio and ST)
MR-1a	55	n/a
MR-1b	53	n/a
LT-2	57	66
LT-3	66	46
LT-4	62	73
LT-5	49	45
LT-6	55	47
ST-7	56	43
ST-8	63	40
MR-9	58	n/a
MR-10	60	n/a
MR-11	58	n/a
Bio-1	34	42
Bio-2	51	49
Bio-3	39	42
Bio-4	45	51
Bio-5	48	49
Bio-6	49	51
Bio-7	41	41
Bio-8	37	57

2.3.4 Noise Prediction Model Analysis for Alternative 3 Activities during Construction Noise Exempt Hours

Construction activities that are proposed to be conducted during construction noise exempt hours in the year 2013 for Alternative 3 of the Project would generate exterior noise levels which exceed significance criteria established by the City of Folsom at several noise-sensitive receivers. The 50 dBA daytime L_{50} noise standard is exceeded at MR-1a, MR-1b, LT-2, LT-3, LT-4, LT-6, ST-7, ST-8, MR-9, MR-10, and MR-11. At LT-2 and LT-4, the modeled L_{eq} is below the measured daytime L_{50} and therefore, there would be no noise impacts at these noise-sensitive receivers. Although the modeled noise levels due to daytime construction activities for Alternative 3 would exceed the L_{50} noise standard and existing ambient daytime L_{50}s at MR-1a, MR-1b, LT-3, LT-6, ST-7, ST-8, MR-9, MR-10 and MR-11, construction noise is exempt from local standards from 7:00 a.m. to 6:00 p.m. during weekdays and from 8:00 a.m. to 5:00 p.m. on weekends. There would be no significant noise impacts if construction activities are conducted within these construction noise exempt times.

If construction activities are conducted in between 6:00 p.m. and 10:00 p.m., then mitigation will be necessary in order to meet the daytime noise standard of 50 dBA L_{50} at all respective noise-sensitive receivers where the modeled L_{eq} is above 50 dBA L_{eq}. If construction activities are conducted in between 10:00 p.m. and 7:00 a.m., then mitigation would be necessary in order to meet the nighttime noise standard of 45 dBA L_{50} at all respective noise-sensitive receivers where the modeled L_{eq} is above 45 dBA L_{eq}.

Noise levels would not exceed 60 dBA L_{eq} at any wildlife receptor site, therefore there are no expected impacts to wildlife habitat.

2.3.5 Noise Prediction Model Results and Analysis for Alternative 2 during Non-Exempt Construction Noise Hours

There are several potential construction activities planned for Alternative 2 that may be conducted outside of construction noise exempt times. These activities are marked with an asterisk in Tables 14 and 16. “Drill and blasting and dredging rock in-the-wet” and “intake approach walls and slab activities” were the only construction activities modeled at the Approach Channel/Spur Dike Area because they are the loudest and quietest individual construction activities, respectively, that would be conducted during non-exempt hours for Alternative 2. Table 27 lists the noise levels generated at noise-sensitive receptors by individual construction activities, including “drill and blasting and dredging rock in-the-wet”, at specific areas of the proposed project during non-exempt hours. At the bottom of the table, the cumulative noise level is listed under each noise-sensitive receptor column if the construction activities would be conducted simultaneously from each respective construction activity area for the proposed project. Figure 3 depicts what the resulting cumulative noise contours if these construction activities were conducted simultaneously. Table 28 explores potential combinations of construction activities and lists the modeled noise levels at noise-sensitive receptors if specific activities are removed from simultaneous non-exempt hour construction activities. In Tables 27 and 28, individual and cumulative noise levels are highlighted in gray if the 45 dBA L_{50} nighttime noise threshold would be exceeded during non-exempt hours at each noise-sensitive receptor. Table 29 lists the noise levels generated at noise-sensitive receptors by individual construction activities, including “intake approach walls and slab construction”, at specific areas of the proposed project during non-exempt hours. At the bottom of the table, the cumulative noise level is listed under each noise-sensitive receptor column if the construction activities would be conducted simultaneously from each respective construction activity area for the proposed project. Figure 4 depicts the resulting cumulative noise contours if these construction activities were conducted simultaneously. Table 30 explores potential combinations of construction activities and lists the modeled noise levels at noise-sensitive receptors if specific activities are removed from simultaneous non-exempt hour construction activities. In Tables 29 and 30, individual and cumulative noise levels are highlighted in gray if the 45 dBA L_{50} nighttime noise threshold would be exceeded during non-exempt hours at each noise-sensitive receptor. It should be noted that there is a 50 dBA L_{50} daytime noise standard that would be applicable from 6:00 p.m. to 10:00 p.m. because noise construction activities would potentially occur during this timeframe and outside of the construction noise exempt hours. The 50 dBA L_{50} daytime noise standard would not be allowed to be exceeded from 6:00 p.m. to 10:00 p.m. as well. The 45 dBA L_{50} nighttime noise standard is the most restrictive non-exempt hour noise standard and it is used for analyzing potential noise impacts outside of construction noise exempt hours since there is no definitive construction schedule.

Many of the construction activities listed in Table 16 have the potential to be conducted simultaneously and there is no definitive time and place where construction activities would be conducted during non-exempt construction hours. Tables 27, 28, 29 and 30 illustrate that certain construction activities generate higher levels of noise impacts at specific receptors. A brief description of the major noise contributing

Figure 3. Alternative 2 – Non-Exempt Hour Simultaneous Construction Activities w/ Drill and Blast and Dredging Rock In-the-Wet (INSERT FIGURE)

Figure 4. Alternatives 2 and 3 – Non-Exempt Hour Simultaneous Construction Activities w/ Intake Approach Walls and Slab Activities (INSERT FIGURE)

Table 27. Alternative 2 Non-Exempt Hour Construction Activities with Drill and Blast and Dredging Rock In-the-Wet

Construction Activity	Noise Levels Generated by Individual Construction Activities at Noise-Sensitive Receptor During Non-Exempt Hours (Drill and Blast / Dredging Rock In-the-Wet)											
	MR-1a	MR-1b	LT-2	LT-3	LT-4	LT-5	LT-6	ST-7	ST-8	MR-9	MR-10	MR-11
Drill and Blast / Dredging Rock In-the-Wet	44	42	46	55	41	37	43	46	51	44	49	45
Prison Staging Area w/ Batch Plant	39	35	31	33	21	22	45	32	28	27	32	24
Transload Facility Construction/Removal	40	36	46	56	41	36	35	37	55	47	43	46
Dike 7 Staging Area	30	29	46	59	21	25	24	23	33	31	54	28
Dike 8 Disposal Area	27	21	35	39	35	30	24	23	57	47	31	54
MIAD Disposal and Staging Area w/ Batch Plant	26	20	33	34	60	42	24	22	43	53	29	36
Overlook Staging Area w/ Batch Plant	35	32	33	41	30	26	35	37	36	33	37	34
Haul Road	14	13	21	34	28	14	9	4	37	32	24	30
Cumulative Noise Level	**47**	**44**	**51**	**62**	**60**	**44**	**48**	**47**	**60**	**55**	**55**	**55**

Note: Noise effects are highlighted in gray if construction (1) could be conducted outside of construction noise exempt hours and (2) would exceed either the daytime exterior noise standard of 50 dBA L_{50} or the nighttime exterior noise standard of 45 dBA L_{50}.

Table 28. Alternative 2 Simultaneous Non-Exempt Hour Construction Activity Combinations with Drill and Blast and Dredging Rock In-the-Wet

Construction Activity Combinations	Cumulative Noise Levels Generated by Simultaneous Construction Activity Combinations at Noise-Sensitive Receptor During Non-Exempt Hours (Drill and Blast / Dredging Rock In-the-Wet)											
	MR-1a	MR-1b	LT-2	LT-3	LT-4	LT-5	LT-6	ST-7	ST-8	MR-9	MR-10	MR-11
Cumulative Noise Level (Without Drill and Blast and Dredging Rock In-the-Wet)	**43**	**40**	**49**	**61**	**60**	**43**	**46**	**41**	**59**	**55**	**54**	**55**
Cumulative Noise Level (Without Prison Staging Area w/ Batch Plant)	**46**	**44**	**51**	**62**	**60**	**44**	**45**	**47**	**60**	**55**	**55**	**55**
Cumulative Noise Level (Without Transload Facility Construction)	**46**	**44**	**49**	**60**	**60**	**43**	**48**	**46**	**58**	**55**	**55**	**55**

Construction Activity Combinations	Cumulative Noise Levels Generated by Simultaneous Construction Activity Combinations at Noise-Sensitive Receptor During Non-Exempt Hours (Drill and Blast / Dredging Rock In-the-Wet)											
	MR-1a	**MR-1b**	**LT-2**	**LT-3**	**LT-4**	**LT-5**	**LT-6**	**ST-7**	**ST-8**	**MR-9**	**MR-10**	**MR-11**
Cumulative Noise Level (Without Dike 7 Staging Area)	**46**	**44**	**49**	**59**	**60**	**44**	**48**	**47**	**60**	**55**	**50**	**55**
Cumulative Noise Level (Without Dike 8 Disposal Area)	**47**	**44**	**51**	**62**	**60**	**44**	**48**	**47**	**56**	**54**	**55**	**49**
Cumulative Noise Level (Without MIAD Disposal and Staging Area w/ Batch Plant)	**47**	**44**	**51**	**62**	**45**	**40**	**48**	**47**	**60**	**51**	**55**	**55**
Cumulative Noise Level (Without Overlook Staging Area w/ Batch Plant)	**46**	**44**	**51**	**62**	**60**	**44**	**48**	**46**	**60**	**55**	**55**	**55**
Cumulative Noise Level (Without MIAD Disposal and Staging Areas and Dike 8 Disposal Area)	**46**	**44**	**51**	**62**	**44**	**40**	**48**	**47**	**56**	**49**	**55**	**49**
Cumulative Noise Level (Without Transload Facility Construction and Dike 7 Staging Area)	**45**	**43**	**47**	**55**	**60**	**43**	**48**	**46**	**58**	**55**	**49**	**55**
Cumulative Noise Level (With Drill and Blast and Dredging Rock In-the-Wet, Overlook Staging Area w/ Batch Plant, and Haul Road Only)	**44**	**43**	**46**	**55**	**41**	**37**	**44**	**46**	**51**	**44**	**49**	**45**

Note: Noise effects are highlighted in gray if construction (1) could be conducted outside of construction noise exempt hours and (2) would exceed either the daytime exterior noise standard of 50 dBA L_{50} or the nighttime exterior noise standard of 45 dBA L_{50}.

Table 29. Alternative 2 Non-Exempt Hour Construction Activities with Intake Approach Walls and Slab Construction

Construction Activity	Noise Levels Generated by Individual Construction Activity at Noise-Sensitive Receptor											
	MR-1a	**MR-1b**	**LT-2**	**LT-3**	**LT-4**	**LT-5**	**LT-6**	**ST-7**	**ST-8**	**MR-9**	**MR-10**	**MR-11**
Intake Approach Walls and Slab	32	31	35	43	29	25	32	34	39	32	37	33
Prison Staging Area w/ Batch Plant	39	35	31	33	21	22	45	32	28	27	32	24
Transload Facility Construction/Removal	40	36	46	56	41	36	35	37	55	47	43	46
Dike 7 Staging Area	30	29	46	59	21	25	24	23	33	31	54	28

Construction Activity	Noise Levels Generated by Individual Construction Activity at Noise-Sensitive Receptor											
	MR-1a	MR-1b	LT-2	LT-3	LT-4	LT-5	LT-6	ST-7	ST-8	MR-9	MR-10	MR-11
Dike 8 Disposal Area	27	21	35	39	35	30	24	23	57	47	31	54
MIAD Disposal and Staging Area w/ Batch Plant	26	20	33	34	60	42	24	22	43	53	29	36
Overlook Staging Area w/ Batch Plant	35	32	33	41	30	26	35	37	36	33	37	34
Haul Road	14	13	21	34	28	14	9	4	37	32	24	30
Cumulative Noise Level	**44**	**40**	**49**	**61**	**60**	**43**	**46**	**41**	**59**	**55**	**54**	**55**

Note: Noise effects are highlighted in gray if construction (1) could be conducted outside of construction noise exempt hours and (2) would exceed either the daytime exterior noise standard of 50 dBA L_{50} or the nighttime exterior noise standard of 45 dBA L_{50}.

Table 30. Alternative 2 Simultaneous Non-Exempt Hour Construction Activity Combinations with Intake Approach Walls and Slab Construction

Construction Activity Combinations	Cumulative Noise Levels Generated by Simultaneous Construction Activity Combinations at Noise-Sensitive Receptor During Non-Exempt Hours (Intake Approach Walls and Slab Construction)											
	MR-1a	MR-1b	LT-2	LT-3	LT-4	LT-5	LT-6	ST-7	ST-8	MR-9	MR-10	MR-11
Cumulative Noise Level (Without Intake Approach Walls and Slab Construction)	**43**	**40**	**49**	**61**	**60**	**43**	**46**	**41**	**59**	**55**	**54**	**55**
Cumulative Noise Level (Without Prison Staging Area w/ Batch Plant)	**42**	**39**	**49**	**61**	**60**	**43**	**40**	**41**	**59**	**55**	**54**	**55**
Cumulative Noise Level (Without Transload Facility Construction)	**42**	**38**	**47**	**59**	**60**	**42**	**46**	**40**	**58**	**54**	**54**	**54**
Cumulative Noise Level (Without Dike 7 Staging Area)	**44**	**40**	**47**	**57**	**60**	**43**	**46**	**41**	**59**	**55**	**45**	**55**
Cumulative Noise Level (Without Dike 8 Disposal Area)	**44**	**40**	**49**	**61**	**60**	**43**	**46**	**41**	**55**	**54**	**54**	**47**
Cumulative Noise Level (Without MIAD Disposal and Staging Area w/ Batch Plant)	**44**	**40**	**49**	**61**	**43**	**38**	**46**	**41**	**59**	**50**	**54**	**55**
Cumulative Noise Level (Without Overlook Staging Area w/ Batch Plant)	**43**	**40**	**49**	**61**	**60**	**43**	**46**	**40**	**59**	**55**	**54**	**55**

Construction Activity Combinations	Cumulative Noise Levels Generated by Simultaneous Construction Activity Combinations at Noise-Sensitive Receptor During Non-Exempt Hours (Intake Approach Walls and Slab Construction)											
	MR-1a	**MR-1b**	**LT-2**	**LT-3**	**LT-4**	**LT-5**	**LT-6**	**ST-7**	**ST-8**	**MR-9**	**MR-10**	**MR-11**
Cumulative Noise Level (Without MIAD Disposal and Staging Areas and Dike 8 Disposal Area)	**44**	**40**	**49**	**61**	**42**	**37**	**46**	**41**	**55**	**47**	**54**	**47**
Cumulative Noise Level (Without Transload Facility Construction and Dike 7 Staging Area)	**41**	**38**	**41**	**47**	**60**	**42**	**46**	**40**	**58**	**54**	**42**	**54**
Cumulative Noise Level (With Intake Approach Walls and Slab Construction, Overlook Staging Area w/ Batch Plant, and Haul Road Only)	**37**	**35**	**37**	**46**	**34**	**29**	**37**	**39**	**42**	**37**	**40**	**37**

Note: Noise effects are highlighted in gray if construction (1) could be conducted outside of construction noise exempt hours and (2) would exceed either the daytime exterior noise standard of 50 dBA L_{50} or the nighttime exterior noise standard of 45 dBA L_{50}.

construction activities that could generate noise impacts at each noise-sensitive receptor is included below. Major noise contributing construction activities are defined as activities that generate noise levels of 35 dBA or higher at any noise-sensitive receptors.

1. At Folsom State Prison (MR-1a and MR-1b), it is assumed that the prison structures would provide a minimum of 30 dBA attenuation due to the concrete walls and small, thick glass windows. It is also assumed that the exterior concrete walls surrounding the prison facility would provide an additional 5 dBA of attenuation. Taking these assumptions into account, noise levels at Folsom State Prison would not be significant.

2. At Tacana Drive and East Natoma Street (LT-2), drill and blasting and dredging rock in-the-wet, transload facility construction/removal, and Dike 7 staging area utilization activities would generate noise levels that exceed the 45 dBA L_{50} nighttime exterior noise standard if the activities would be conducted individually. The major noise contributing activities at LT-2 would be Approach Channel/Spur Dike construction activities, transload facility construction/removal activities, and utilization of the Dike 7 staging area. Potential construction noise impacts may be generated at LT-2 if construction activities are conducted outside of construction noise exempt hours and mitigation may be necessary in order to prevent noise impacts at LT-2.

3. At Mountain View Drive (LT-3), drill and blasting and dredging rock in-the-wet, transload facility construction/removal, and Dike 7 staging area utilization activities would generate noise levels that exceed the 45 dBA L_{50} nighttime exterior noise standard if the activities would be conducted individually. The major noise contributing activities at LT-3 would be Approach Channel/Spur Dike construction activities, transload facility construction/removal activities, utilization of the Dike 7 and Overlook staging areas, and utilization of the Dike 8 disposal area. Potential construction noise impacts may be generated at LT-3 if construction activities are conducted outside of construction noise exempt hours and mitigation may be necessary in order to prevent noise impacts at LT-3.

4. At East Natoma Street and Green Valley Road (LT-4), MIAD disposal and staging area utilization would generate noise levels that exceed the 45 dBA L_{50} nighttime exterior noise standard if it was utilized without any other simultaneous construction activities. The major noise contributing activities at LT-4 would be Approach Channel/Spur Dike construction activities, transload facility construction/removal activities, utilization of the Dike 8 disposal area, and utilization of the MIAD disposal and staging areas. Potential construction noise impacts may be generated at LT-4 if construction activities are conducted outside of construction noise exempt hours and mitigation may be necessary in order to prevent noise impacts at LT-4.

5. At East of Folsom Auburn Rd. and Pierpoint Circle (LT-6), utilization of the Prison staging area would generate noise levels that exceed the 45 dBA L_{50} nighttime exterior noise standard if it was utilized without any other simultaneous construction activities. The major noise contributing activities at LT-6 would be

Approach Channel/Spur Dike construction activities, utilization of the Prison or Overlook staging areas, and transload facility construction/removal activities. Potential construction noise impacts may be generated at LT-6 if construction activities are conducted outside of construction noise exempt hours and mitigation may be necessary in order to prevent noise impacts at LT-6.

6. At the Beal's Point Campground (ST-7), guests would be staying overnight. Drill and blasting and dredging rock in-the-wet construction activities would generate noise levels that exceed the 45 dBA L_{50} nighttime exterior noise standard if it would be conducted by itself without any other simultaneous construction activities. The major noise contributing activities at ST-7 would be Approach Channel/Spur Dike construction activities, transload facility construction/removal activities, utilization of the Overlook staging area. Potential construction noise impacts may be generated at ST-7 if construction activities are conducted outside of construction noise exempt hours and mitigation may be necessary in order to prevent noise impacts at ST-7.

7. At Folsom Point Park (ST-8), guests would not be staying overnight. Therefore, there are no anticipated noise impacts during non-exempt hours.

8. At East Natoma Street and Briggs Ranch Drive (MR-9), transload facility construction/removal, Dike 8 disposal area utilization, and MIAD staging and disposal area utilization activities would generate noise levels that exceed the 45 dBA L_{50} nighttime exterior noise standard if the activities would be conducted individually. The major noise contributing activities at MR-9 are Approach Channel/Spur Dike construction activities, transload facility construction/removal activities, utilization of the Dike 8 disposal area, and utilization of the MIAD disposal and staging area. Potential construction noise impacts may be generated at MR-9 if construction activities are conducted outside of construction noise exempt hours and mitigation may be necessary in order to prevent noise impacts at MR-9.

9. At Lorena Lane (MR-10), drill and blasting and dredging rock in-the-wet and Dike 7 staging area utilization activities would generate noise levels that exceed the 45 dBA L_{50} nighttime exterior noise standard if the activities would be conducted individually. The major noise contributing activities at MR-10 would be Approach Channel/Spur Dike construction activities, transload facility construction/removal activities, utilization of the Dike 7 staging area, and utilization of the Overlook staging area. Potential construction noise impacts may be generated at MR-10 if construction activities are conducted outside of construction noise exempt hours and mitigation may be necessary in order to prevent noise impacts at MR-10.

10. At Folsom Point Church of Christ (MR-11), drill and blasting and dredging rock in-the-wet, transload facility construction/removal, and Dike 8 disposal area utilization activities would generate noise levels that exceed the 45 dBA L_{50} nighttime exterior noise standard if the activities would be conducted individually. The major noise contributing activities at MR-11 would be Approach Channel/Spur Dike construction activities, transload facility construction/removal activities, utilization of the Dike 8 disposal area, and utilization of the MIAD

disposal and staging area. Potential construction noise impacts may be generated at MR-11 if construction activities are conducted outside of construction noise exempt hours and mitigation may be necessary in order to prevent noise impacts at MR-11.

Due to the uncertainty in regards to the time and location of construction activities and equipment that would be utilized during nighttime hours, it is difficult to ascertain when there would or would not be noise impacts at specific noise-sensitive receptors. Under Alternative 2, mitigation measures would be necessary for all of these long-term, short-term, and modeled receiver sites where the daytime and nighttime exterior noise standards would be exceeded outside of construction noise exempt hours. Implementation of the mitigation measures discussed in Section 2.4 would reduce the construction noise effects during non-exempt hours at human noise sensitive receptors to less than significant. Additionally, if noise complaints are to occur from construction activities in non-exempt hours, it is expected that the Corps contractor would address those complaints and implement further mitigation, as needed, to reduce these effects. As a result, it is assumed that any significant effects associated with noise would be reduced to less than significant, with the implementation of the mitigation discussed in Section 2.4, and by responding to noise complaints when they are received. Furthermore, due to the many variables that need to be taken into account for non-exempt construction activities, it is recommended that a noise monitoring program be instituted in order to ensure compliance and establish the necessary mitigation measures where they are needed.

Noise levels would not exceed 60 dBA L_{eq} at any wildlife receptor site, therefore there are no expected impacts to wildlife habitat during non-exempt construction noise hours.

2.3.6 Noise Prediction Model Results and Analysis for Alternative 3 Non-Exempt Construction Noise Hours Activities

There are several potential construction activities planned for Alternative 3 that may be conducted outside of construction noise exempt times. These activities are marked with an asterisk in Tables 15 and 17. “Fill cells” and “intake approach walls and slab activities” were the only construction activities modeled at the Approach Channel/Spur Dike Area because they are the loudest and quietest individual construction activities, respectively, that would be conducted during non-exempt hours for Alternative 3. Table 31 lists the noise levels generated at noise-sensitive receptors by individual construction activities, including “fill cells”, at specific areas of the proposed project during non-exempt hours. At the bottom of the table, the cumulative noise level is listed under each noise-sensitive receptor column if the construction activities would be conducted simultaneously from each respective construction activity area for the proposed project. Figure 5 depicts the resulting cumulative noise contours if these construction activities were conducted simultaneously. Table 32 explores potential combinations of construction activities and lists the modeled noise levels at noise-sensitive receptors if

Figure 5. Alternative 3 – Non-Exempt Hour Simultaneous Construction Activities w/ Fill Cells Activities (INSERT FIGURE)

Table 31. Alternative 3 Non-Exempt Hour Construction Activities with Fill Cells Activities

Construction Activity	Noise Levels Generated by Individual Construction Activities at Noise-Sensitive Receptor During Non-Exempt Hours (Fill Cells)											
	MR-1a	MR-1b	LT-2	LT-3	LT-4	LT-5	LT-6	ST-7	ST-8	MR-9	MR-10	MR-11
Fill Cells	49	48	52	61	46	42	49	51	56	49	54	51
Prison Staging Area w/ Batch Plant	39	35	31	33	21	22	45	32	28	27	32	24
Transload Facility Construction/Removal	40	36	46	56	41	36	35	37	55	47	43	46
Dike 7 Staging Area	30	29	46	59	21	25	24	23	33	31	54	28
Dike 8 Disposal Area	27	21	35	39	35	30	24	23	57	47	31	54
MIAD Disposal and Staging Area w/ Batch Plant	26	20	33	34	60	42	24	22	43	53	29	36
Overlook Staging Area w/ Batch Plant	35	32	33	41	30	26	35	37	36	33	37	34
Haul Road	14	13	21	34	28	14	9	4	37	32	24	30
Cumulative Noise Level	**50**	**49**	**54**	**64**	**60**	**46**	**51**	**52**	**61**	**56**	**57**	**56**

Note: Noise effects are highlighted in gray if construction (1) could be conducted outside of construction noise exempt hours and (2) would exceed either the daytime exterior noise standard of 50 dBA L_{50} or the nighttime exterior noise standard of 45 dBA L_{50}.

Table 32. Alternative 3 Simultaneous Non-Exempt Hour Construction Activity Combinations with Fill Cells Activities

Construction Activity Combinations	Cumulative Noise Levels Generated by Simultaneous Construction Activity Combinations at Noise-Sensitive Receptor During Non-Exempt Hours (Fill Cells)											
	MR-1a	MR-1b	LT-2	LT-3	LT-4	LT-5	LT-6	ST-7	ST-8	MR-9	MR-10	MR-11
Cumulative Noise Level (Without Fill Cells)	**43**	**40**	**49**	**61**	**60**	**43**	**46**	**41**	**59**	**55**	**54**	**55**
Cumulative Noise Level (Without Prison Staging Area w/ Batch Plant)	**50**	**49**	**54**	**64**	**60**	**46**	**50**	**52**	**61**	**56**	**57**	**56**
Cumulative Noise Level (Without Transload Facility Construction)	**50**	**49**	**53**	**63**	**60**	**45**	**51**	**52**	**60**	**55**	**57**	**56**
Cumulative Noise Level (Without Dike 7 Staging Area)	**50**	**49**	**53**	**62**	**60**	**46**	**51**	**52**	**61**	**56**	**55**	**56**

Construction Activity Combinations	Cumulative Noise Levels Generated by Simultaneous Construction Activity Combinations at Noise-Sensitive Receptor During Non-Exempt Hours (Fill Cells)											
	MR-1a	**MR-1b**	**LT-2**	**LT-3**	**LT-4**	**LT-5**	**LT-6**	**ST-7**	**ST-8**	**MR-9**	**MR-10**	**MR-11**
Cumulative Noise Level (Without Dike 8 Disposal Area)	**50**	**49**	**54**	**64**	**60**	**46**	**51**	**52**	**59**	**55**	**57**	**52**
Cumulative Noise Level (Without MIAD Disposal and Staging Area w/ Batch Plant)	**50**	**49**	**54**	**64**	**48**	**44**	**51**	**52**	**61**	**53**	**57**	**56**
Cumulative Noise Level (Without Overlook Staging Area w/ Batch Plant)	**50**	**49**	**54**	**64**	**60**	**46**	**51**	**52**	**61**	**56**	**57**	**56**
Cumulative Noise Level (Without MIAD Disposal and Staging Areas and Dike 8 Disposal Area)	**50**	**49**	**54**	**64**	**48**	**43**	**51**	**52**	**59**	**52**	**57**	**52**
Cumulative Noise Level (Without Transload Facility Construction and Dike 7 Staging Area)	**50**	**49**	**52**	**61**	**60**	**45**	**51**	**52**	**60**	**55**	**55**	**56**
Cumulative Noise Level (With Fill Cells, Overlook Staging Area w/ Batch Plant, and Haul Road Only)	**50**	**48**	**52**	**61**	**47**	**43**	**49**	**52**	**56**	**50**	**54**	**51**

Note: Noise effects are highlighted in gray if construction (1) could be conducted outside of construction noise exempt hours and (2) would exceed either the daytime exterior noise standard of 50 dBA L_{50} or the nighttime exterior noise standard of 45 dBA L_{50}.

Table 33. Alternative 3 Non-Exempt Hour Construction Activities with Intake Approach Walls and Slab Construction

Construction Activity	Noise Levels Generated by Individual Construction Activity at Noise-Sensitive Receptor											
	MR-1a	**MR-1b**	**LT-2**	**LT-3**	**LT-4**	**LT-5**	**LT-6**	**ST-7**	**ST-8**	**MR-9**	**MR-10**	**MR-11**
Intake Approach Walls and Slab	32	31	35	43	29	25	32	34	39	32	37	33
Prison Staging Area w/ Batch Plant	39	35	31	33	21	22	45	32	28	27	32	24
Transload Facility Construction/Removal	40	36	46	56	41	36	35	37	55	47	43	46
Dike 7 Staging Area	30	29	46	59	21	25	24	23	33	31	54	28
Dike 8 Disposal Area	27	21	35	39	35	30	24	23	57	47	31	54
MIAD Disposal and Staging Area w/	26	20	33	34	60	42	24	22	43	53	29	36

Construction Activity	Noise Levels Generated by Individual Construction Activity at Noise-Sensitive Receptor											
	MR-1a	MR-1b	LT-2	LT-3	LT-4	LT-5	LT-6	ST-7	ST-8	MR-9	MR-10	MR-11
Batch Plant												
Overlook Staging Area w/ Batch Plant	35	32	33	41	30	26	35	37	36	33	37	34
Haul Road	14	13	21	34	28	14	9	4	37	32	24	30
Cumulative Noise Level	**44**	**40**	**49**	**61**	**60**	**43**	**46**	**41**	**59**	**55**	**54**	**55**

Note: Noise effects are highlighted in gray if construction (1) could be conducted outside of construction noise exempt hours and (2) would exceed either the daytime exterior noise standard of 50 dBA L_{50} or the nighttime exterior noise standard of 45 dBA L_{50}.

Table 34. Alternative 3 Simultaneous Non-Exempt Hour Construction Activity Combinations with Intake Approach Walls and Slab Construction

Construction Activity Combinations	Cumulative Noise Levels Generated by Simultaneous Construction Activity Combinations at Noise-Sensitive Receptor During Non-Exempt Hours (Intake Approach Walls and Slab Construction)											
	MR-1a	MR-1b	LT-2	LT-3	LT-4	LT-5	LT-6	ST-7	ST-8	MR-9	MR-10	MR-11
Cumulative Noise Level (Without Intake Approach Walls and Slab Construction)	**43**	**40**	**49**	**61**	**60**	**43**	**46**	**41**	**59**	**55**	**54**	**55**
Cumulative Noise Level (Without Prison Staging Area w/ Batch Plant)	**42**	**39**	**49**	**61**	**60**	**43**	**40**	**41**	**59**	**55**	**54**	**55**
Cumulative Noise Level (Without Transload Facility Construction)	**42**	**38**	**47**	**59**	**60**	**42**	**46**	**40**	**58**	**54**	**54**	**54**
Cumulative Noise Level (Without Dike 7 Staging Area)	**44**	**40**	**47**	**57**	**60**	**43**	**46**	**41**	**59**	**55**	**45**	**55**
Cumulative Noise Level (Without Dike 8 Disposal Area)	**44**	**40**	**49**	**61**	**60**	**43**	**46**	**41**	**55**	**54**	**54**	**47**
Cumulative Noise Level (Without MIAD Disposal and Staging Area w/ Batch Plant)	**44**	**40**	**49**	**61**	**43**	**38**	**46**	**41**	**59**	**50**	**54**	**55**
Cumulative Noise Level (Without Overlook Staging Area w/ Batch Plant)	**43**	**40**	**49**	**61**	**60**	**43**	**46**	**40**	**59**	**55**	**54**	**55**

Construction Activity Combinations	Cumulative Noise Levels Generated by Simultaneous Construction Activity Combinations at Noise-Sensitive Receptor During Non-Exempt Hours (Intake Approach Walls and Slab Construction)											
	MR-1a	**MR-1b**	**LT-2**	**LT-3**	**LT-4**	**LT-5**	**LT-6**	**ST-7**	**ST-8**	**MR-9**	**MR-10**	**MR-11**
Cumulative Noise Level (Without MIAD Disposal and Staging Areas and Dike 8 Disposal Area)	**44**	**40**	**49**	**61**	**42**	**37**	**46**	**41**	**55**	**47**	**54**	**47**
Cumulative Noise Level (Without Transload Facility Construction and Dike 7 Staging Area)	**41**	**38**	**41**	**47**	**60**	**42**	**46**	**40**	**58**	**54**	**42**	**54**
Cumulative Noise Level (With Intake Approach Walls and Slab Construction, Overlook Staging Area w/ Batch Plant, and Haul Road Only)	**37**	**35**	**37**	**46**	**34**	**29**	**37**	**39**	**42**	**37**	**40**	**37**

Note: Noise effects are highlighted in gray if construction (1) could be conducted outside of construction noise exempt hours and (2) would exceed either the daytime exterior noise standard of 50 dBA L_{50} or the nighttime exterior noise standard of 45 dBA L_{50}.

specific activities are removed from simultaneous non-exempt hour construction activities. In Tables 31 and 32, individual and cumulative noise levels are highlighted in gray if the 45 dBA L_{50} nighttime noise threshold would be exceeded during non-exempt hours at each noise-sensitive receptor. Table 33 lists the noise levels generated at noise-sensitive receptors by individual construction activities, including “intake approach walls and slab construction”, at specific areas of the proposed project during non-exempt hours. At the bottom of the table, the cumulative noise level is listed under each noise-sensitive receptor column if the construction activities would be conducted simultaneously from each respective construction activity area for the proposed project. Figure 4 depicts the resulting cumulative noise contours if these construction activities were conducted simultaneously. This is the same figure for Alternatives 2 and 3 because “intake approach walls and slab activities” are the quietest noise generating activities that would be conducted at the Approach Channel/Spur Dike Area for both alternatives. Table 34 explores potential combinations of construction activities and lists the modeled noise levels at noise-sensitive receptors if specific activities are removed from simultaneous non-exempt hour construction activities. In Tables 33 and 34, individual and cumulative noise levels are highlighted in gray if the 45 dBA L_{50} nighttime noise threshold would be exceeded during non-exempt hours at each noise-sensitive receptor. It should be noted that there is a 50 dBA L_{50} daytime noise standard that would be applicable from 6:00 p.m. to 10:00 p.m. because noise construction activities would potentially occur during this timeframe and outside of the construction noise exempt hours. The 50 dBA L_{50} daytime noise standard would not be allowed to be exceeded from 6:00 p.m. to 10:00 p.m. as well. The 45 dBA L_{50} nighttime noise standard is the most restrictive non-exempt hour noise standard and it is used for analyzing potential noise impacts outside of construction noise exempt hours since there is no definitive construction schedule.

Many of the construction activities listed in Table 17 have the potential to be conducted simultaneously and there is no definitive time and place where construction activities would be conducted during non-exempt construction hours. Tables 31, 32, 33 and 34 illustrate that certain construction activities generate higher levels of noise impacts at specific receptors. A brief description of the major noise contributing construction activities that could generate noise impacts at each noise-sensitive receptor is included below. Major noise contributing construction activities are defined as activities that generate noise levels of 35 dBA or higher at any noise-sensitive receptors.

1. At Folsom State Prison (MR-1a and MR-1b), it is assumed that the prison structures would provide a minimum of 30 dBA attenuation due to the concrete walls and small, thick glass windows. It is also assumed that the exterior concrete walls surrounding the prison facility would provide an additional 5 dBA of attenuation. Taking these assumptions into account, noise levels at Folsom State Prison would not be significant.
2. At Tacana Drive and East Natoma Street (LT-2), fill cells, transload facility construction/removal, and Dike 7 staging area utilization activities would generate noise levels that exceed the 45 dBA L_{50} nighttime exterior noise standard if the activities would be conducted individually. The major noise

contributing activities at LT-2 would be Approach Channel/Spur Dike construction activities, transload facility construction/removal activities, and utilization of the Dike 7 staging area. Potential construction noise impacts may be generated at LT-2 if construction activities are conducted outside of construction noise exempt hours and mitigation may be necessary in order to prevent noise impacts at LT-2.

3. At Mountain View Drive (LT-3), fill cells, transload facility construction/removal, and Dike 7 staging area utilization activities would generate noise levels that exceed the 45 dBA L_{50} nighttime exterior noise standard if the activities would be conducted individually. The major noise contributing activities at LT-3 would be Approach Channel/Spur Dike construction activities, transload facility construction/removal activities, utilization of the Dike 7 and Overlook staging areas, and utilization of the Dike 8 disposal area. Potential construction noise impacts may be generated at LT-3 if construction activities are conducted outside of construction noise exempt hours and mitigation may be necessary in order to prevent noise impacts at LT-3.

4. At East Natoma Street and Green Valley Road (LT-4), fills cells and MIAD disposal and staging area utilization activities would generate noise levels that exceed the 45 dBA L_{50} nighttime exterior noise standard if the activities would be conducted individually. The major noise contributing activities at LT-4 would be Approach Channel/Spur Dike construction activities, transload facility construction/removal activities, utilization of the Dike 8 disposal area, and utilization of the MIAD disposal and staging areas. Potential construction noise impacts may be generated at LT-4 if construction activities are conducted outside of construction noise exempt hours and mitigation may be necessary in order to prevent noise impacts at LT-4.

5. At East of Folsom Auburn Rd. and Pierpoint Circle (LT-6), fills cells and Prison staging area utilization activities would generate noise levels that exceed the 45 dBA L_{50} nighttime exterior noise standard if the activities would be conducted individually. The major noise contributing activities at LT-6 would be Approach Channel/Spur Dike construction activities, utilization of the Prison or Overlook staging areas, and transload facility construction/removal activities. Potential construction noise impacts may be generated at LT-6 if construction activities are conducted outside of construction noise exempt hours and mitigation may be necessary in order to prevent noise impacts at LT-6.

6. At the Beal's Point Campground (ST-7), guests would be staying overnight. Fill cells construction activities would generate noise levels that exceed the 45 dBA L_{50} nighttime exterior noise standard if it would be conducted by itself without any other simultaneous construction activities. The major noise contributing activities at ST-7 would be Approach Channel/Spur Dike construction activities, transload facility construction/removal activities, utilization of the Overlook staging area. Potential construction noise impacts may be generated at ST-7 if construction activities are conducted outside of construction noise exempt hours and mitigation may be necessary in order to prevent noise impacts at ST-7.

7. At Folsom Point Park (ST-8), guests would not be staying overnight. Therefore, there are no anticipated noise impacts during non-exempt hours.

8. At East Natoma Street and Briggs Ranch Drive (MR-9), fill cells, transload facility construction/removal, Dike 8 disposal area utilization, and MIAD staging and disposal area utilization activities would generate noise levels that exceed the 45 dBA L_{50} nighttime exterior noise standard if the activities would be conducted individually. The major noise contributing activities at MR-9 are Approach Channel/Spur Dike construction activities, transload facility construction/removal activities, utilization of the Dike 8 disposal area, and utilization of the MIAD disposal and staging area. Potential construction noise impacts may be generated at MR-9 if construction activities are conducted outside of construction noise exempt hours and mitigation may be necessary in order to prevent noise impacts at MR-9.

9. At Lorena Lane (MR-10), fill cells and Dike 7 staging area utilization activities would generate noise levels that exceed the 45 dBA L_{50} nighttime exterior noise standard if the activities would be conducted individually. The major noise contributing activities at MR-10 would be Approach Channel/Spur Dike construction activities, transload facility construction/removal activities, utilization of the Dike 7 staging area, and utilization of the Overlook staging area. Potential construction noise impacts may be generated at MR-10 if construction activities are conducted outside of construction noise exempt hours and mitigation may be necessary in order to prevent noise impacts at MR-10.

10. At Folsom Point Church of Christ (MR-11), fill cells, transload facility construction/removal, and Dike 8 disposal area utilization activities would generate noise levels that exceed the 45 dBA L_{50} nighttime exterior noise standard if the activities would be conducted individually. The major noise contributing activities at MR-11 would be Approach Channel/Spur Dike construction activities, transload facility construction/removal activities, utilization of the Dike 8 disposal area, and utilization of the MIAD disposal and staging area. Potential construction noise impacts may be generated at MR-11 if construction activities are conducted outside of construction noise exempt hours and mitigation may be necessary in order to prevent noise impacts at MR-11.

Due to the uncertainty in regards to the time and location of construction activities and equipment that would be utilized during nighttime hours, it is difficult to ascertain when there would or would not be noise impacts at specific noise-sensitive receptors. Under Alternative 3, mitigation measures would be necessary for all of these long-term, short-term, and modeled receiver sites where the daytime and nighttime exterior noise standards would be exceeded outside of construction noise exempt hours. Implementation of the mitigation measures discussed in Section 2.4 would reduce the construction noise effects during non-exempt hours at human noise sensitive receptors to less than significant. Additionally, if noise complaints are to occur from construction activities in non-exempt hours, it is expected that the Corps contractor would address those complaints and implement further mitigation, as needed, to reduce these effects. As a result, it is assumed that any significant effects associated with noise would be reduced to less than significant, with the implementation of the mitigation discussed in Section 2.4, and by responding to noise complaints when they are received. Furthermore, due to the many variables that need to be taken into account for non-exempt construction activities, it is recommended that a noise monitoring program be instituted in order to ensure compliance and establish the necessary mitigation measures where they are needed.

Noise levels would not exceed 60 dBA L_{eq} at any wildlife receptor site, therefore there are no expected impacts to wildlife habitat during non-exempt construction noise hours.

2.3.7 Noise Prediction Model Results and Analysis for Blasting Activities

A noise modeling program known as BNoise2 is used in order to determine the sound power level of an individual blast. Assumptions are made based on data provided by the USACE and information in Appendix E (Technical Noise Report) of the 2010 EA/IS for the Joint Federal Project for the Construction of the Control Structure and Lining of the Spillway Chute and Stilling Basin. The following assumptions are:

- There would be approximately 400 blasts in-the-wet and 200 blasts in-the-dry from February 2014 to August 2017 (approximately 1,100 days of work) for Alternative 2. This results in an approximately one blast every other day
- There would be approximately 200 blasts in-the-wet and 280 blasts in-the-dry from February 2014 to August 2017 (approximately 1,100 days of work) for Alternative 3. This results in approximately one blast every other day
- Ammonium nitrate and fuel oil (ANFO) charges would be used
- A charge weight of 44 pounds would be packed in 20-foot deep borings
- The borings would be spaced 5 feet apart in a 20-foot-wide bench
- The most charges that would be used during any blast is 75 charges

Using the assumptions above, BNoise2 calculated a SPL of 84.5 dBC SEL at 328 feet for one charge. If 75 charges are used, the PWL would be 141.2 dBA at 328 feet. This PWL is input into the Cadna/A model at the approach channel excavation area in order to account for changes in topography. Table 35 shows the resulting SELs at each noise-sensitive receiver.

Table 35. Noise Levels at Noise-Sensitive Receivers due to Individual Blasts

Site ID	Noise Level due to Individual Blast (dBA SEL)
MR-1a	54
MR-1b	50

Table 35. Noise Levels at Noise-Sensitive Receivers due to Individual Blasts

Site ID	Noise Level due to Individual Blast (dBA SEL)
LT-2	48
LT-3	60
LT-4	45
LT-5	51
LT-6	57
ST-7	60
ST-8	59
MR-9	54
MR-10	51
MR-11	48
Bio-1	40
Bio-2	55
Bio-3	43
Bio-4	41
Bio-5	45
Bio-6	50
Bio-7	44
Bio-8	44

Blasting would be conducted during construction noise exempt hours and would only be at the noise levels listed in Table 35 for no more than a few seconds. This would not significantly increase any of the modeled L_{eq}s for other construction noise exempt hour activities. There would be no noise impacts at human or wildlife noise-sensitive receivers due to blasting.

2.3.8 Noise Impacts on Fish

Potential Impacts on Fish. As identified previously, underwater sound from blasting and pile driving has the potential to impact fish inhabiting Folsom Lake. Noise potentially causes both auditory and non-auditory effects on fish. The non-auditory effects of noise may be obvious, for instance when an underwater detonation of explosives results in floating dead fish. Other injuries, such as swim bladder rupture in fish, may be shown only by dissection of exposed individuals. These adverse impacts only occur at high levels of sound, typically within tens, or at most a few hundred meters of underwater blasts, and hence affect relatively small areas and numbers of individuals (Nedwell and Edwards 2004).

The auditory effects of sound include temporary or permanent noise-induced deafness. Behavioral effects elicited by underwater noise can include a startle reaction or a species avoiding an area of high noise. Such responses are poorly understood or documented, yet behavioral effects may have an influence over great ranges, often kilometers, reaching much larger numbers of individuals. Fish response to sound can also be varied, ranging from the classic fright response that results in a startle behavior and sudden burst of short duration and distance swimming, to other responses such as packing or balling, polarizing, increasing swimming speed, diving, or avoidance (Olsen 1969).

Extremely loud sound levels can have very negative effects on fish including temporary or permanent deafness, tissue damage, and even acute mortality. The most severe instances, often associated with explosive sources, result from a high amplitude shock wave caused by the initial impulse and the negative pressure wave reflected by the water surface (Turnpenny and Nedwell 1994; Houghton and Munday 1987). Tissue damage arises when the wave passes through tissues of different densities. A wave passed through the tissues at different speeds can result in a shear environment, and in extreme cases the tissues can be torn apart. This is most severe where tissue density differences are the greatest, which in the case of demersal fish, is at the muscle - swim bladder interface (Turnpenny and Nedwell 1994).

This physical trauma, often termed barotrauma, has a direct impact on the fish and health of the fish. The degree of this impact has been characterized as a numerical scale (O'Keefe and Young 1984; based on an earlier scale developed by Hubbs et al. 1960). These numerical explosion damage criteria for fish cover the range of gross visible effects from exposure to large high amplitude shockwaves:

1. No damage (fish survives)
2. Light hemorrhaging (fish survives)
3. Light hemorrhaging and some kidney damage (impaired escape response and possible increased vulnerability to predation)
4. Swimbladder bursts and gross kidney damage (fish killed)
5. Incomplete body wall break and gross internal damage (fish killed)
6. Complete rupture of body cavity and organ destruction (fish killed)

While this range is diagnostic for direct trauma due to high amplitude shockwaves, it also applies for high intensity sound waves generated by other sources such as impact pile driving.

This definition of direct effects also implies indirect effects to fish due to noise impacts. These indirect effects usually manifest themselves as a reduction in the ability to evade predation (stunning, or reduced swimming ability), a change in behavior that leads to increased exposure to predation (inability to access a refuge habitat), or an inability to detect predators or prey effectively (temporary or permanent deafness).

The underwater sound levels associated with blasting depends on the size of the charge.

Blasting In-the-Wet. Wet blasting will generate very little airborne noise, but has the potential to kill fish in Folsom Lake. It is likely that some fish will be killed during wet blasting. Recommended mitigation procedures are described in the mitigation section.

Drilling In-the-Wet. Drilling generates noise from both the drill bit striking the rock near the collar of the holes, as well as from mechanical equipment and compressors used on the drills. If the drilling occurs with three or more feet of water, noise made from drill bit striking the rock will be almost immeasurable in air. Drilling from platforms will not occur in less than 35 feet of water, and thus is not expected to generate measurable noise in air. It is likely that some fish will be disturbed during drilling, but underwater sound levels are not expected to result in injury or death to fish.

2.4 Mitigation

The following measures would be implemented in order to reduce noise effects from general construction activities to less than significant. Any activity that would generate noise that could not be mitigated to less than significant would be conducted only during those hours when construction noise is exempt.

(1). Conduct the loudest construction activities only during construction noise exempt hours. These activities include pile driving, blasting, drilling, and dredging.

(2). Establish a noise monitoring program for construction activities conducted outside of construction noise exempt hours in order to maintain compliance with exterior noise standards.

(3). Contractor would be responsible for maintaining equipment in best possible working condition.

(4). Each piece of construction equipment would be fitted with efficient, well-maintained mufflers.

(5). Schedule truck loading, unloading, and hauling operations during non-exempt construction hours as much as practical.

(6). Locate construction equipment as far as possible from nearby noise-sensitive receptors. In particular, locating the batch plant at the Folsom Overlook staging area would reduce noise effects on sensitive receptors during non-exempt hours.

(7). Situate construction equipment so that natural berms or aggregate stockpiles are located in between the equipment and noise-sensitive receptors.

(8). Enclose pumps that are not submerged and enclose above-ground conveyor systems in acoustically treated enclosures.

(9). Line or cover hoppers, conveyor transfer points, storage bins and chutes with sound-deadening material.

(10). Acoustically attenuating shielding (barriers) and shrouds would be used when possible.

(11). Use blast mats to cover blasts in order to minimize the possibility of fly rock.

(12). For construction activities being conducted outside of construction noise exempt hours, the Contractor would obtain a permit from all nearby cities and counties in the vicinity of the project.

(13). For drilling activities in the water, the use of down-the-hole-hammers are recommended, which produce much less noise than top-hammer drills from the striking bar.

If all of these mitigation procedures are put into practice for Alternatives 2 and 3, there is still the potential for construction activities that are conducted during non-exempt hours to exceed the daytime and nighttime noise standards at noise-sensitive receptors.

Specific mitigation measures should be utilized in order to reduce noise levels from blasting. The BMPs listed below assume use of the standard practice of linear (rather than spherical) charges, and standard timing separation of 8 milliseconds to reduce cumulative effects between adjacent charges. BMPs include:

- Designing efficient detonations (“blast design”) that fracture the rock with minimal energy released to surrounding water.[1] Efficient detonations are achieved by:
    - Establishing a not-to-exceed peak pressure-change (over-pressure) limit of 100kPa (14.5 psi).
    - Controlling maximum pressure thresholds by establishing cautious charge confinement rules regarding the type and amount of stemming[2] (material placed in the upper portions of blast holes), and the amount of confining rock burden between charges and the free or open face to which they break.
    - Monitoring peak blast-induced pressure and impulse;

[1] The use of stemming to confine blasts, results in several typically listed BMPs becoming less necessary to minimize the impact of the underwater blast on fish. Stemming is used to control extreme peak pressures spikes released in the water. Another method of removing steep peak pressure spikes is to specify the burn rate of the exploding charge or Velocity of Detonation (VOD) which impacts the relative amounts of gas versus shock energy. Specifying the explosive properties, therefore, is not necessary as a BMP when proper stemming is utilized.

[2] Stemming is the practice of placing inert material on the top of the charge to help confine the energy released by the charge to the material to be demolished, and reduce the energy released to the water or air.

- o Requiring the use of multiple time-sequenced charges that will reduce the cumulative impacts on the water environment;
- o Timing blasting when fish tend to be in streams in northern tributaries far from the blast site, e.g., February through June for rainbow trout; the timing of spawning of Chinook salmon in Folsom Lake is not well characterized.
- o Setting off small charges (“scare charges”) or firing air-cannons into the water before blasting to chase fish from the blast area;
- o Grouping continuous periods of noisy work or simultaneous noisy work (e.g., multiple drill barges) to prevent the fish from re-entering the area during short quiet periods);
- o Using air curtains or bubble curtains to attenuate pressure waves. Air supply to bubble pipes would be provided by clean-air compressors that contain no oil or other contaminants.
- o Not using ammonium nitrate-fuel oil mixtures (ANFO) in or near water because they will not function as desired and if released into water they will dissolve and release toxic by-products (ammonia and nitrates)

- For drilling activities in the water, BMP’s include the use of down-the-hole-hammers, which produce much less noise than top-hammer drills from the striking bar.

2.5 Cumulative

There is the potential for future construction activities that are conducted concurrently throughout the life of the Folsom Dam JFP and involved with other projects in the vicinity of the Project to temporarily increase noise levels in the surrounding areas. The projects include:

- Johnny Cash Folsom Prison Blues Trail: Historic Truss Bridge to Green Valley Road Segment
- Raw Water Bypass Pipeline Project
- Central California Area Office Building Replacement Project
- Lower American River Salmonid Spawning Gravel Augmentation and Side-channel Habitat Establishment Program
- Folsom Dam Safety and Flood Damage Reduction Project Ongoing Construction Activities
- Widening of Green Valley Road
- Folsom Dam Raise

Simultaneous construction of these projects would increase noise levels, from onsite construction and transport of materials. The worst case assumption indicates that simultaneous construction could potentially increase source noise emissions by 3 dBA. If these construction projects are implemented concurrently, the combined cumulative effects could be above significance thresholds. If this were the case, each project would need to mitigate individual noise effects which could decrease overall cumulative effects. However, without consideration of scheduling and sequence of activities, determination of whether concurrent construction projects within and adjacent to Folsom Lake could have significant cumulative noise effects is not possible. Construction involved with both the Folsom Dam JFP and the projects listed above are temporary in nature and, therefore, there would be no cumulative noise effects other than increases in noise levels during simultaneous construction activities.

2.6 Summary/Conclusion

The largest noise impacts from the proposed Project are due to construction activities being conducted outside of construction noise exempt hours. There is no definitive schedule in regards to the time and location of construction equipment utilization during non-exempt hours. Therefore, construction activities conducted outside of the construction noise exempt hours may exceed the noise significance critieria. Mitigation would be necessary in order to reduce noise impacts, but even with mitigation, there is the potential for noise impacts outside of construction noise exempt hours.

Noise levels would not exceed the 60 dBA L_{eq} at wildlife receptor sites. There are no expected noise impacts.

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LT-2 (Tacana Drive and E. Natoma St.)

Date	Start Time	End Time	Hourly L_{eq} (dBA)
3/25/2009	17:00:00	18:00:00	68.9
3/25/2009	18:00:00	19:00:00	68.4
3/25/2009	19:00:00	20:00:00	67.8
3/25/2009	20:00:00	21:00:00	65.9
3/25/2009	21:00:00	22:00:00	65.7
3/25/2009	22:00:00	23:00:00	62.9
3/25/2009	23:00:00	0:00:00	60.0
3/26/2009	0:00:00	1:00:00	56.6
3/26/2009	1:00:00	2:00:00	56.9
3/26/2009	2:00:00	3:00:00	51.5
3/26/2009	3:00:00	4:00:00	58.8
3/26/2009	4:00:00	5:00:00	57.1
3/26/2009	5:00:00	6:00:00	63.8
3/26/2009	6:00:00	7:00:00	67.6
3/26/2009	7:00:00	8:00:00	68.3
3/26/2009	8:00:00	9:00:00	69.4
3/26/2009	9:00:00	10:00:00	68.4
3/26/2009	10:00:00	11:00:00	67.8
3/26/2009	11:00:00	12:00:00	69.0
3/26/2009	12:00:00	13:00:00	68.1
3/26/2009	13:00:00	14:00:00	68.6
3/26/2009	14:00:00	15:00:00	69.1
3/26/2009	15:00:00	16:00:00	68.8
3/26/2009	16:00:00	17:00:00	69.4

LT-3 (Mountain View Dr.)

Date	Start Time	End Time	Hourly L_{eq} (dBA)
3/24/2009	15:00:00	16:00:00	47.5
3/24/2009	16:00:00	17:00:00	46.3
3/24/2009	17:00:00	18:00:00	48.7
3/24/2009	18:00:00	19:00:00	45.7
3/24/2009	19:00:00	20:00:00	43.1
3/24/2009	20:00:00	21:00:00	42.2
3/24/2009	21:00:00	22:00:00	42.1
3/24/2009	22:00:00	23:00:00	41.1
3/24/2009	23:00:00	0:00:00	40.7
3/25/2009	0:00:00	1:00:00	35.9
3/25/2009	1:00:00	2:00:00	34.7
3/25/2009	2:00:00	3:00:00	32.8
3/25/2009	3:00:00	4:00:00	34.3
3/25/2009	4:00:00	5:00:00	37.6
3/25/2009	5:00:00	6:00:00	42.0
3/25/2009	6:00:00	7:00:00	46.4
3/25/2009	7:00:00	8:00:00	49.9
3/25/2009	8:00:00	9:00:00	50.6
3/25/2009	9:00:00	10:00:00	47.6
3/25/2009	10:00:00	11:00:00	47.9
3/25/2009	11:00:00	12:00:00	49.5
3/25/2009	12:00:00	13:00:00	50.5
3/25/2009	13:00:00	14:00:00	50.9
3/25/2009	14:00:00	15:00:00	50.7

LT-4 (E. Natoma St. and Green Valley Rd.)

Date	Start Time	End Time	Hourly L_{eq} (dBA)
3/24/2009	14:00:00	15:00:00	73.8
3/24/2009	15:00:00	16:00:00	73.9
3/24/2009	16:00:00	17:00:00	74.1
3/24/2009	17:00:00	18:00:00	74.1
3/24/2009	18:00:00	19:00:00	73.8
3/24/2009	19:00:00	20:00:00	72.2
3/24/2009	20:00:00	21:00:00	71.2
3/24/2009	21:00:00	22:00:00	71.2
3/24/2009	22:00:00	23:00:00	68.1
3/24/2009	23:00:00	0:00:00	65.4
3/25/2009	0:00:00	1:00:00	62.5
3/25/2009	1:00:00	2:00:00	61.0
3/25/2009	2:00:00	3:00:00	58.0
3/25/2009	3:00:00	4:00:00	60.1
3/25/2009	4:00:00	5:00:00	65.1
3/25/2009	5:00:00	6:00:00	70.1
3/25/2009	6:00:00	7:00:00	73.2
3/25/2009	7:00:00	8:00:00	75.2
3/25/2009	8:00:00	9:00:00	75.0
3/25/2009	9:00:00	10:00:00	73.3
3/25/2009	10:00:00	11:00:00	73.5
3/25/2009	11:00:00	12:00:00	73.1
3/25/2009	12:00:00	13:00:00	72.9
3/25/2009	13:00:00	14:00:00	74.1

LT-5 (Shadowfax Court)

Date	Start Time	End Time	Hourly L_{eq} (dBA)
3/24/2009	13:00:00	14:00:00	50.9
3/24/2009	14:00:00	15:00:00	46.0
3/24/2009	15:00:00	16:00:00	49.0
3/24/2009	16:00:00	17:00:00	48.9
3/24/2009	17:00:00	18:00:00	50.8
3/24/2009	18:00:00	19:00:00	57.5
3/24/2009	19:00:00	20:00:00	48.5
3/24/2009	20:00:00	21:00:00	47.9
3/24/2009	21:00:00	22:00:00	49.0
3/24/2009	22:00:00	23:00:00	41.4
3/24/2009	23:00:00	0:00:00	39.8
3/25/2009	0:00:00	1:00:00	39.5
3/25/2009	1:00:00	2:00:00	34.1
3/25/2009	2:00:00	3:00:00	36.4
3/25/2009	3:00:00	4:00:00	33.1
3/25/2009	4:00:00	5:00:00	37.1
3/25/2009	5:00:00	6:00:00	44.1
3/25/2009	6:00:00	7:00:00	50.2
3/25/2009	7:00:00	8:00:00	50.1
3/25/2009	8:00:00	9:00:00	49.3
3/25/2009	9:00:00	10:00:00	44.9
3/25/2009	10:00:00	11:00:00	44.0
3/25/2009	11:00:00	12:00:00	43.3
3/25/2009	12:00:00	13:00:00	45.7

LT-6 (East of Folsom Auburn Rd. and Pierpoint Circle)

Date	Start Time	End Time	Hourly L_{eq} (dBA)
3/24/2009	15:00:00	16:00:00	56.8
3/24/2009	16:00:00	17:00:00	54.5
3/24/2009	17:00:00	18:00:00	49.6
3/24/2009	18:00:00	19:00:00	40.8
3/24/2009	19:00:00	20:00:00	47.1
3/24/2009	20:00:00	21:00:00	45.9
3/24/2009	21:00:00	22:00:00	41.6
3/24/2009	22:00:00	23:00:00	38.2
3/24/2009	23:00:00	0:00:00	35.7
3/25/2009	0:00:00	1:00:00	34.4
3/25/2009	1:00:00	2:00:00	35.4
3/25/2009	2:00:00	3:00:00	31.7
3/25/2009	3:00:00	4:00:00	36.4
3/25/2009	4:00:00	5:00:00	33.5
3/25/2009	5:00:00	6:00:00	38.2
3/25/2009	6:00:00	7:00:00	41.5
3/25/2009	7:00:00	8:00:00	45.9
3/25/2009	8:00:00	9:00:00	49.0
3/25/2009	9:00:00	10:00:00	45.4
3/25/2009	10:00:00	11:00:00	51.1
3/25/2009	11:00:00	12:00:00	49.1
3/25/2009	12:00:00	13:00:00	48.8
3/25/2009	13:00:00	14:00:00	51.0
3/25/2009	14:00:00	15:00:00	52.7

Site ID	Location	Start Date	Start Time (10 min. Meas.)	L_{eq} (dBA)	L_{max} (dBA)	L_{min} (dBA)	L90 (dBA)	L50 (dBA)	L10 (dBA)
ST-2	Tacana Dr. and E. Natoma St.	3/25/2009	16:40:00	66.2	79.5	39.6	47.4	63.8	69.9
ST-2	Tacana Dr. and E. Natoma St.	3/25/2009	16:50:00	67.7	86.8	40.7	52.2	64.7	71.1
ST-2	Tacana Dr. and E. Natoma St.	3/25/2009	20:28:00	63.0	79.7	39.2	45.3	53.3	67.2
ST-2	Tacana Dr. and E. Natoma St.	3/25/2009	20:39:00	62.4	78.5	41.9	45.5	55.1	66.7
ST-2	Tacana Dr. and E. Natoma St.	3/26/2009	0:11:00	53.0	71.3	31.9	34.7	38.3	53.0
ST-2	Tacana Dr. and E. Natoma St.	3/26/2009	0:21:00	53.6	72.4	32.6	35.1	38.7	53.0
ST-3	Mountain View Dr.	3/24/2009	17:25:00	45.1	61.0	36.1	39.6	42.9	47.6
ST-3	Mountain View Dr.	3/24/2009	17:35:00	46.1	60.7	39.2	41.7	44.5	48.7
ST-3	Mountain View Dr.	3/24/2009	20:40:00	41.1	53.7	35.5	37.9	40.5	43.3
ST-3	Mountain View Dr.	3/24/2009	20:51:00	40.1	57.6	34.5	36.6	39.3	42.1
ST-3	Mountain View Dr.	3/24/2009	22:49:00	40.7	55.8	33.3	35.9	39.5	43.7
ST-3	Mountain View Dr.	3/24/2009	22:59:00	39.0	54.3	33.2	35.4	37.5	41.4
ST-4	E. Natoma St. and Green Valley Rd.	3/24/2009	17:52:00	70.5	87.3	44.9	55.6	69.2	73.8
ST-4	E. Natoma St. and Green Valley Rd.	3/24/2009	18:02:00	70.8	79.8	51.6	60.1	69.6	74.1
ST-4	E. Natoma St. and Green Valley Rd.	3/24/2009	21:08:00	69.4	83.4	47.2	57.8	67.2	73.0

Site ID	Location	Start Date	Start Time (10 min. Meas.)	L_{eq} (dBA)	L_{max} (dBA)	L_{min} (dBA)	L90 (dBA)	L50 (dBA)	L10 (dBA)
ST-4	E. Natoma St. and Green Valley Rd.	3/24/2009	21:18:00	69.6	84.4	46.7	57.2	67.0	73.6
ST-4	E. Natoma St. and Green Valley Rd.	3/24/2009	23:46:00	60.4	75.2	31.8	36.0	46.5	65.4
ST-4	E. Natoma St. and Green Valley Rd.	3/24/2009	23:56:00	62.8	81.4	31.4	36.3	47.6	66.5
ST-5	Shadowfax Ct.	3/24/2009	18:18:00	60.9	78.4	43.3	47.3	50.9	59.8
ST-5	Shadowfax Ct.	3/24/2009	18:28:00	52.4	71.3	43.2	45.6	48.4	51.3
ST-5	Shadowfax Ct.	3/24/2009	21:34:00	47.4	62.7	40.9	44.2	46.9	49.4
ST-5	Shadowfax Ct.	3/24/2009	21:45:00	50.7	62.8	40.7	44.0	46.8	53.0
ST-5	Shadowfax Ct.	3/24/2009	23:18:00	41.7	70.6	30.7	34.9	38.7	42.7
ST-5	Shadowfax Ct.	3/24/2009	23:29:00	41.3	60.5	31.5	35.8	39.6	44.2
ST-6	East of Folsom Auburn Rd. and Robin Ln.	3/25/2009	15:19:00	50.2	64.8	36.6	40.1	44.3	55.0
ST-6	East of Folsom Auburn Rd. and Robin Ln.	3/25/2009	15:29:00	50.9	72.9	41.1	45.4	48.8	53.6
ST-6	East of Folsom Auburn Rd. and Robin Ln.	3/25/2009	19:52:00	40.6	60.6	32.3	34.7	36.9	42.1
ST-6	East of Folsom Auburn Rd. and Robin Ln.	3/25/2009	20:02:00	42.6	59.9	35.0	38.3	40.7	45.4
ST-6	East of Folsom Auburn Rd. and Robin Ln.	3/25/2009	23:31:00	35.4	51.7	31.2	32.6	34.2	37.1
ST-6	East of Folsom Auburn Rd. and Robin Ln.	3/25/2009	23:41:00	34.9	47.6	29.6	31.1	32.8	36.1
ST-7	Beals Point (Campground)	3/24/2009	15:11:00	48.9	71.1	38.0	40.8	43.2	51.1
ST-7	Beals Point (Campground)	3/24/2009	15:22:00	49.0	79.2	35.9	39.1	42.2	46.4

Site ID	Location	Start Date	Start Time (10 min. Meas.)	L_{eq} (dBA)	L_{max} (dBA)	L_{min} (dBA)	L90 (dBA)	L50 (dBA)	L10 (dBA)
ST-8	Folsom Point (Park)	3/24/2009	16:57:00	43.7	57.7	34.8	37.1	39.6	47.7
ST-8	Folsom Point (Park)	3/24/2009	17:07:00	41.3	52.8	35.6	37.5	39.1	44.7
ST-8	Folsom Point (Park)	3/24/2009	20:12:00	41.3	61.8	31.3	35.5	37.6	40.1
ST-8	Folsom Point (Park)	3/24/2009	20:22:00	40.9	54.1	31.7	34.0	36.7	45.7

Site ID	Location	Start Date	Start Time (10 min. Meas.)	L_{eq} (dBA)	L_{max} (dBA)	L_{min} (dBA)	L90 (dBA)	L50 (dBA)	L10 (dBA)
BIO-1	Main St.	3/25/2009	10:51:00	44.1	62.6	35.4	38.3	41.6	46.8
BIO-1	Main St.	3/25/2009	19:26:00	48.8	65.4	31.9	37.8	44.3	52.3
BIO-1	Main St.	3/25/2009	22:53:00	44.2	59.6	34.0	36.9	40.4	48.2
BIO-2	East of Folsom Auburn Rd. and Robin Ln.	3/25/2009	15:19:00	50.2	64.8	36.6	40.1	44.3	55.0
BIO-2	East of Folsom Auburn Rd. and Robin Ln.	3/25/2009	15:29:00	50.9	72.9	41.1	45.4	48.8	53.6
BIO-2	East of Folsom Auburn Rd. and Robin Ln.	3/25/2009	19:52:00	40.6	60.6	32.3	34.7	36.9	42.1
BIO-2	East of Folsom Auburn Rd. and Robin Ln.	3/25/2009	20:02:00	42.6	59.9	35.0	38.3	40.7	45.4
BIO-2	East of Folsom Auburn Rd. and Robin Ln.	3/25/2009	23:31:00	35.4	51.7	31.2	32.6	34.2	37.1
BIO-2	East of Folsom Auburn Rd. and Robin Ln.	3/25/2009	23:41:00	34.9	47.6	29.6	31.1	32.8	36.1
BIO-3	Erwin Ave. and Snipes Blvd.	3/25/2009	10:30:00	43.4	59.5	36.8	39.1	42.2	45.8
BIO-3	Erwin Ave. and Snipes Blvd.	3/25/2009	19:08:00	44.8	65.4	34.0	36.1	37.9	45.1
BIO-3	Erwin Ave. and Snipes Blvd.	3/25/2009	23:09:00	36.9	47.9	32.1	34.2	35.8	39.1
BIO-4	S. Lexington Dr. and Oak Avenue Parkway	3/26/2009	15:57:00	51.0	68.4	45.0	47.2	50.4	53.2

Site ID	Location	Start Date	Start Time (10 min. Meas.)	L_{eq} (dBA)	L_{max} (dBA)	L_{min} (dBA)	L90 (dBA)	L50 (dBA)	L10 (dBA)
BIO-4	S. Lexington Dr. and Oak Avenue Parkway	3/26/2009	20:58:00	49.6	61.0	44.0	46.4	48.5	51.3
BIO-4	S. Lexington Dr. and Oak Avenue Parkway	3/26/2009	23:48:00	43.1	63.1	34.4	36.4	40.1	45.1
BIO-5	Willow Bend Rd. and Grey Fox Ct.	3/26/2009	14:21:00	49.8	60.5	43.2	45.8	49.0	52.0
BIO-5	Willow Bend Rd. and Grey Fox Ct.	3/26/2009	20:13:00	46.4	56.8	37.7	40.6	43.8	50.1
BIO-5	Willow Bend Rd. and Grey Fox Ct.	3/26/2009	23:07:00	37.1	51.1	27.5	30.5	34.6	40.2
BIO-6	Haddington Dr. and E. Natoma St.	3/26/2009	13:45:00	51.9	63.5	45.3	48.1	50.9	54.1
BIO-6	Haddington Dr. and E. Natoma St.	3/26/2009	19:53:00	52.0	64.7	40.9	45.5	49.4	55.8
BIO-6	Haddington Dr. and E. Natoma St.	3/26/2009	22:49:00	47.9	66.5	31.4	36.0	42.3	48.5
BIO-7	Sturbridge Dr. and Stonemill Dr.	3/26/2009	14:54:00	42.7	59.5	34.5	36.8	40.6	45.5
BIO-7	Sturbridge Dr. and Stonemill Dr.	3/26/2009	20:34:00	38.5	52.6	32.6	35.5	37.6	40.5
BIO-7	Sturbridge Dr. and Stonemill Dr.	3/26/2009	23:27:00	31.4	43.8	26.7	29.1	30.6	32.8
BIO-8	Wellington Way and Grizzly Way	3/24/2009	15:53:00	58.0	67.5	42.9	48.3	56.5	61.7

Site ID	Location	Start Date	Start Time (10 min. Meas.)	L_{eq} (dBA)	L_{max} (dBA)	L_{min} (dBA)	L90 (dBA)	L50 (dBA)	L10 (dBA)
BIO-8	Wellington Way and Grizzly Way	3/24/2009	19:38:00	59.9	71.4	44.5	49.9	56.7	63.7
BIO-8	Wellington Way and Grizzly Way	3/24/2009	22:18:00	51.2	68.7	39.5	42.9	45.0	53.6

Alternative 2 Equipment Estimate Summary

Equipment	Quantity	Horsepower (HP)	Duty Cycle	Total SPL of Equipment at 50 Feet (dBA Leq)	Total PWL of Equipment (dBA)
Site Prep / Haul Rd Prep					
Large Dozer	1	570	80%	81.0	115.6
Small Dozer	1	185	80%	81.0	115.6
Large Motor Grader	1	275	80%	84.0	118.6
Large Roller	1	250	80%	79.0	113.6
80 Ton Crane	1	200	80%	80.0	114.6
4 Mgal Water Truck	1	350	80%	75.0	109.6
Generator	2	200	65%	82.1	116.7
Welding Machines	4	30	50%	77.0	111.6
Outboard powered workskiffs	2	40	40%	78.2	112.8
Rock Import Trucks	10	350	90%	85.5	120.1
Small Tug	1	250	80%	86.2	120.7
Super 30 carrylift	1	350	70%	83.5	118.0
Construct Transload Facility*					
Large Dozer	1	570	80%	81.0	115.6
Small Dozer	1	185	80%	81.0	115.6
Large Motor Grader	1	275	80%	84.0	118.6
Large Roller	1	250	30%	74.8	109.4
225T Crane	1	400	80%	80.0	114.6
80 Ton Crane	1	200	80%	80.0	114.6
4 Mgal Water Truck	1	350	80%	75.0	109.6
8 Mgal Water WAGON	1	450	80%	75.0	109.6
Off HWY 50 TN Trucks	2	650	80%	78.0	112.6
Rock Import Trucks	3	350	70%	79.2	113.8
Large Excavator	1	550	90%	80.5	115.1

Equipment	Quantity	Horsepower (HP)	Duty Cycle	Total SPL of Equipment at 50 Feet (dBA Leq)	Total PWL of Equipment (dBA)
Rub Tire Backhoe	1	125	70%	76.5	111.0
Loader 980 size	1	350	70%	77.5	112.0
Super 30 carrylift	1	350	70%	83.5	118.0
Loader 966 size	1	300	80%	78.0	112.6
Haul Road Embankment*					
Large Dozer	1	570	80%	81.0	115.6
Large Motor Grader	1	275	80%	84.0	118.6
Large Excavator	1	532	60%	78.8	113.4
8 Mgal water truck	1	490	90%	75.5	110.1
40 TN Articulated Trucks	2	405	90%	78.6	113.1
80 Ton Crane	1	350	80%	80.0	114.6
Super 20 Carrylift	1	225	60%	82.8	117.4
Cutoff Wall Concrete Placement*					
Large Dozer	1	570	80%	81.0	115.6
1200 CFM Compressor	4	575	15%	75.8	110.4
Large Roller	1	250	10%	70.0	104.6
Drill Rig	2	670	30%	81.8	116.4
100 Ton Crane	2	643	30%	78.8	113.4
8 Mgal Water WAGON	1	450	20%	69.0	103.6
20 CY Dump Trucks	4	350	30%	76.8	111.4
Rub Tire Backhoe	2	125	80%	80.0	114.6
Loader 360 Wheel Loader	2	100	80%	81.0	115.6
Loader 966 size	2	300	80%	81.0	115.6
Cement Mixer	1	25	80%	77.0	111.6
Large Excavator	1	700	90%	80.5	115.1
Common Excavation to Waste*					
Large Dozer-Ripper	2	570	90%	84.6	119.1
Large Excavator	1	428	90%	80.5	115.1

Equipment	Quantity	Horsepower (HP)	Duty Cycle	Total SPL of Equipment at 50 Feet (dBA Leq)	Total PWL of Equipment (dBA)
Off HWY 50 TN Trucks	7	650	80%	83.5	118.1
8 MG Water Pull	1	450	90%	75.5	110.1
Large Motor Grader	1	400	90%	84.5	119.1
Dozer	1	185	90%	81.5	116.1
Roller	1	250	50%	77.0	111.6
Rock Excavation Dry*					
Rock Drills	4	250	100%	87.0	121.6
Large Excavator	1	428	90%	80.5	115.1
Off HWY 50 TN Trucks	6	650	80%	82.8	117.4
8 MG Water Pull	1	450	90%	75.5	110.1
Large Dozer-Ripper	1	550	90%	81.5	116.1
Large Motor Grader	1	400	40%	81.0	115.6
8 MG Water Pull	1	450	90%	75.5	110.1
Dozer	1	185	90%	81.5	116.1
Powder Truck	1	350	90%	75.5	110.1
Mobilization for Approach Walls (Road, Crane Pads)*					
Cat D-8 Dozer -Ripper	1	305	80%	81.0	115.6
Cat 980 Loader	1	318	80%	78.0	112.6
Cat 730 Articulated trucks	3	317	80%	79.8	114.4
Highway 10-wheeler dump truck	1	330	80%	75.0	109.6
Graders 140H	1	165	80%	84.0	118.6
Water Truck 4000gal	1	330	80%	75.0	109.6
Highway tractor - trailer	1	330	60%	73.8	108.4
Electric - Line Man Truck	1	200	70%	74.5	109.0
Mech trucks	2	200	70%	77.5	112.0
Fuel trucks	2	250	70%	77.5	112.0
Pipe Fitters Truck	1	200	70%	74.5	109.0
Flatbed trucks	2	200	60%	75.8	110.4

Equipment	Quantity	Horsepower (HP)	Duty Cycle	Total SPL of Equipment at 50 Feet (dBA Leq)	Total PWL of Equipment (dBA)
Pickup's standard F-150 (gas)	5	380	50%	79.0	113.6
Pickup's Ford 150 4X4 (gas)	2	411	50%	75.0	109.6
Intake Approach Walls & Slab*					
Manitowoc 555 - 150 ton Crawler	1	340	70%	79.5	114.0
50 ton Hydraulic Crane	1	174	70%	79.5	114.0
Concrete Boom Pump	1	330	70%	79.5	114.0
Highway tractor - trailer	1	330	70%	74.5	109.0
Pickup's Ford 150 4X4 (gas)	1	411	50%	72.0	106.6
Set up/Operate Bubble Curtain/Silt Curtain*					
Tendors	2	200	70%	87.6	122.2
Dozer	1	250	80%	81.0	115.6
Mid size Excavator	1	200	80%	80.0	114.6
Small Tug	1	250	80%	86.2	120.7
Large Tug	1	400	60%	86.9	121.5
1500 CFM Compressors	4	600	15%	75.8	110.4
80 TN crane	1	250	80%	80.0	114.6
Super 20 Carrylift	1	200	60%	82.8	117.4
Dredge Common to Rock*					
Large long reach Excavator/cutter	1	1100	90%	93.1	127.7
250 Ton Clam Derrick Barge	2	450	50%	81.0	115.6
Large Tug	2	500	50%	90.1	124.7
85 TN Rock Trucks	3	650	70%	79.2	113.8
Light plants	3	40	100%	83.9	118.5
Dozer	1	450	70%	80.5	115.0
Large Loader	1	500	10%	69.0	103.6
Barge Winches	1	400	40%	85.2	119.8
Drill and Shoot/Dredge Rock Wet*					
Rock Drills	3	350	80%	84.8	119.4

Equipment	Quantity	Horsepower (HP)	Duty Cycle	Total SPL of Equipment at 50 Feet (dBA Leq)	Total PWL of Equipment (dBA)
Large long reach Excavator/cutter	1	1100	80%	92.6	127.2
250 Ton Clam Derrick Barge	2	450	50%	81.0	115.6
Small Tug	1	250	40%	83.1	117.7
Large Tug	1	500	60%	87.9	122.5
50 TN Rock Trucks	5	600	75%	81.7	116.3
Light plants	4	40	60%	83.0	117.5
Large Dozer	1	450	50%	79.0	113.6
Large Loader	1	500	20%	72.0	106.6
Barge Winches	8	250	20%	89.2	123.7
Powder Truck	1	350	80%	75.0	109.6
Spur Dike Rip Rap*					
Large Dozer	1	570	80%	81.0	115.6
Large Motor Grader	1	275	80%	84.0	118.6
Large Excavator	1	532	60%	78.8	113.4
8 Mgal water truck	1	490	90%	75.5	110.1
40 TN Articulated Trucks	2	405	90%	78.6	113.1
80 Ton Crane	1	350	80%	80.0	114.6
Super 20 Carrylift	1	225	60%	82.8	117.4
Transfer Excavation Material to Disposal Site*					
Large Dozer-Ripper	2	570	90%	84.6	119.1
Large Excavator	1	428	90%	80.5	115.1
Off HWY 50 TN Trucks	7	650	80%	83.5	118.1
8 MG Water Pull	1	450	90%	75.5	110.1
Large Motor Grader	1	400	90%	84.5	119.1
Dozer	1	250	90%	81.5	116.1
Teardown, Clean Up, and Site Restoration*					
Large Tug	1	500	60%	87.9	122.5
Large long reach Excavator/cutter	1	1100	60%	91.3	125.9

Equipment	Quantity	Horsepower (HP)	Duty Cycle	Total SPL of Equipment at 50 Feet (dBA Leq)	Total PWL of Equipment (dBA)
1500 CFM Compressors	2	600	90%	80.6	115.1
Small Tug	1	250	80%	86.2	120.7
250 Ton Clam Derrick Barge	2	450	80%	83.0	117.6
Large Loader	1	500	40%	75.0	109.6
Barge Winches	4	250	40%	89.2	123.7
50 TN Rock Trucks	2	600	50%	76.0	110.6
Large Dozer	1	450	50%	79.0	113.6
Tendors	1	200	70%	84.6	119.2
Remove Transload Facility*					
Large Dozer	1	570	80%	81.0	115.6
Small Dozer	1	185	80%	81.0	115.6
Large Motor Grader	1	275	80%	84.0	118.6
Large Roller	1	250	30%	74.8	109.4
225T Crane	1	400	80%	80.0	114.6
80 Ton Crane	1	200	80%	80.0	114.6
4 Mgal Water Truck	1	350	80%	75.0	109.6
8 Mgal Water WAGON	1	450	80%	75.0	109.6
Off HWY 50 TN Trucks	2	650	80%	78.0	112.6
Rock Import Trucks	3	350	70%	79.2	113.8
Large Excavator	1	550	90%	80.5	115.1
Rub Tire Backhoe	1	125	70%	76.5	111.0
Loader 980 size	1	350	70%	77.5	112.0
Super 30 carrylift	1	350	70%	83.5	118.0
Loader 966 size	1	300	80%	78.0	112.6
Staging Area w/ Rock Crusher					
Rock Crusher	1	n/a	100%**	83.0	117.6
Batch Plant	1	n/a	100%**	83.0	117.6
Large Dozer	2	570	100%**	82.0	116.6

Equipment	Quantity	Horsepower (HP)	Duty Cycle	Total SPL of Equipment at 50 Feet (dBA Leq)	Total PWL of Equipment (dBA)
Belly dump truck	2	300	100%**	79.0	113.6
Staging Area w/out Rock Crusher					
Batch Plant	1	n/a	100%**	83.0	117.6
Large Dozer	2	570	100%**	82.0	116.6
Belly dump truck	2	300	100%**	79.0	113.6
Batch Plant Activities at Staging Area*					
Batch Plant	1	n/a	100%**	83.0	117.6

*potential nighttime activity

**assumed 100% duty cycle

Alternative 3 Equipment Estimate Summary

Equipment	Quantity	Horsepower (HP)	Duty Cycle	Total SPL of Equipment at 50 Feet (dBA Leq)	Total PWL of Equipment (dBA)
Mobilization for Cofferdam					
Large Dozer	1	570	80%	81.0	115.6
Small Dozer	1	185	80%	81.0	115.6
Large Motor Grader	1	275	80%	84.0	118.6
Large Roller	1	250	80%	79.0	113.6
80 Ton Crane	1	200	80%	80.0	114.6
4 Mgal Water Truck	1	350	80%	75.0	109.6
Generator	2	200	65%	82.1	116.7
Welding Machines	4	30	50%	77.0	111.6
Outboard powered workskiffs	2	40	40%	78.2	112.8
Rock Import Trucks	10	350	90%	85.5	120.1
Small Tug	1	250	80%	86.2	120.7
Super 30 carrylift	1	350	70%	79.5	114.0
Mid size Excavator	1	200	80%	84.0	118.6
Construct Transload Facility					
Large Dozer	1	570	80%	81.0	115.6
Small Dozer	1	185	80%	81.0	115.6
Large Motor Grader	1	275	80%	84.0	118.6
Large Roller	1	250	30%	74.8	109.4
225T Crane	1	400	80%	80.0	114.6
80 Ton Crane	1	200	80%	80.0	114.6
4 Mgal Water Truck	1	350	80%	75.0	109.6
8 Mgal Water WAGON	1	450	80%	75.0	109.6
Off HWY 50 TN Trucks	2	650	80%	78.0	112.6
Rock Import Trucks	3	350	70%	79.2	113.8
Large Excavator	1	550	90%	80.5	115.1

Equipment	Quantity	Horsepower (HP)	Duty Cycle	Total SPL of Equipment at 50 Feet (dBA Leq)	Total PWL of Equipment (dBA)
Rub Tire Backhoe	1	125	70%	76.5	111.0
Loader 980 size	1	350	70%	77.5	112.0
Super 30 carrylift	1	350	70%	83.5	118.0
Loader 966 size	1	300	80%	78.0	112.6
Common Excavation Below Cofferdam					
Large Dozer-Ripper	2	570	90%	84.6	119.1
Large Excavator	1	428	90%	80.5	115.1
Off HWY 50 TN Trucks	7	650	80%	83.5	118.1
8 MG Water Pull	1	450	90%	75.5	110.1
Large Motor Grader	1	400	90%	84.5	119.1
Dozer	1	250	90%	81.5	116.1
Common Dredge Below Cofferdam					
Large Long Reach Excavator/ Cutter	1	1100	90%	93.1	127.7
250 Ton Clam Derrick Barge	2	450	50%	89.7	124.3
Large Tug	2	500	50%	90.1	124.7
85 TN Rock Trucks	3	650	70%	79.2	113.8
Light Plants	3	40	100%	83.9	118.5
Dozer	1	450	70%	80.5	115.0
Large Loader	1	500	10%	69.0	103.6
Barge Winches	1	400	40%	85.2	119.8
Conststruction of Sheet Pile Cells					
4100 Manitowoc Crane	1	364	100%	81.0	115.6
Barge Winches	2	400	50%	89.2	123.7
Vibro Hammer	1	250	80%	100.0	134.6
Pile Hammer	1	250	20%	94.0	128.6
Generator	1	250	50%	78.0	112.6
250 CFM Compressor	1	150	50%	75.0	109.6

Equipment	Quantity	Horsepower (HP)	Duty Cycle	Total SPL of Equipment at 50 Feet (dBA Leq)	Total PWL of Equipment (dBA)
Welding Machine	1	30	20%	67.0	101.6
Pump	1	200	5%	68.0	102.6
Yard crane	1	350	20%	74.0	108.6
Outboard powered worksiffs	1	40	25%	73.1	107.7
Material Transport Tugboat	1	500	100%	90.1	124.7
Fill Cells					
20 CY bottom dump trucks	6	300	75%	82.5	117.1
Front end loader	1	200	75%	77.8	112.3
4100 Manitowoc Crane	1	364	100%	81.0	115.6
Barge Winches	2	800	50%	92.2	126.8
Vibro Hammer	1	250	80%	100.0	134.6
Pile Hammer	1	250	20%	94.0	128.6
Generator	1	250	50%	78.0	112.6
250 CFM Compressor	1	150	50%	75.0	109.6
Welding Machine	1	30	20%	67.0	101.6
Pump	1	200	5%	68.0	102.6
Fill Processing Plant	1	1100	90%	93.1	127.7
Mobilization for Approach Walls					
Cat D-8 Dozer -Ripper	1	305	80%	81.0	115.6
Cat 980 Loader	1	318	80%	78.0	112.6
Cat 730 Articulated trucks	3	317	80%	79.8	114.4
Highway 10-wheeler dump truck	1	330	80%	75.0	109.6
Graders 140H	1	165	80%	84.0	118.6
Water Truck 4000gal	1	330	80%	75.0	109.6
Highway tractor - trailer	1	330	60%	73.8	108.4
Electric - Line Man Truck	1	200	70%	74.5	109.0
Mech trucks	2	200	70%	77.5	112.0
Fuel trucks	2	250	70%	77.5	112.0

Equipment	Quantity	Horsepower (HP)	Duty Cycle	Total SPL of Equipment at 50 Feet (dBA Leq)	Total PWL of Equipment (dBA)
Pipe Fitters Truck	1	200	70%	74.5	109.0
Flatbed trucks	2	200	60%	74.8	109.4
Pickup's standard F-150 (gas)	5	380	50%	79.0	113.6
Pickup's Ford 150 4X4 (gas)	2	411	50%	75.0	109.6
Intake Approach Walls and Slab					
Manitowoc 555 - 150 ton Crawler	1	340	70%	79.5	114.0
50 ton Hydraulic Crane	1	174	70%	79.5	114.0
Concrete Boom Pump	1	330	70%	79.5	114.0
Highway tractor - trailer	1	330	70%	74.5	109.0
Pickup's Ford 150 4X4 (gas)	1	411	50%	72.0	106.6
Remove Cell Rubble Fill					
3900 Manitowoc Crane	1	300	80%	80.0	114.6
20 CY bottom dump trucks	6	300	100%	83.8	118.4
Dozer	2	180	80%	84.0	118.6
Remove Sheets					
4100 Manitowoc Crane	1	364	100%	81.0	115.6
Barge Winches	2	400	50%	89.2	123.7
Vibro Hammer	1	250	80%	86.2	120.7
Pile Hammer	1	250	20%	80.1	114.7
Generator	1	250	50%	78.0	112.6
250 CFM Compressor	1	150	50%	75.0	109.6
Welding Machine	1	30	20%	67.0	101.6
Pump	1	200	5%	68.0	102.6
Material Transport Tugboat	1	500	100%	90.1	124.7
Yard crane	1	350	100%	81.0	115.6
Transfer Excavation Material to Disposal Site*					
Large Dozer-Ripper	2	570	90%	84.6	119.1
Large Excavator	1	428	90%	80.5	115.1

Equipment	Quantity	Horsepower (HP)	Duty Cycle	Total SPL of Equipment at 50 Feet (dBA Leq)	Total PWL of Equipment (dBA)
Off HWY 50 TN Trucks	7	650	80%	83.5	118.1
8 MG Water Pull	1	450	90%	75.5	110.1
Large Motor Grader	1	400	90%	84.5	119.1
Dozer	1	250	90%	81.5	116.1
Rock Excavation Dry*					
Rock Drills	4	250	100%	87.0	121.6
Large Excavator	1	428	90%	80.5	115.1
Off HWY 50 TN Trucks	5	650	80%	82.0	116.6
8 MG Water Pull	1	450	90%	75.5	110.1
Large Dozer-Ripper	1	550	90%	81.5	116.1
Large Motor Grader	1	400	40%	81.0	115.6
8 MG Water Pull	1	450	90%	75.5	110.1
Dozer	1	185	90%	81.5	116.1
Powder Truck	1	350	90%	75.5	110.1
Dewater Behind Cofferdam*					
Pump	1	2200	85%	95.9	130.4
Set up/operate Bubble Curtain/Silt Curtain					
Tendors	2	200	70%	87.6	122.2
Dozer	1	250	80%	81.0	115.6
Mid size Excavator	1	200	80%	80.0	114.6
Small Tug	1	250	80%	86.2	120.7
Large Tug	1	400	60%	86.9	121.5
1500 CFM Compressors	4	600	15%	75.8	110.4
80 TN crane	1	250	80%	80.0	114.6
Super 20 Carrylift	1	200	60%	78.8	113.4
Dredge Common to Rock*					
Large long reach Excavator/cutter	1	1100	90%	93.1	127.7
250 Ton Clam Derrick Barge	2	450	50%	81.0	115.6

Equipment	Quantity	Horsepower (HP)	Duty Cycle	Total SPL of Equipment at 50 Feet (dBA Leq)	Total PWL of Equipment (dBA)
Large Tug	2	500	50%	90.1	124.7
85 TN Rock Trucks	3	650	70%	79.2	113.8
Light plants	3	40	100%	83.9	118.5
Dozer	1	450	70%	80.5	115.0
Large Loader	1	500	10%	69.0	103.6
Barge Winches	1	400	40%	85.2	119.8
Drill and Shoot/Dredge Rock Wet*					
Rock Drills	3	350	80%	84.8	119.4
Large long reach Excavator/cutter	1	1100	80%	92.6	127.2
250 Ton Crane/Derrick	2	450	50%	81.0	115.6
Small Tug	1	250	40%	83.1	117.7
Large Tug	1	500	60%	87.9	122.5
50 TN Rock Trucks	3	600	60%	78.6	113.1
Light plants	4	40	60%	83.0	117.5
Large Dozer	1	450	50%	79.0	113.6
Large Loader	1	500	20%	72.0	106.6
Barge Winches	8	250	20%	89.2	123.7
Powder Truck	1	350	80%	75.0	109.6
Spur Dike Rip Rap					
Large Dozer	1	570	80%	81.0	115.6
Large Motor Grader	1	275	80%	84.0	118.6
Large Excavator	1	532	60%	78.8	113.4
8 Mgal water truck	1	490	90%	75.5	110.1
40 TN Articulated Trucks	2	405	90%	78.6	113.1
80 Ton Crane	1	350	80%	80.0	114.6
Super 20 Carrylift	1	225	60%	82.8	117.4
Teardown, Clean Up, and Site Restoration*					
Large Tug	1	500	60%	87.9	122.5

Equipment	Quantity	Horsepower (HP)	Duty Cycle	Total SPL of Equipment at 50 Feet (dBA Leq)	Total PWL of Equipment (dBA)
Large long reach Excavator/cutter	1	1100	60%	91.3	125.9
1500 CFM Compressors	2	600	90%	80.6	115.1
Small Tug	1	250	80%	86.2	120.7
250 Ton Clam Derrick Barge	2	450	80%	83.0	117.6
Large Loader	1	500	40%	75.0	109.6
Barge Winches	4	250	40%	89.2	123.7
50 TN Rock Trucks	2	600	50%	76.0	110.6
Large Dozer	1	450	50%	79.0	113.6
Tendors	1	200	70%	84.6	119.2
Remove Transload Facility*					
Large Dozer	1	570	80%	81.0	115.6
Small Dozer	1	185	80%	81.0	115.6
Large Motor Grader	1	275	80%	84.0	118.6
Large Roller	1	250	30%	74.8	109.4
225T Crane	1	400	80%	80.0	114.6
80 Ton Crane	1	200	80%	80.0	114.6
4 Mgal Water Truck	1	350	80%	75.0	109.6
8 Mgal Water WAGON	1	450	80%	75.0	109.6
Off HWY 50 TN Trucks	2	650	80%	78.0	112.6
Rock Import Trucks	3	350	70%	79.2	113.8
Large Excavator	1	550	90%	80.5	115.1
Rub Tire Backhoe	1	125	70%	76.5	111.0
Loader 980 size	1	350	70%	77.5	112.0
Super 30 carrylift	1	350	70%	83.5	118.0
Loader 966 size	1	300	80%	78.0	112.6
Staging Area w/ Rock Crusher					
Rock Crusher	1	n/a	100%**	83.0	117.6
Batch Plant	1	n/a	100%**	83.0	117.6

Equipment	Quantity	Horsepower (HP)	Duty Cycle	Total SPL of Equipment at 50 Feet (dBA Leq)	Total PWL of Equipment (dBA)
Large Dozer	2	570	100%**	82.0	116.6
Belly dump truck	2	300	100%**	79.0	113.6
Staging Area w/out Rock Crusher					
Batch Plant	1	n/a	100%**	83.0	117.6
Large Dozer	2	570	100%**	82.0	116.6
Belly dump truck	2	300	100%**	79.0	113.6
Batch Plant Activities at Staging Area*					
Batch Plant	1	n/a	100%**	83.0	117.6

*potential nighttime activity

**assumed 100% duty cycle

The City of Folsom is the nearest jurisdiction to the Proposed Project and has the most restrictive noise control ordinance in terms of noise level and exempt hours. Compliance with the City of Folsom Noise Ordinance will ensure Project compliance with noise standards for other jurisdictions. Construction noise is exempt from these regulations during the hours of 7:00 a.m. to 6:00 p.m. on weekdays and 8:00 a.m. to 5:00 p.m. on weekends. A summary of the City of Folsom Noise Standards is provided in Table E-1. Construction activities conducted prior to 7:00 a.m. or after 6:00 p.m. weekdays or prior to 8:00 a.m. or after 5:00 p.m. weekends must comply with the noise levels shown in Table E-1.

Table E-1: Noise Ordinance Standards (City of Folsom)*

			Noise Levels Not To Be Exceeded In Residential Zone (dBA)**	
Exterior Noise Standards	Maximum Time of Exposure	Noise Metric	7 a.m. to 10 p.m. (daytime)	10 p.m. to 7 a.m. (nighttime)
	30 Minutes/Hour	L_{50}	50	45
	15 Minutes/Hour	L_{25}	55	50
	5 Minutes/Hour	$L_{8.3}$	60	55
	1 Minute/Hour	$L_{1.7}$	65	60
	Any period of time	L_{max}	70	65
Interior Noise Standards				
	5 Minutes/Hour	$L_{8.3}$	45	35
	1 Minute/Hour	$L_{1.7}$	50	40
	Any period of time	L_{max}	55	45

*Construction Noise Exemption Times: 7:00 a.m. - 6:00 p.m. Weekdays
8:00 a.m. - 5:00 p.m. Weekends
**5 dBA reduction for impact noise during non-exempt times
SOURCE: City of Folsom, CA Municipal Code. Chapter 8.42, Table 8.42.040

Construction activities have the potential to exceed City of Folsom noise standards during non-exempt hours. In order to ensure compliance with the noise levels shown in Table E-1, or other noise standards as approved by the City of Folsom during non-exempt hours, the contractor shall implement and enforce a Noise Control Plan.

The Noise Control Plan will be developed by a qualified acoustical consultant[1] and will ensure that cumulative noise levels from all construction activities conducted prior to 7:00 a.m. or after 6:00 p.m. weekdays or prior to 8:00 a.m. or after 5:00 p.m. weekends will not exceed the levels shown in Table E-1, or other noise standards as approved by the City of Folsom, at any noise-sensitive receptor location.

All construction activities conducted outside of the construction noise exempt hours will be reviewed by a qualified acoustical consultant. If cumulative noise levels from construction activities are predicted to exceed the levels shown in Table E-1, or other noise standards as approved by the City of Folsom, noise mitigation measures will be employed to reduce noise to an acceptable level and a Noise Measurement Plan will be implemented to ensure effective mitigation. The Noise Measurement Plan will incorporate Type 1 (Precision) Sound Level Meter(s) as specified by the American National Standards Institute (ANSI) Standard S1.4-1971 (R1976) or S1.4-1983, "Specifications for Sound Level Meters" and will include a protocol to verify compliance with Table E-1 or other noise standards as approved by the City of Folsom.

[1] A "Qualified Acoustical Consultant" is an acoustical consultant qualified to perform acoustical analyses within the City of Folsom, El Dorado County, Sacramento County or Placer County. These jurisdictions should be contacted for a listing of qualified acoustical consultants. A list of Sacramento County qualified consultants is available online at http://www.dera.saccounty.net/Portals/0/docs/All%20Specialties-Consultants.pdf

Appendix I

Cultural Resources

Joint Federal Project Section 106 Consultation Record*

*May not include all communication for project.

Date	Type of Contact	Organization	Title	Contents of Communication
2007	Outgoing Letters	Shingle Springs, United Auburn		Bureau of Reclamation completed EIS/EIR for Dam Safety components of JFP (May 2006)
11/18/2008	Outgoing Letter	SHPO	Archaeologist	Phase I SHPO APE Letter
11/25/2008	Outgoing Letter	Shingle Springs, United Auburn	Chairperson	Phase I NA Consultation Letters
3/9/2009	Incoming Phone Call	Shingle Springs		No known sites in APE.
4/29/2009	Outgoing Letter	SHPO	Archaeologist	Phase I "No Adverse Effect" SHPO Letter
5/5/2009	Incoming Letter	SHPO	Archaeologist	Phase I SHPO Concurrence Letter
6/3/2010	Outgoing Letters	Shingle Springs, United Auburn	Chairperson	Phase II NA Consultation Letters
7/19/2010	Outgoing Letter	SHPO	Archaeologist	Phase II "No Adverse Effect" SHPO Letter
7/26/2010	Incoming Letter	SHPO	Archaeologist	Phase II SHPO Concurrence Letter
10/13/2011	Outgoing Letters	Shingle Springs, United Auburn, Tsi-Akim Maidu	Chairperson, Tribal Administrator, Vice Chairperson	Phase III NA Consultation Letters
10/24/2011	Incoming Letter	Shingle Springs	Cultural Resources Office Manager	Initiation of consultation, consultation of cultural and historic resource issues, request for information, request to be added as consulting party to identify TCPs.
11/7/2011	Outgoing Email	Shingle Springs	Cultural Resources Office Manager	Links to requested information on past projects, request to meet with tribal members.
11/7/2011	Incoming Email	United Auburn	THPO	Email from notifying us of letter and asking for inventory and environmental information.
11/7/2011	Outgoing Email	United Auburn	THPO	Provided project map, links to previous environmental reports, propose meeting with tribe.
11/16/2011	Incoming Letter	United Auburn	Tribal Administrator, THPO	Request for environmental and cultural reports, request tribal monitors, request a site visit.
12/6/2011	Tribal Consultation Meeting	United Auburn	THPO, Preservation Committee Chair, Lead Tribal Monitor	Tribal consultation meeting with United Auburn. Provided project history, maps of project, descriptive information, details of process, answered questions.
12/7/2011	Outgoing Email	Shingle Springs	Cultural Resources Office Manager, THPO	Follow up to email sent 11/7/2011 to request meeting with tribal members, ask if more information was needed.
12/15/2011	Outgoing Email	United Auburn	THPO	Follow up to consultation meeting with the tribe, provided updated records search data.
12/15/2011	Outgoing Email	Shingle Springs	Cultural Resources Office Manager, THPO	Follow up to emails sent 11/7/2011 and 12/7/2011, provided updated records search data and request meeting with tribal members.
12/22/2011	Outgoing Letter	Shingle Springs, United Auburn, Tsi-Akim Maidu	Chairperson, Tribal Administrator, Vice Chairperson	Description of project APE, project activities, identifcation efforts, communication to date, asking for information.
12/22/2011	Outgoing Letter	SHPO	Archaeologist	Letter describing APE and project, and efforts to identify historic properties.
1/12/2012	Incoming Letter	United Auburn	Tribal Administrator, THPO	Letter communicating that the tribe does not have further archaeological concerns for the project, request mitigation banking use native plants and resources.
1/17/2012	Incoming Phone Call	Shingle Springs		Request scheduling meeting with tribe.
1/17/2012	Outgoing Email	Shingle Springs	Cultural Respurces Office Manager	Attempt to schedule tribal consultation meeting on 1/30/2012.
1/17/2012	Incoming Email	Shingle Springs	Cultural Respurces Office Manager	Confirmation of tribal consultation meeting on 1/30/2012.
1/25/2012	Incoming Letter	SHPO	Archaeologist	SHPO concurrence with the APE and efforts to identify historic properties.
1/30/2012	Outgoing Email	Shingle Springs	Cultural Resources Office Manager, THPO	Tribe cancelled consultation meeting, need to reschedule.
2/6/2012	Incoming Email	Shingle Springs	Cultural Respurces Office Manager	Acceptance of tribal consultation meeting on 2/13/12

Date	Type of Contact	Organization	Title	Contents of Communication
2/13/2012	Incoming Email	Shingle Springs	Cultural Respurces Office Manager	Tribe cancelled consultation meeting, need to reschedule.
2/13/2012	Outgoing Email	Shingle Springs	Cultural Respurces Office Manager	Reschedule of tribal meeting on 2/27/12. Tribe accepted.
2/27/2012	Outgoing Email	Shingle Springs	Cultural Respurces Office Manager	Corps cancelled consultation meeting, need to reschedule.
2/27/2012	Outgoing Email	Shingle Springs	Cultural Resources Office Manager, THPO	Schedule of tribal consultation meeting on 3/16/2012.
3/16/2012	Tribal Consultation Meeting	Shingle Springs		Tribal consultation meeting with Shingle Springs. Tribe expressed wish for a field visit, their impression that previous Section 106 consultation was not adequate, their concerns that TCPs might be in the APE, their concerns about operation of the dam/reservoir, and downstream effects. Corps committed to scheduling field visit, tribe to review already provided information.
3/21/2012	Incoming Email	Shingle Springs	Cultural Respurces Office Manager	Crystal confirmed receipt of previous consultation letters, previous environmental documents, records and literature search data.
4/27/2012	Outgoing Email	Shingle Springs, United Auburn	Cultural Resources Office Manager, THPO	Schedule of tribal site visit on 6/13/12.
6/11/2012	Outgoing Email	Shingle Springs, United Auburn	Cultural Resources Office Manager, THPO	Corps cancelled tribal site visit, rescheduled to 7/19/2012.
7/2/2012	Incoming Email	Shingle Springs	THPO	Shingle Springs confirmed attendance for 7/19/12 field visit.
7/2/2012	Outgoing Voicemail	Tsi-Akim Maidu		Called and left message on voicemail to invite Tsi-Akim Maidu to 7/19/12 site visit.
7/5/2012	Outgoing Voicemail	Tsi-Akim Maidu		Called and left second message on voicemail to invite Tsi-Akim Maidu to 7/19/12 site visit.
7/6/2012	Incoming Email	United Auburn	THPO	United Auburn confirmed attendance for 7/19/12 field visit.
7/16/2012	Outgoing Email	Shingle Springs, United Auburn	Cultural Resources Office Manager, THPO	Informed tribes of public meetings for the public comment period of the EIS/EIR to be held in August.
7/18/2012	Outgoing Email	Shingle Springs, United Auburn	Cultural Resources Office Manager, THPO	Confirmation of tribal site visit on 7/19/12.
7/19/2012	Incoming Email	United Auburn	THPO	Cancellation of attendance at 7/19/12 site visit.
7/19/2012	Site Visit	Shingle Springs		Tribal site visit of JFP Project.
7/24/2012	Outgoing Phone Call	Shingle Springs	THPO	Follow up to site visit on 7/19/12. Left voice mail message.
7/25/2012	Outgoing Email	Shingle Springs	THPO	Follow up to site visit on 7/19/12.
7/27/2012	Incoming Email	Shingle Springs	THPO	Communication that tribe still needs to review site visit notes.
7/27/2012	Outgoing Email	Shingle Springs	THPO	Acknowledgement of email from tribe.
7/31/2012	Outgoing Phone Call	Shingle Springs	THPO	Follow up to site visit on 7/19/12. Left voice mail message.
8/27/2012	Outgoing Email	Shingle Springs	THPO	Follow up email in regard to site visit on 7/19/12 to inquire if the tribe has any comments, questions, or concerns. Reaffirmed the end of the public comment period of EIS/EIR on 9/10/12.

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA, 95814-2922

REPLY TO
ATTENTION OF

Environmental Resources Branch

OCT 1 3 2011

Mr. Nicholas Fonseca
Chairperson
Shingle Springs Band of Miwok Indians
P.O. Box 1340
Shingle Springs, California 95682

Dear Mr. Fonseca:

In accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, we are writing to inform you of the proposed Folsom Dam Modifications, Approach Channel project near Folsom, California. The California Department of Water Resources (DWR) and the U.S. Army Corps of Engineers (Corps) are constructing the Project as a component of the Folsom Dam Joint Federal Project (JFP). The Bureau of Reclamation (BUR) has previously consulted on the Dam Safety component of the JFP in 2006 and 2007. The Corps is responsible for completion of the Flood Risk Management (FRM) components of the JFP, to include construction of an auxiliary spillway. The Corps has consulted with potentially interested Native American tribes on previous phases of the overall JFP in 2008 and 2010. At this time we are beginning identification efforts for a supplemental environmental impact statement/environmental impact report (EIS/EIR) for the JFP and more specifically, on the Folsom Dam Modifications, Approach Channel project (Project).

The area of potential effects (APE) for the Project is located near the left and right abutments of Folsom Dam and near Dikes 7 and 8 and the Morman Island Auxiliary Dam in Sacramento County. The project is located on the Folsom, California, 7.5-minute U.S.G.S. topographic map, T10N R7E, and R8E in portions of Section 19, 20, 21, 24, 28, 29, and 30 (enclosure 1). The EIS/EIR will address construction alternatives that are intended to improve dam safety and provide FRM within the APE. Alternatives analyzed for the EIS/EIR may include one or more of the following design measures: installation of a temporary cofferdam or cutoff walls, construction of a spur dike, blasting to remove bedrock material, dredging, terrestrial deposition of dredge material, and temporary modification of existing terrestrial sites for haul routes and staging areas.

We have completed a records and literature search at the North Central Information Center at California State University, Sacramento. Other than Folsom Dam, there are no known historic properties located within the APE for the Project. We also plan to conduct a pedestrian survey of the APE not previously consulted on during the BUR's consultation. If buried or previously unidentified resources are located during project activities, all work in the vicinity of the find would cease, and the California State Historic Preservation Office would be contacted for additional consultation per 36 CFR 800.13, Post Review Discoveries, and interested Native American representatives would be consulted.

A public scoping meeting for the Project will be held to present an overview of the Project and the EIS/EIR process, and to afford all interested parties with an opportunity to comment on the scope of the analysis and potential alternatives. The public scoping meeting will be held at the Folsom Community Center at 52 Natoma Street in Folsom, California on October 20, 2011. Presentation on the Project will begin at 6 p.m. and we invite you to attend as an interested party.

We have contacted the Native American Heritage Commission, who provided your name as being potentially interested in our proposed project. We are sensitive to traditional cultural properties and sacred sites, and make every effort to avoid them. Please let us know if you have knowledge of locations of archeological sites, or areas of traditional cultural value or concern in or near the Project APE. Correspondence may be sent to Ms. Melissa Montag, U.S. Army Corps of Engineers, Sacramento District, 1325 J Street, Sacramento, California 95814-2922. If you have any questions or would like additional information, please contact Ms. Montag at (916) 557-7907 or by email at: Melissa.L.Montag@usace.army.mil.

Sincerely,

Alicia E. Kirchner
Chief, Planning Division

Enclosure

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA, 95814-2922

REPLY TO
ATTENTION OF

Environmental Resources Branch

Mr. Gregory S. Baker, Tribal Administrator
United Auburn Indian Community
Auburn Rancheria
10720 Indian Hill Road
Auburn, California 95603

OCT 13 2011

Dear Mr. Baker:

In accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, we are writing to inform you of the proposed Folsom Dam Modifications, Approach Channel project near Folsom, California. The California Department of Water Resources (DWR) and the U.S. Army Corps of Engineers (Corps) are constructing the Project as a component of the Folsom Dam Joint Federal Project (JFP). The Bureau of Reclamation (BUR) has previously consulted on the Dam Safety component of the JFP in 2006 and 2007. The Corps is responsible for completion of the Flood Risk Management (FRM) components of the JFP, to include construction of an auxiliary spillway. The Corps has consulted with potentially interested Native American tribes on previous phases of the overall JFP in 2008 and 2010. At this time we are beginning identification efforts for a supplemental environmental impact statement/environmental impact report (EIS/EIR) for the JFP and more specifically, on the Folsom Dam Modifications, Approach Channel project (Project).

The area of potential effects (APE) for the Project is located near the left and right abutments of Folsom Dam and near Dikes 7 and 8 and the Morman Island Auxiliary Dam in Sacramento County. The project is located on the Folsom, California, 7.5-minute U.S.G.S. topographic map, T10N R7E, and R8E in portions of Section 19, 20, 21, 24, 28, 29, and 30 (enclosure 1). The EIS/EIR will address construction alternatives that are intended to improve dam safety and provide FRM within the APE. Alternatives analyzed for the EIS/EIR may include one or more of the following design measures: installation of a temporary cofferdam or cutoff walls, construction of a spur dike, blasting to remove bedrock material, dredging, terrestrial deposition of dredge material, and temporary modification of existing terrestrial sites for haul routes and staging areas.

We have completed a records and literature search at the North Central Information Center at California State University, Sacramento. Other than Folsom Dam, there are no known historic properties located within the APE for the Project. We also plan to conduct a pedestrian survey of the APE not previously consulted on during the BUR's consultation. If buried or previously unidentified resources are located during project activities, all work in the vicinity of the find would cease, and the California State Historic Preservation Office would be contacted for additional consultation per 36 CFR 800.13, Post Review Discoveries, and interested Native American representatives would be consulted.

A public scoping meeting for the Project will be held to present an overview of the Project and the EIS/EIR process, and to afford all interested parties with an opportunity to comment on the scope of the analysis and potential alternatives. The public scoping meeting will be held at the Folsom Community Center at 52 Natoma Street in Folsom, California on October 20, 2011. Presentation on the Project will begin at 6 p.m. and we invite you to attend as an interested party.

We have contacted the Native American Heritage Commission, who provided your name as being potentially interested in our proposed project. We are sensitive to traditional cultural properties and sacred sites, and make every effort to avoid them. Please let us know if you have knowledge of locations of archeological sites, or areas of traditional cultural value or concern in or near the Project APE. Correspondence may be sent to Ms. Melissa Montag, U.S. Army Corps of Engineers, Sacramento District, 1325 J Street, Sacramento, California 95814-2922. If you have any questions or would like additional information, please contact Ms. Montag at (916) 557-7907 or by email at: Melissa.L.Montag@usace.army.mil.

Sincerely,

E. Scott Clark

Alicia E. Kirchner
Chief, Planning Division

Enclosure

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA, 95814-2922

REPLY TO
ATTENTION OF

Environmental Resources Branch

OCT 13 2011

Mr. David Keyser, Chairperson
United Auburn Indian Community
Auburn Rancheria
10720 Indian Hill Road
Auburn, California 95603

Dear Mr. Keyser:

In accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, we are writing to inform you of the proposed Folsom Dam Modifications, Approach Channel project near Folsom, California. The California Department of Water Resources (DWR) and the U.S. Army Corps of Engineers (Corps) are constructing the Project as a component of the Folsom Dam Joint Federal Project (JFP). The Bureau of Reclamation (BUR) has previously consulted on the Dam Safety component of the JFP in 2006 and 2007. The Corps is responsible for completion of the Flood Risk Management (FRM) components of the JFP, to include construction of an auxiliary spillway. The Corps has consulted with potentially interested Native American tribes on previous phases of the overall JFP in 2008 and 2010. At this time we are beginning identification efforts for a supplemental environmental impact statement/environmental impact report (EIS/EIR) for the JFP and more specifically, on the Folsom Dam Modifications, Approach Channel project (Project).

The area of potential effects (APE) for the Project is located near the left and right abutments of Folsom Dam and near Dikes 7 and 8 and the Morman Island Auxiliary Dam in Sacramento County. The project is located on the Folsom, California, 7.5-minute U.S.G.S. topographic map, T10N R7E, and R8E in portions of Section 19, 20, 21, 24, 28, 29, and 30 (enclosure 1). The EIS/EIR will address construction alternatives that are intended to improve dam safety and provide FRM within the APE. Alternatives analyzed for the EIS/EIR may include one or more of the following design measures: installation of a temporary cofferdam or cutoff walls, construction of a spur dike, blasting to remove bedrock material, dredging, terrestrial deposition of dredge material, and temporary modification of existing terrestrial sites for haul routes and staging areas.

We have completed a records and literature search at the North Central Information Center at California State University, Sacramento. Other than Folsom Dam, there are no known historic properties located within the APE for the Project. We also plan to conduct a pedestrian survey of the APE not previously consulted on during the BUR's consultation. If buried or previously unidentified resources are located during project activities, all work in the vicinity of the find would cease, and the California State Historic Preservation Office would be contacted for additional consultation per 36 CFR 800.13, Post Review Discoveries, and interested Native American representatives would be consulted.

A public scoping meeting for the Project will be held to present an overview of the Project and the EIS/EIR process, and to afford all interested parties with an opportunity to comment on the scope of the analysis and potential alternatives. The public scoping meeting will be held at the Folsom Community Center at 52 Natoma Street in Folsom, California on October 20, 2011. Presentation on the Project will begin at 6 p.m. and we invite you to attend as an interested party.

We have contacted the Native American Heritage Commission, who provided your name as being potentially interested in our proposed project. We are sensitive to traditional cultural properties and sacred sites, and make every effort to avoid them. Please let us know if you have knowledge of locations of archeological sites, or areas of traditional cultural value or concern in or near the Project APE. Correspondence may be sent to Ms. Melissa Montag, U.S. Army Corps of Engineers, Sacramento District, 1325 J Street, Sacramento, California 95814-2922. If you have any questions or would like additional information, please contact Ms. Montag at (916) 557-7907 or by email at: Melissa.L.Montag@usace.army.mil.

Sincerely,

Alicia E. Kirchner
Chief, Planning Division

Enclosure

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA, 95814-2922

REPLY TO
ATTENTION OF

Environmental Resources Branch

Ms. Eileen Moon
Vice Chairperson
Tsi-Akim Maidu
1239 East Main Street
Grass Valley, California 95945

OCT 13 2011

Dear Ms. Moon:

In accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, we are writing to inform you of the proposed Folsom Dam Modifications, Approach Channel project near Folsom, California. The California Department of Water Resources (DWR) and the U.S. Army Corps of Engineers (Corps) are constructing the Project as a component of the Folsom Dam Joint Federal Project (JFP). The Bureau of Reclamation (BUR) has previously consulted on the Dam Safety component of the JFP in 2006 and 2007. The Corps is responsible for completion of the Flood Risk Management (FRM) components of the JFP, to include construction of an auxiliary spillway. The Corps has consulted with potentially interested Native American tribes on previous phases of the overall JFP in 2008 and 2010. At this time we are beginning identification efforts for a supplemental environmental impact statement/environmental impact report (EIS/EIR) for the JFP and more specifically, on the Folsom Dam Modifications, Approach Channel project (Project).

The area of potential effects (APE) for the Project is located near the left and right abutments of Folsom Dam and near Dikes 7 and 8 and the Morman Island Auxiliary Dam in Sacramento County. The project is located on the Folsom, California, 7.5-minute U.S.G.S. topographic map, T10N R7E, and R8E in portions of Section 19, 20, 21, 24, 28, 29, and 30 (enclosure 1). The EIS/EIR will address construction alternatives that are intended to improve dam safety and provide FRM within the APE. Alternatives analyzed for the EIS/EIR may include one or more of the following design measures: installation of a temporary cofferdam or cutoff walls, construction of a spur dike, blasting to remove bedrock material, dredging, terrestrial deposition of dredge material, and temporary modification of existing terrestrial sites for haul routes and staging areas.

We have completed a records and literature search at the North Central Information Center at California State University, Sacramento. Other than Folsom Dam, there are no known historic properties located within the APE for the Project. We also plan to conduct a pedestrian survey of the APE not previously consulted on during the BUR's consultation. If buried or previously unidentified resources are located during project activities, all work in the vicinity of the find would cease, and the California State Historic Preservation Office would be contacted for additional consultation per 36 CFR 800.13, Post Review Discoveries, and interested Native American representatives would be consulted.

A public scoping meeting for the Project will be held to present an overview of the Project and the EIS/EIR process, and to afford all interested parties with an opportunity to comment on the scope of the analysis and potential alternatives. The public scoping meeting will be held at the Folsom Community Center at 52 Natoma Street in Folsom, California on October 20, 2011. Presentation on the Project will begin at 6 p.m. and we invite you to attend as an interested party.

We have contacted the Native American Heritage Commission, who provided your name as being potentially interested in our proposed project. We are sensitive to traditional cultural properties and sacred sites, and make every effort to avoid them. Please let us know if you have knowledge of locations of archeological sites, or areas of traditional cultural value or concern in or near the Project APE. Correspondence may be sent to Ms. Melissa Montag, U.S. Army Corps of Engineers, Sacramento District, 1325 J Street, Sacramento, California 95814-2922. If you have any questions or would like additional information, please contact Ms. Montag at (916) 557-7907 or by email at: Melissa.L.Montag@usace.army.mil.

Sincerely,

Alicia E. Kirchner
Chief, Planning Division

Enclosure

SHINGLE SPRINGS RANCHERIA

Shingle Springs Band of Miwok Indians,
Shingle Springs Rancheria
(Verona Tract), California
5281 Honpie Road, Placerville, CA 95667
P.O. Box 1340, Shingle Springs, CA 95682
(530) 676-8010 Office (530)676-8033 Fax

October 24, 2011

Department of the Army
U.S. Army Engineer District, Sacramento
Corps of Engineers
1325 J Street
Sacramento, CA 95814-2922

RE: The Proposed Folsom Dam Modifications, Approach Channel Project near Folsom California

Dear Ms. Melissa Montag

The Most likely Descendant, Daniel Fonseca would like to initiate consultation process with the Department of the Army for Folsom Dam Modifications Approach Channel Project located in Sacramento County. Among other things, we would like this consultation to address the cultural and historic resource issues, pursuant to the regulations implementing Section 106 of the National Historic Preservation Act.

Prior to meeting we would like to request any and all completed record searches and or surveys that were done in or around the project area up to and including environmental, archaeological and cultural reports.

Please let this letter serve as a formal request for the Shingle Springs Band of Miwok Indians to be added as a consulting party in identifying any Traditional Cultural Properties (TCPs) that may exist within the project's Area of Potential Effects (APE).

Please contact Crystal Dilworth, Cultural Resource Office Manager at 530-698-1471 to schedule a consultation meeting pursuant to Section 106 of the NHPA.

Sincerely,

Daniel Fonseca
Cultural Resources Director

Montag, Melissa L SPK

From:	Montag, Melissa L SPK
Sent:	Monday, November 07, 2011 1:54 PM
To:	Marcos Guerrero
Cc:	Tribal Preservation; Melodi McAdams; Greg Baker
Subject:	RE: Folsom Dam Modifications (UNCLASSIFIED)
Attachments:	Project_Map_2.pdf

Classification: UNCLASSIFIED
Caveats: NONE

Hello Marcos,

We would be happy to meet with you at your convenience to discuss the project. I'm attaching and sending some links to information on previous environmental and cultural resources compliance done in the project area for your information and review. The current proposed work is a part of the larger Joint Federal Project, a combined venture between the Corps of Engineers and the Bureau of Reclamation that was included in an Environmental Impact Statement in 2007. We are presently working towards NEPA and Section 106 compliance in a supplemental EIS to that 2007 document.

I'm also included an aerial map that shows some of the project features in a little more detail. Although the area was almost entirely included within the Bureau's NEPA and Section 106 compliance efforts there are some areas and activities not previously included. As a result I have requested an updated records and literature search from the North Central Information Center. Once I have received those results I would be happy to share with you the information on previous surveys and known sites in the area.

The Corps has a website where we are posting information on the current project as it becomes available:
http://www.spk.usace.army.mil/projects/civil/americanriver/jfp/docs.html

The Corps has posted several NEPA compliance related documents at an ftp site here:
ftp://ftp.usace.army.mil/pub/spk/Folsom_JFP/

And the Bureau has a fairly exhaustive list of documents they completed as part of the Joint Federal Project here:
http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=1808

I would like to propose that we meet sometime in early December. I would like to plan to have a few Corps technical team members present in order to be able to describe the project and answer any questions you may have. We would be able to host the meeting in our offices at 1325 J Street in Sacramento or we would be happy to come to wherever is convenient for you. We could follow up that meeting with a site visit later, if needed. If you have some dates and times in early December that would work best for you please let me know, we will work around your schedule.

Melissa Montag
Senior Environmental Manager/Historian
U.S. Army Corps of Engineers
Cultural, Recreation & Social Assessment Section (CESPK-PD-RC)
1325 J Street
Sacramento, CA 95814-2922
(916) 557-7907
e-mail: Melissa.L.Montag@usace.army.mil Please note that due to security requirements our out of the office notification has been disabled. If I do not respond to your message in a few days, I may be out of the office. I will respond as soon as I am able. Thank you.

-----Original Message-----
From: Marcos Guerrero [mailto:mguerrero@auburnrancheria.com]
Sent: Monday, November 07, 2011 12:43 PM
To: Montag, Melissa L SPK

Cc: Tribal Preservation; Melodi McAdams; Greg Baker
Subject: Folsom Dam Modifications

Hello Melissa,

You will be receiving a letter in the mail from Greg Baker, Tribal Administrator, regarding this project. In the mean time I would like to set up a meeting/site visit and go over some of the tribes concerns. We are currently reviewing our inventory or any resources in your project area, but consider it sensitive for cultural and environmental resources. We also have qualified UAIC tribal members that would also like to participate in the survey.

Please let me know when we could discuss your project.

Thank you and we look forward to your response,

Marcos Guerrero, RPA, THPO

Tribal Historic Preservation Committee

United Auburn Indian Community of the Auburn Rancheria

10720 Indian Hill Road

Auburn, CA 95603

Office: (530) 883-2364

Cell: (916) 420-0213

Fax: (530) 885-5476

Classification: UNCLASSIFIED
Caveats: NONE

MIWOK MAIDU
United Auburn Indian Community
of the Auburn Rancheria

November 16, 2011

Melissa Montag
Senior Environmental Manager/Historian
U.S. Army Corps of Engineers
Cultural, Recreation & Social Assessment Section (CESPK-PD-RC)
1325 J Street
Sacramento, CA 95814-2922

Subject: Folsom Dam Modifications, Approach Channel Project

Dear Ms. Montag,

Thank you for requesting information regarding the above referenced project. The United Auburn Indian Community (UAIC) of the Auburn Rancheria is comprised of Miwok and Southern Maidu (Nisenan) people whose tribal lands are within Placer County and ancestral territory spans into El Dorado, Nevada, Sacramento, Sutter, and Yuba counties. The UAIC is concerned about development within its aboriginal territory that has potential to impact the lifeways, cultural sites, and landscapes that may be of sacred or ceremonial significance. We appreciate the opportunity to comment on this and other projects in your jurisdiction.

In order to ascertain whether or not the project could affect cultural resources that may be of importance to the UAIC, we would like to receive copies of any archaeological reports that have been, or will be, completed for the project. We also request copies of future environmental documents for the proposed project so that we have the opportunity to comment on potential impacts and proposed mitigation measures related to cultural resources. The UAIC would also like the opportunity to have our tribal monitors accompany you during the field survey and ground disturbing activities. The information gathered will provide us with a better understanding of the project and cultural resources on site and is invaluable for consultation purposes.

The UAIC's preservation committee has identified cultural resources within your project area and in close proximity, and would like to request a site visit to confirm their locations and meet with you regarding this project. Thank you again for taking these matters into consideration, and for involving the UAIC early in the planning process. We look forward to reviewing the aforementioned documents as requested. Please contact Marcos Guerrero, Tribal Historic Preservation Officer, at (530) 883-2364 or email at mguerrero@auburnrancheria.com if you have any questions.

Sincerely,

Gregory S. Baker,
Tribal Administrator

CC: Marcos Guerrero, UAIC

Montag, Melissa L SPK

From: Montag, Melissa L SPK
Sent: Thursday, December 15, 2011 2:51 PM
To: Marcos Guerrero
Cc: Montag, Melissa L SPK
Subject: Joint Federal Project - Folsom Dam Modifications - Phase III Project (UNCLASSIFIED)
Attachments: USACE Records Search Reports List JFP Phase III Dec2011.xlsx; USACE Records Search Reports B JFP Phase III Dec2011.pdf; USACE Records Search Reports A JFP Phase III Dec2011.pdf; USACE Records Search Resources JFP Phase III Dec2011.pdf

Classification: UNCLASSIFIED
Caveats: NONE

Hi Marcos,

As you requested, I am providing you with scanned copies of the just completed records and literature search for the Joint Federal Project Folsom Dam Modifications, Phase III Project that we met with you on last week. The files are a little large but I'm hoping they come through okay, I didn't want to reduce the file size and lose image quality. I'm reluctant to post them on our public ftp site since this is considered confidential information so if you have any issues getting the files let me know and I will reproduce and send you hard copies.

I'm also including a brief bibliography of the report numbers referenced on the map. As you know, the records and information are considered privileged and confidential and should not be shared publically. Let me know if you have any questions about the information. You mentioned that you would like to conduct a site visit of the project, which we would be happy to coordinate. Perhaps if you have some available dates and times in January I can work on coordinating that on my end?

And I will be sending a letter with some additional information, maps, and summarization of communication in the near future as part of our continuing consultation process. Please let me know if you have any questions.

Sincerely,

Melissa Montag
Senior Environmental Manager/Historian
U.S. Army Corps of Engineers
Cultural, Recreation & Social Assessment Section (CESPK-PD-RC)
1325 J Street
Sacramento, CA 95814-2922
(916) 557-7907
e-mail: Melissa.L.Montag@usace.army.mil

Please note that due to security requirements our out of the office notification has been disabled. If I do not respond to your message in a few days, I may be out of the office. I will respond as soon as I am able. Thank you.

Classification: UNCLASSIFIED
Caveats: NONE

Montag, Melissa L SPK

From: Montag, Melissa L SPK
Sent: Thursday, December 15, 2011 2:58 PM
To: Crystal Dilworth
Cc: dfonseca@ssband.org; Montag, Melissa L SPK
Subject: RE: Follow up on Corps Folsom Dam Modifications Project (UNCLASSIFIED)
Attachments: USACE Records Search Reports List JFP Phase III Dec2011.xlsx; USACE Records Search Reports B JFP Phase III Dec2011.pdf; USACE Records Search Reports A JFP Phase III Dec2011.pdf; USACE Records Search Reports List JFP Phase III Dec2011.xlsx

Classification: UNCLASSIFIED
Caveats: NONE

Hello Crystal,

As you requested in your October 24, 2011 letter to the Corps of Engineers, I am providing you with scanned copies of the just completed records and literature search for the Joint Federal Project Folsom Dam Modifications, Phase III Project. The files are a little large but I'm hoping they come through okay, I didn't want to reduce the file size and lose image quality. I'm reluctant to post them on our public ftp site since this is considered confidential information so if you have any issues getting the files let me know and I will reproduce and send you hard copies.

I'm also including a brief bibliography of the report numbers referenced on the map. As you know, the records and information are considered privileged and confidential and should not be shared publically. Let me know if you have any questions about the information.

If you would like to meet to discuss the project or would like additional information please let me know. I would like to plan to have a few Corps technical team members present in order to be able to describe the project and answer any questions you may have. We would be able to host the meeting in our offices at 1325 J Street in Sacramento or we would be happy to come to wherever is convenient for you. We could follow up that meeting with a site visit later, if needed.

Thank you for your interest in our project.

Sincerely,

Melissa Montag
Senior Environmental Manager/Historian
U.S. Army Corps of Engineers
Cultural, Recreation & Social Assessment Section (CESPK-PD-RC)
1325 J Street
Sacramento, CA 95814-2922
(916) 557-7907
e-mail: Melissa.L.Montag@usace.army.mil
Please note that due to security requirements our out of the office notification has been disabled. If I do not respond to your message in a few days, I may be out of the office. I will respond as soon as I am able. Thank you.

-----Original Message-----
From: Montag, Melissa L SPK
Sent: Wednesday, December 07, 2011 8:53 AM
To: 'Crystal Dilworth'
Cc: 'dfonseca@ssband.org'
Subject: FW: Follow up on Corps Folsom Dam Modifications Project (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hello Crystal,

I wanted to follow up with you in reference to my email below. I received the October 24, 2011 letter from Mr. Fonseca requesting information on the project, and environmental and cultural reports on the Folsom Dam Modifications, Approach Channel Project, an aspect of the overall Join Federal Project. I replied with links to information in my email below but wanted to see if you had any additional information requests at this time. I am awaiting the results of an updated records and literature search and once I have received that I will send you a scan of the map depicting surveys and sites in the project area.

Additionally, as mentioned in my November 7, 2011 email below, please let me know if you would like to meet. I would like to plan to have a few Corps technical team members present in order to be able to describe the project and answer any questions you may have. We would be able to host the meeting in our offices at 1325 J Street in Sacramento or we would be happy to come to wherever is convenient for you. We could follow up that meeting with a site visit later, if needed.

Thank you for your interest in our project.

Sincerely,

Melissa Montag
Senior Environmental Manager/Historian
U.S. Army Corps of Engineers
Cultural, Recreation & Social Assessment Section (CESPK-PD-RC)
1325 J Street
Sacramento, CA 95814-2922
(916) 557-7907
e-mail: Melissa.L.Montag@usace.army.mil Please note that due to security requirements our out of the office notification has been disabled. If I do not respond to your message in a few days, I may be out of the office. I will respond as soon as I am able. Thank you.

-----Original Message-----
From: Montag, Melissa L SPK
Sent: Monday, November 07, 2011 2:00 PM
To: Crystal Dilworth
Subject: Follow up on Corps Folsom Dam Modifications Project (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hello Crystal,

I received the letter dated October 24, 2011 from Daniel Fonseca that requested additional information on the Folsom Dam Modifications, Approach Channel Project and that requested to meet with the Corps in reference to the project.

We would be happy to meet with you at your convenience to discuss the project. As was requested in the letter, I'm attaching and sending some links to information on previous environmental and cultural resources compliance done in the project area for your information and review. The current proposed work is a part of the larger Joint Federal Project, a combined venture between the Corps of Engineers and the Bureau of Reclamation that was included in an Environmental Impact Statement in 2007. We are presently working towards NEPA and Section 106 compliance in a supplemental EIS to that 2007 document.

I'm also included an aerial map that shows some of the project features in a little more detail. Although the area was almost entirely included within the Bureau's NEPA and Section 106 compliance efforts there are some areas and activities not previously included. As a result I have requested an updated records and literature search from the North Central Information Center. Once I have received those results I would be happy to share with you the information on previous surveys and known sites in the area.

The Corps has a website where we are posting information on the current project as it becomes available:
http://www.spk.usace.army.mil/projects/civil/americanriver/jfp/docs.html

The Corps has posted several NEPA compliance related documents at an ftp site here:
ftp://ftp.usace.army.mil/pub/spk/Folsom_JFP/

And the Bureau has a fairly exhaustive list of documents they completed as part of the Joint Federal Project here:
http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=1808

I would like to propose that we meet sometime in early December. I would like to plan to have a few Corps technical team members present in order to be able to describe the project and answer any questions you may have. We would be able to host the meeting in our offices at 1325 J Street in Sacramento or we would be happy to come to wherever is convenient for you. We could follow up that meeting with a site visit later, if needed. If you have some dates and times in early December that would work best for you please let me know, we will work around your schedule.

Thank you for your interest in our project.

Sincerely,

Melissa Montag
Senior Environmental Manager/Historian
U.S. Army Corps of Engineers
Cultural, Recreation & Social Assessment Section (CESPK-PD-RC)
1325 J Street
Sacramento, CA 95814-2922
(916) 557-7907
e-mail: Melissa.L.Montag@usace.army.mil

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Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA, 95814-2922

REPLY TO
ATTENTION OF

Environmental Resources Branch

DEC 22 2011

Mr. Marcos Guerrero
Tribal Historic Preservation Officer
United Auburn Indian Community of the Auburn Rancheria
10720 Indian Hill Road
Auburn, California 95603

Dear Mr. Guerrero:

In accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, we are writing to inform you of the proposed Folsom Dam Modifications, Approach Channel Phase III (Phase III) Project near Folsom, California. The Phase III Project is a component of the Folsom Dam Joint Federal Project (JFP), which includes Flood Damage Reduction (FDR) measures to Folsom Dam, its dikes, and associated features. The U.S. Bureau of Reclamation (USBR) is responsible for construction of Dam Safety features for the JFP while the U.S. Army Corps of Engineers (Corps) is in the process of constructing the FDR features of the overall JFP. The Corps has consulted with potentially interested Native American tribes and individuals on previous phases of the overall JFP in 2008 and 2010. We contacted you in a letter dated October 13, 2011 to inform you of the Phase III Project, provide you with general project information, invite you to the public scoping meeting, and ask for any interest you may have on the Phase III Project.

We received your letter dated November 16, 2011, requesting information on the Phase III Project, as well as all record searches, surveys, environmental, archaeological and cultural reports completed in or around the APE. As you requested in an email to Ms. Melissa Montag, Corps Historian, on November 7, 2011, Ms. Montag provided links to the available requested reports and Phase III Project background on the USBR website and our project and ftp websites. We met with you on December 6, 2011, to discuss the Phase III Project further and in an email on December 15, 2011 Ms. Montag provided you with copies of the recently completed records and literature search for the Phase III Project.

In accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, we are writing you now to further define the area of potential effects (APE), provide additional information, describe our efforts to identify historic properties, and further request if you have any information or if you have interest in the Phase III Project. We are in the process of completing a supplemental environmental impact statement/environmental impact report for the JFP and more specifically, on the Phase III Project.

The Corps, in coordination with the Central Valley Flood Protection Board and the Sacramento Area Flood Control Agency, is implementing the JFP FDR features in order to significantly decrease the flood risk in the Sacramento area. Pursuant to 36 CFR Part 800.2(c)(2)(ii)(A) we are offering you the opportunity to identify any concerns you may have about the project, and advise on the identification and evaluation of historic properties, including those of traditional religious and cultural importance, within the APE.

The APE for the Phase III Project is located near the left abutment of Folsom Dam and near Dikes 7 and 8 and the Mormon Island Auxiliary Dam (MIAD) in Sacramento County. The project is located on the Folsom, California, 7.5-minute U.S.G.S. topographic map, T10N R7E, in portions of Section 19, 29, and 30 (Enclosure 1). This is an expanded APE from our 2010 correspondence and includes all the currently known FDR features of the JFP. The revised APE is almost entirely within the APE that the USBR included in their consultation during the completion of the 2007 JFP Environmental Impact Statement/Environmental Impact Report and Section 106 compliance.

Phase III of the Project includes the completion of the approach channel and spur dike for the auxiliary spillway at Folsom Dam. Components for construction of these features include:

- Construction of a transload facility adjacent to Dike 7.
- Construction of a concrete batch plant.
- Installation of a 1,000 foot long concrete secant pile cutoff wall between the rock plug and the control structure.
- Placement of fill material along the east side of the rock plug to maintain the 80 foot wide haul road connection to the spillway.
- Excavation of material from the rock plug between the control structure and the cutoff wall.
- Installation of the approach channel slab and concrete walls.
- Excavation of the remaining rock plug to flood the approach channel.
- Dredging of the remaining material to complete the approach channel.
- Disposal of material at MIAD and temporary stockpile of material at Dike 7.
- Construction of a spur dike on the north side of the approach channel.

We have determined that the APE includes those areas highlighted and outlined in Enclosure 1. Most of the APE for the Phase III Project was included in the Section 106 consultation conducted by the USBR for excavation of the spillway under the JFP in 2006 and 2007 and during our previous Section 106 consultation for the Phase I and II of the Corps' JFP FDR measures. The only portion of the APE not included in the previous consultation efforts is the section of the transload facility that extends into Folsom Reservoir.

We have completed an updated records and literature search at the North Central Information Center at California State University, Sacramento. The only known cultural resources within the APE for the Phase III Project are Folsom Dam, Dike 7, Dike 8, and MIAD. Folsom Dam and its associated features are eligible for listing in the National Register of Historic Places. The known cultural resources within the APE will not be adversely affected by the Phase III Project. Other than the portions of the Phase III Project that extend into Folsom Reservoir (the transload facility, the spillway approach channel, and the spur dike) all of the APE has been previously surveyed or heavily disturbed by construction of the dam in the 1950s; follow on modification, maintenance, and repair of Folsom Dam, dikes and MIAD; or construction of roads and other development around Folsom Reservoir.

If buried or previously unidentified resources are located during project activities, all work in the vicinity of the find would cease, and the California State Historic Preservation Office would be contacted for additional consultation per 36 CFR 800.13, Post Review Discoveries, and interested Native American representatives would be consulted.

Pursuant to 36 CFR Part 800.3(f)(2), we request that you notify us if you have interest in the Phase III Project or if you may attach religious and cultural significance to historic properties in the APE. We are sensitive to traditional cultural properties and sacred sites, and make every effort to avoid them. Please let us know if you have knowledge of locations of archeological sites, traditional cultural properties, or areas of traditional cultural value or concern in or near the Phase III Project APE.

Correspondence may be sent to Ms. Melissa Montag, U.S. Army Corps of Engineers, Sacramento District, 1325 J Street, Sacramento, California 95814-2922. If you have any questions or would like additional information about the Section 106 compliance and consultation, please contact Ms. Montag at (916) 557-7907 or by email at: Melissa.L.Montag@usace.army.mil. Please contact Ms. Pamela Amie, Project Manager, at (916) 557-7811 with any specific project questions.

Sincerely,

for Alicia E. Kirchner
Chief, Planning Division

Enclosure

Cc (w/enclosures):
Mr. Gregory S. Baker, Tribal Administrator, United Auburn Indian Community of the Auburn Rancheria, 10720 Indian Hill Road, Auburn, California 95603
Ms. Anastasia Leigh, U.S. Department of the Interior, Bureau of Reclamation, 2800 Cottage Way, MP-153, Sacramento, California 95825

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA, 95814-2922

REPLY TO
ATTENTION OF

Environmental Resources Branch

DEC 22 2011

Mr. Daniel Fonseca
Tribal Historic Preservation Officer
Shingle Springs Rancheria
P.O. Box 1340
Shingle Springs, California 95682

Dear Mr. Fonseca:

In accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, we are writing to inform you of the proposed Folsom Dam Modifications, Approach Channel Phase III (Phase III) Project near Folsom, California. The Phase III Project is a component of the Folsom Dam Joint Federal Project (JFP), which includes Flood Damage Reduction (FDR) measures to Folsom Dam, its dikes, and associated features. The U.S. Bureau of Reclamation (USBR) is responsible for construction of Dam Safety features for the JFP while the U.S. Army Corps of Engineers (Corps) is in the process of constructing the FDR features of the overall JFP. The Corps has consulted with potentially interested Native American tribes and individuals on previous phases of the overall JFP in 2008 and 2010. We contacted you in a letter dated October 13, 2011 to inform you of the Phase III Project, provide you with general project information, invite you to the public scoping meeting, and ask for any interest you may have on the Phase III Project.

We received your letter dated October 24, 2011, requesting initiation of the consultation process on the Phase III Project, as well as all record searches, surveys, environmental, archaeological and cultural reports completed in or around the APE. In your letter you also formally requested that the Shingle Springs Band of Miwok Indians be added as a consulting party in identifying any traditional cultural properties that may exist within the area of potential effects (APE). As requested, Ms. Melissa Montag, Corps Historian, contacted Ms. Crystal Dilworth, leaving a phone message on October 28, 2011 to discuss the project further. Ms. Montag followed that phone message with an email on November 7, 2011 providing links to the available requested reports and Phase III Project background. On December 7, 2011, Ms. Montag sent an email to arrange for a meeting with the Shingle Springs Band of Miwok Indians as requested and in an email on December 15, 2011, Ms. Montag provided you with copies of the recently completed records and literature search for the Phase III Project. We ask that you notify us if you would like to meet to discuss the project, arrange for a site visit, or would like additional information.

In accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, we are writing you now to further define the APE, provide additional information, describe our efforts to identify historic properties, and further request if you have any information or if you have interest in the Phase III Project. We are in the process of completing a supplemental environmental impact statement/environmental impact report for the JFP and more specifically, on the Phase III Project.

The Corps, in coordination with the Central Valley Flood Protection Board and the Sacramento Area Flood Control Agency, is implementing the JFP FDR features in order to significantly decrease the flood risk in the Sacramento area. Pursuant to 36 CFR Part 800.2(c)(2)(ii)(A) we are offering you the opportunity to identify any concerns you may have about the project, and advise on the identification and evaluation of historic properties, including those of traditional religious and cultural importance, within the APE.

The APE for the Phase III Project is located near the left abutment of Folsom Dam and near Dikes 7 and 8 and the Mormon Island Auxiliary Dam (MIAD) in Sacramento County. The project is located on the Folsom, California, 7.5-minute U.S.G.S. topographic map, T10N R7E, in portions of Section 19, 29, and 30 (Enclosure 1). This is an expanded APE from our 2010 correspondence and includes all the currently known FDR features of the JFP. The revised APE is almost entirely within the APE that the USBR included in their consultation during the completion of the 2007 JFP Environmental Impact Statement/Environmental Impact Report and Section 106 compliance.

Phase III of the Project includes the completion of the approach channel and spur dike for the auxiliary spillway at Folsom Dam. Components for construction of these features include:

- Construction of a transload facility adjacent to Dike 7.
- Construction of a concrete batch plant.
- Installation of a 1,000 foot long concrete secant pile cutoff wall between the rock plug and the control structure.
- Placement of fill material along the east side of the rock plug to maintain the 80 foot wide haul road connection to the spillway.
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- Excavation of the remaining rock plug to flood the approach channel.
- Dredging of the remaining material to complete the approach channel.
- Disposal of material at MIAD and temporary stockpile of material at Dike 7.
- Construction of a spur dike on the north side of the approach channel.

We have determined that the APE includes those areas highlighted and outlined in Enclosure 1. Most of the APE for the Phase III Project was included in the Section 106 consultation conducted by the USBR for excavation of the spillway under the JFP in 2006 and 2007 and during our previous Section 106 consultation for the Phase I and II of the Corps' JFP

FDR measures. The only portion of the APE not included in the previous consultation efforts is the section of the transload facility that extends into Folsom Reservoir.

We have completed an updated records and literature search at the North Central Information Center at California State University, Sacramento. The only known cultural resources within the APE for the Phase III Project are Folsom Dam, Dike 7, Dike 8, and MIAD. Folsom Dam and its associated features are eligible for listing in the National Register of Historic Places. The known cultural resources within the APE will not be adversely affected by the Phase III Project. Other than the portions of the Phase III Project that extend into Folsom Reservoir (the transload facility, the spillway approach channel, and the spur dike) all of the APE has been previously surveyed or heavily disturbed by construction of the dam in the 1950s; follow on modification, maintenance, and repair of Folsom Dam, dikes and MIAD; or construction of roads and other development around Folsom Reservoir.

If buried or previously unidentified resources are located during project activities, all work in the vicinity of the find would cease, and the California State Historic Preservation Office would be contacted for additional consultation per 36 CFR 800.13, Post Review Discoveries, and interested Native American representatives would be consulted.

Pursuant to 36 CFR Part 800.3(f)(2), we request that you notify us if you have interest in the Phase III Project or if you may attach religious and cultural significance to historic properties in the APE. We are sensitive to traditional cultural properties and sacred sites, and make every effort to avoid them. Please let us know if you have knowledge of locations of archeological sites, traditional cultural properties, or areas of traditional cultural value or concern in or near the Phase III Project APE.

Correspondence may be sent to Ms. Melissa Montag, U.S. Army Corps of Engineers, Sacramento District, 1325 J Street, Sacramento, California 95814-2922. If you have any questions or would like additional information about the Section 106 compliance and consultation, please contact Ms. Montag at (916) 557-7907 or by email at: Melissa.L.Montag@usace.army.mil. Please contact Ms. Pamela Amie, Project Manager, at (916) 557-7811 with any specific project questions.

Sincerely,

For ~~Alicia~~ Alicia E. Kirchner
Chief, Planning Division

Enclosure

Cc (w/enclosures):
Ms. Crystal Dilworth, Cultural Resource Office Manager, Shingle Springs Rancheria, P.O. Box 1340, Shingle Springs, California 95682
Ms. Anastasia Leigh, U.S. Department of the Interior, Bureau of Reclamation, 2800 Cottage Way, MP-153, Sacramento, California 95825

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA, 95814-2922

REPLY TO
ATTENTION OF

Environmental Resources Branch

DEC 22 2011

Ms. Eileen Moon
Vice Chairperson
Tsi-Akim Maidu
1239 East Main Street
Grass Valley, California 95945

Dear Ms. Moon:

In accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, we are writing to inform you of the proposed Folsom Dam Modifications, Approach Channel Phase III (Phase III) Project near Folsom, California. The Phase III Project is a component of the Folsom Dam Joint Federal Project (JFP), which includes Flood Damage Reduction (FDR) measures to Folsom Dam, its dikes, and associated features. The U.S. Bureau of Reclamation (USBR) is responsible for construction of Dam Safety features for the JFP while the U.S. Army Corps of Engineers (Corps) is in the process of constructing the FDR features of the overall JFP. The Corps has consulted with potentially interested Native American tribes and individuals on previous phases of the overall JFP in 2008 and 2010. We contacted you in a letter dated October 13, 2011 to inform you of the Phase III Project, provide you with general project information, invite you to the public scoping meeting, and ask for any interest you may have on the Phase III Project.

In accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, we are writing you now to further define the area of potential effects (APE), provide additional information, describe our efforts to identify historic properties, and further request if you have any information or if you have interest in the Phase III Project. We are in the process of completing a supplemental environmental impact statement/environmental impact report for the JFP and more specifically, on the Phase III Project.

The Corps, in coordination with the Central Valley Flood Protection Board and the Sacramento Area Flood Control Agency, is implementing the JFP FDR features in order to significantly decrease the flood risk in the Sacramento area. Pursuant to 36 CFR Part 800.2(c)(2)(ii)(A) we are offering you the opportunity to identify any concerns you may have about the project, and advise on the identification and evaluation of historic properties, including those of traditional religious and cultural importance, within the APE.

The APE for the Phase III Project is located near the left abutment of Folsom Dam and near Dikes 7 and 8 and the Mormon Island Auxiliary Dam (MIAD) in Sacramento County. The project is located on the Folsom, California, 7.5-minute U.S.G.S. topographic map, T10N R7E, in portions of Section 19, 29, and 30 (Enclosure 1). This is an expanded APE from our 2010 correspondence and includes all the currently known FDR features of the JFP. The revised APE is almost entirely within the APE that the USBR included in their consultation during the completion of the 2007 JFP Environmental Impact Statement/Environmental Impact Report and Section 106 compliance.

Phase III of the Project includes the completion of the approach channel and spur dike for the auxiliary spillway at Folsom Dam. Components for construction of these features include:

- Construction of a transload facility adjacent to Dike 7.
- Construction of a concrete batch plant.
- Installation of a 1,000 foot long concrete secant pile cutoff wall between the rock plug and the control structure.
- Placement of fill material along the east side of the rock plug to maintain the 80 foot wide haul road connection to the spillway.
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- Excavation of the remaining rock plug to flood the approach channel.
- Dredging of the remaining material to complete the approach channel.
- Disposal of material at MIAD and temporary stockpile of material at Dike 7.
- Construction of a spur dike on the north side of the approach channel.

We have determined that the APE includes those areas highlighted and outlined in Enclosure 1. Most of the APE for the Phase III Project was included in the Section 106 consultation conducted by the USBR for excavation of the spillway under the JFP in 2006 and 2007 and during our previous Section 106 consultation for the Phase I and II of the Corps' JFP FDR measures. The only portion of the APE not included in the previous consultation efforts is the section of the transload facility that extends into Folsom Reservoir.

We have completed an updated records and literature search at the North Central Information Center at California State University, Sacramento. The only known cultural resources within the APE for the Phase III Project are Folsom Dam, Dike 7, Dike 8, and MIAD. Folsom Dam and its associated features are eligible for listing in the National Register of Historic Places. The known cultural resources within the APE will not be adversely affected by the Phase III Project. Other than the portions of the Phase III Project that extend into Folsom Reservoir (the transload facility, the spillway approach channel, and the spur dike) all of the APE has been previously surveyed or heavily disturbed by construction of the dam in the 1950s; follow on modification, maintenance, and repair of Folsom Dam, dikes and MIAD; or construction of roads and other development around Folsom Reservoir.

If buried or previously unidentified resources are located during project activities, all work in the vicinity of the find would cease, and the California State Historic Preservation Office would be contacted for additional consultation per 36 CFR 800.13, Post Review Discoveries, and interested Native American representatives would be consulted.

Pursuant to 36 CFR Part 800.3(f)(2), we request that you notify us if you have interest in the Phase III Project or if you may attach religious and cultural significance to historic properties in the APE. We are sensitive to traditional cultural properties and sacred sites, and make every effort to avoid them. Please let us know if you have knowledge of locations of archeological sites, traditional cultural properties, or areas of traditional cultural value or concern in or near the Phase III Project APE.

Correspondence may be sent to Ms. Melissa Montag, U.S. Army Corps of Engineers, Sacramento District, 1325 J Street, Sacramento, California 95814-2922. If you have any questions or would like additional information about the Section 106 compliance and consultation, please contact Ms. Montag at (916) 557-7907 or by email at: Melissa.L.Montag@usace.army.mil. Please contact Ms. Pamela Amie, Project Manager, at (916) 557-7811 with any specific project questions.

Sincerely,

for Alicia E. Kirchner
Chief, Planning Division

Enclosure

Cc (w/enclosures):
Ms. Anastasia Leigh, U.S. Department of the Interior, Bureau of Reclamation, 2800 Cottage Way, MP-153, Sacramento, California 95825

MIWOK
MAIDU

United Auburn Indian Community
of the Auburn Rancheria

David Keyser, Chairman | Kimberly DuBach, Vice Chair | Gene Whitehouse, Secretary | Brenda Conway, Treasurer | Calvin Moman, Council Member

January 12, 2012

Melissa Montag
U.S. Army Corps of Engineers
Sacramento District
1325 J Street
Sacramento, California 95814-2922

Subject: Folsom Dam Modifications, Approach Channel Phase III (Phase III) Project near Folsom, California, component of the Folsom Dam Joint Federal Project (JFP)

Dear Ms. Montag,

Thank you for the opportunity to consult on the above referenced project. The United Auburn Indian Community (UAIC) of the Auburn Rancheria is comprised of Miwok and Southern Maidu (Nisenan) people whose tribal lands are within Placer County and ancestral territory spans into El Dorado, Nevada, Sacramento, Sutter, and Yuba counties. The UAIC is concerned about development within its aboriginal territory that has potential to impact the lifeways, cultural sites, and landscapes that may be of sacred or ceremonial significance. We appreciate the opportunity to comment on this and other projects in your jurisdiction.

The UAIC has reviewed relevant project information and all requests and recommendations have been addressed. Based on the negative finding the Tribe concludes that the UAIC does not have any further archaeological concerns for this project. It is reasonable to conclude that the project should not result in the alteration of or adverse physical or aesthetic effect to any significant archaeological or historical burials, sites, structures, objects, or buildings; nor should the project have the potential to cause a physical change that would affect unique cultural values or restrict pre-historic religious or sacred uses of the project area. However, when a mitigation bank is chosen, the UAIC would like for Native plants and resources to be considered in the restoration effort. The UAIC also welcomes restoration and mitigation bank opportunities and programs on Tribal lands.

Thank you again for the opportunity to consult on this project. Please contact Marcos Guerrero, Tribal Historic Preservation Officer, at (530) 883-2364 or email at mguerrero@auburnrancheria.com if you have any questions.

Sincerely,

Gregory S. Baker,
Tribal Administrator

CC: Marcos Guerrero, THPO

Tribal Office 10720 Indian Hill Road Auburn, CA 95603 (530) 883-2390 FAX (530) 883-2380

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA, 95814-2922

REPLY TO
ATTENTION OF

Environmental Resources Branch

DEC 22 2011

Mr. Milford Wayne Donaldson
State Historic Preservation Officer
Office of Historic Preservation
P.O. Box 942896
Sacramento, California 94296-0001

Dear Mr. Donaldson:

In accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, we are writing to inform you of the proposed Folsom Dam Modifications, Approach Channel Phase III (Phase III) Project near Folsom, California. The Phase III Project is a component of the Folsom Dam Joint Federal Project (JFP), which includes Flood Damage Reduction (FDR) measures to Folsom Dam, its dikes, and associated features. The U.S. Bureau of Reclamation (USBR) is responsible for construction of Dam Safety features for the JFP while the U.S. Army Corps of Engineers (Corps) is in the process of constructing the FDR features of the overall JFP. The USBR has previously consulted on the Dam Safety component of the JFP with your office under reference number BUR061114A.

The Corps, in coordination with the Central Valley Flood Protection Board and the Sacramento Area Flood Control Agency, is implementing the JFP FDR features in order to significantly decrease the flood risk in the Sacramento area. Pursuant to 36 CFR Part 800.3 we are initiating the Section 106 process for the Phase III Project and we are asking for your comments on our proposed efforts to identify historic properties under 36 CFR Part 800.4. We are also asking for your concurrence with our determination of the area of potential effects (APE) for the Phase III Project in accordance with 36 CFR Part 800.4(a)(1).

Previous consultation with your office occurred under reference number COE081120C for Phases I and II of the Corps' JFP FDR measures (Enclosure 1). In a letter dated May 5, 2009, Mr. William Soule of your office concurred with our finding of No Adverse Effect, in accordance with 36 CFR 800.5(b), for the Phase I Project. In a letter dated July 26, 2010, Mr. Soule concurred with our finding of No Adverse Effect, in accordance with 36 CFR 800.5(b), for the Phase II Project.

As described in our previous consultation, the overall FDR measures that we will be constructing for the JFP consist of a continuing series of construction projects with separate environmental compliance efforts for each project (Enclosure 2). Due to the nature of these iterative phases, because descriptive information on what each construction effort will include will not be available until plans are developed in the months leading up to the estimated construction schedule, and in consultation with your office, we determined that the Section 106 compliance for each phase would be handled separately and as information becomes available.

As a result, we are defining the APE for the Phase III Project and we are providing you with information on the current proposed construction effort for the Corps' JFP FDR measures.

The APE for the Phase III Project is located near the left abutment of Folsom Dam and near Dikes 7 and 8 and the Mormon Island Auxiliary Dam (MIAD) in Sacramento County. The project is located on the Folsom, California, 7.5-minute U.S.G.S. topographic map, T10N R7E, in portions of Section 19, 29, and 30 (Enclosure 3). This is an expanded APE from our 2010 correspondence and includes all the currently known FDR features of the JFP. The Phase III Project revised APE is similar to the APE consulted on for the Phase II Project (Enclosure 4), with an additional area identified for the proposed location of a temporary transload facility near Dike 7. The revised APE is almost entirely within the APE that the USBR included in their consultation during the completion of the 2007 JFP Environmental Impact Statement/Environmental Impact Report and Section 106 compliance.

Phase III of the Project includes the completion of the approach channel and spur dike for the auxiliary spillway at Folsom Dam. Components for construction of these features include:

- Construction of a transload facility adjacent to Dike 7.
- Construction of a concrete batch plant.
- Installation of a 1,000 foot long concrete secant pile cutoff wall between the rock plug and the control structure.
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- Installation of the approach channel slab and concrete walls.
- Excavation of the remaining rock plug to flood the approach channel.
- Dredging of the remaining material to complete the approach channel.
- Disposal of material at the MIAD and temporary stockpile of material at Dike 7.
- Construction of a spur dike on the north side of the approach channel.

We have preliminarily determined that the APE includes those areas highlighted and outlined in Enclosure 3. We invite any comments you may have on our preliminary determination of the APE. Most of the APE for the Phase III Project was included in the consultation conducted by the USBR for excavation of the spillway under the JFP in 2006 and 2007 and during our previous consultation for the Phase I and II of the Corps' JFP FDR measures. The only portion of the APE not included in the previous consultation efforts is the section of the transload facility that extends into Folsom Reservoir. We would also like to ask for your comments on our proposed efforts to identify historic properties as outlined below.

We have completed an updated records and literature search at the North Central Information Center at California State University, Sacramento. The only known cultural resources within the APE for the Phase III Project are Folsom Dam, Dike 7, Dike 8, and MIAD. If there are areas not previously included in the USBR's or our previous survey and consultation we plan to conduct a pedestrian survey of those portions of the APE.

We obtained a list of potentially interested Native Americans from the Native American Heritage Commission and contacted them in letters dated October 13, 2011 to inquire if they have knowledge of locations of archeological sites, or areas of traditional cultural value or concern in or near the Phase III Project APE. Both the United Auburn Indian Community of the Auburn Rancheria (UAIC) and the Shingle Springs Rancheria (SSR) have contacted us in reference to the Phase III Project and have asked to meet with us. We met with representatives of the UAIC on December 6, 2011 and plan to continue communicating with the UAIC on the Phase III Project. We have contacted the SSR by phone and email to coordinate a time to meet, but they have not responded to our inquiries. We plan to continue to try to coordinate with the SSR to determine if they have interest in the Phase III Project.

Pursuant to 36 CFR Part 800.4(a)(1), we request your comments on our preliminary determination of the APE for the Phase III Project. We also request any comments your office may have of our proposed efforts to identify historic properties under 36 CFR Part 800.4. Correspondence may be sent to Ms. Melissa Montag, U.S. Army Corps of Engineers, Sacramento District, 1325 J Street, Sacramento, California 95814-2922. If you have any questions or would like additional information, please contact Ms. Montag at (916) 557-7907 or by email at: Melissa.L.Montag@usace.army.mil.

Sincerely,

for Alicia E. Kirchner
Chief, Planning Division

Enclosures

Cc (w/enclosures):
Anastasia Leigh, U.S. Department of the Interior, Bureau of Reclamation, 2800 Cottage Way, MP-153, Sacramento, California 95825

STATE OF CALIFORNIA – THE NATURAL RESOURCES AGENCY EDMUND G. BROWN, JR., *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
1725 23rd Street, Suite 100
SACRAMENTO, CA 95816-7100
(916) 445-7000 Fax: (916) 445-7053
calshpo@parks.ca.gov
www.ohp.parks.ca.gov

January 25, 2012

Reply to: COE081120C

Alicia E. Kirchner
Army Corps of Engineers
1325 J Street
Sacramento, CA 95814-2922

RE: Folsom Dam Modification Approach Channel Phase III, Sacramento County, California

Dear Ms. Kirchner:

Thank you for requesting my comments on the above cited undertaking. You have requested my comments in accordance with Section 106 of the National Historic Preservation Act as amended. My staff has reviewed the documentation you provided and I would like to offer the following comments.

The current undertaking is the next phase of the Folsom Dam Joint Federal Project which is being undertaken by the Bureau of Reclamation and the Army Corps of Engineers. In your letter of December 22, 2011 you identify an area of potential effect (APE) for this phase of the undertaking. I do not object to how you have drawn the APE for this undertaking. In addition, I find your efforts to date and those proposed reasonable and sufficient to identify historic properties within the undertaking's APE.

If my staff can be of any further assistance, please contact Dwight Dutschke at 916-445-7010.

Sincerely,

Susan K Stratton for

Milford Wayne Donaldson, FAIA
State Historic Preservation Officer

Appendix J

USFWS Coordination Act Report

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In Reply Refer To
81420-2011-CPA-0170-2

NOV - 1 2012

Alicia Kirchner
Chief, Planning Division
Corps of Engineers, Sacramento District
1325 J Street
Sacramento, California 95814-2922

Dear Ms. Kirchner:

The Corps of Engineers (Corps) has requested coordination under the Fish and Wildlife Coordination Act (FWCA) for the American River Watershed Investigation: Folsom Dam Modification Project, Approach Channel. The proposed project would occur within and adjacent Folsom Reservoir, Sacramento County, California, and is intended to function in conjunction with the new spillway and control structure, as well as spillway releases from the main dam, to pass the Probable Maximum Flood event. The enclosed report constitutes the U.S. Fish and Wildlife Service's FWCA report for the proposed project.

If you have any questions regarding this report on the proposed project, please contact Doug Weinrich at (916) 414-6563.

Sincerely,

Daniel Welsh
Acting Field Supervisor

Enclosure

cc:
Jaime LeFevre, COE, Sacramento, CA
Nancy Sandburg, COE, Sacramento, CA
Howard Brown, NOAA Fisheries, Sacramento, CA
Kevin Thomas, CDFG, Rancho Cordova, CA
Jay Rowan, CDFG, Rancho Cordova, CA
Kenneth Kundargi, CDFG, Rancho Cordova, CA

FISH AND WILDLIFE COORDINATION ACT REPORT
AMERICAN RIVER WATERSHED INVESTIGATION
FOLSOM DAM MODIFICATION PROJECT, APPROACH CHANNEL
CALIFORNIA
October 2012

This is the U.S. Fish and Wildlife Service's (Service) Fish and Wildlife Coordination Act report on the effects that excavation of the proposed Folsom Dam Modification Project, Approach Channel (Project) would have on fish and wildlife resources within Folsom Reservoir, lands adjacent the left wing dam of Folsom Dam, and the lower American River in Folsom, California. This report has been prepared under the authority of, and in accordance with, the provisions of the Fish and Wildlife Coordination Act (48 stat. 401, as amended: 16 U.S.C. 661 et seq).

BACKGROUND

The Corps of Engineers (Corps), Bureau of Reclamation (Reclamation), Central Valley Flood Protection Board, and Sacramento Area Flood Control Agency are seeking to significantly reduce the risk of flooding along the main stem of the American River in the Sacramento area while meeting dam safety and public safety objectives. The Energy and Water Appropriations Act of 2006 directed the Secretary of the Army and Secretary of the Interior to collaborate on authorized activities to maximize enhanced flood protection improvements and address dam safety risk reduction needs at Folsom Dam and Reservoir (Folsom Facility) as one Joint Federal Project.

The current spillway and outlets at the Folsom Facility do not have sufficient discharge capacity for managing the predicted Probable Maximum Flood (PMF) and lesser event flood inflows above a 1 in 100 year event (an event that has a 1% chance of occurring in any given year). Currently, the Folsom Facility can safely release flood flows between 115,000 cubic feet per second (cfs) and 160,000 cfs for a duration which provides a level of protection provided by downstream levees associated with a 1 in 100 year event. Structural modifications associated with the Joint Federal Project are proposed to address increasing discharge capability and/or increasing storage during extreme flood events above the 1 in 200 year event (an event that has a 0.5% chance of occurring an any given year) up to the PMF. Combined, the modifications would be able to safely release flood flows between 115,000 cfs and 160,000 cfs for a longer duration equivalent to a 1 in 200 year event level. A new auxiliary spillway is a major feature that would address the need to safely pass part or the entire PMF event. Increasing discharge capability and increasing storage would potentially achieve the goal of a greater than 1 in 200 year flood protection objective (USBR et al. 2006).

An auxiliary spillway consisting of a 1,100-foot-long approach channel on the waterside of a control structure, a spur dike, a gated control structure, and a 3,000-foot-long discharge chute on the downstream side of the control structure is being constructed (Figure 1).

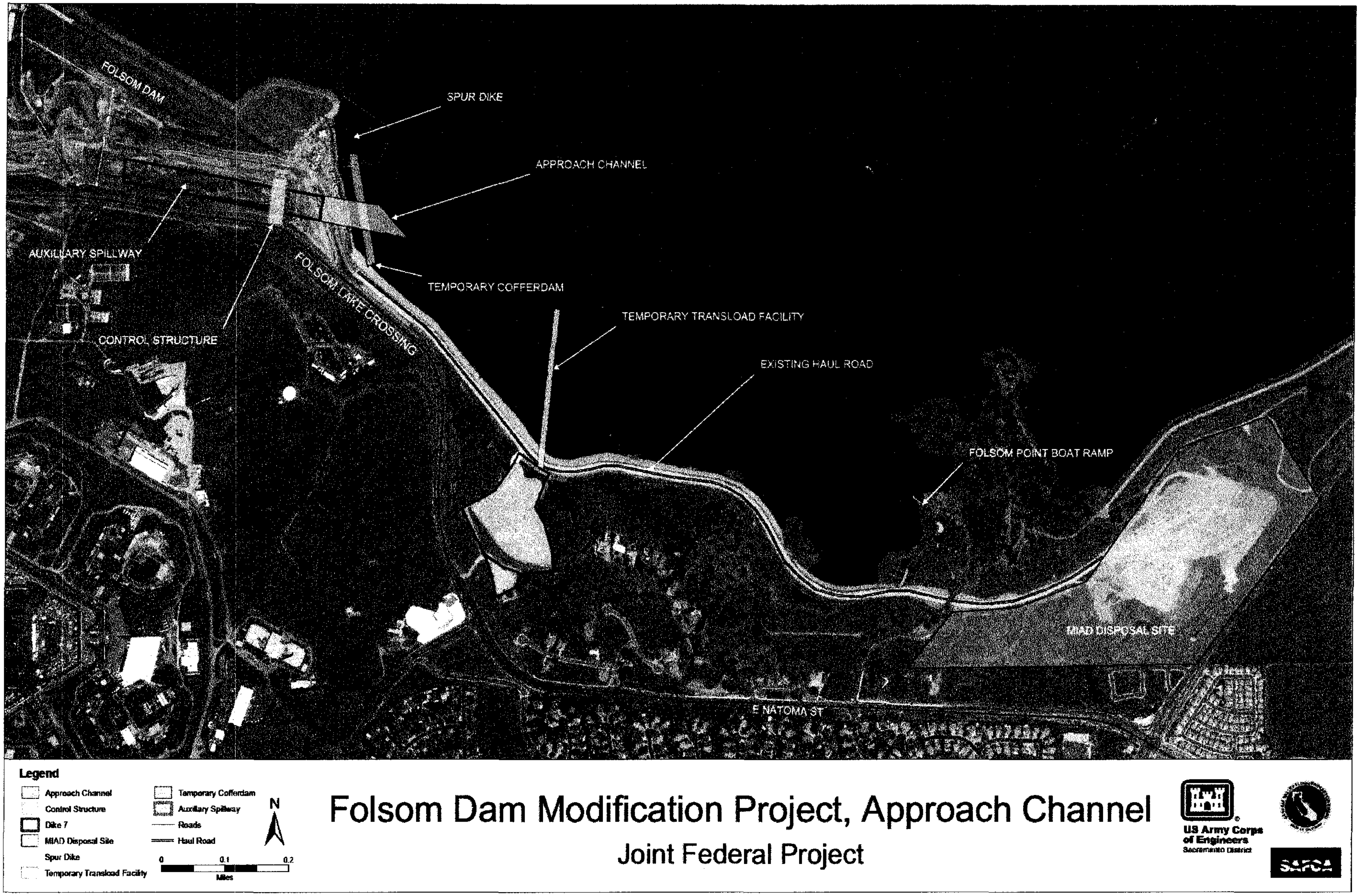

Figure 1. Folsom Dam Modification Project, Approach Channel. SOURCE: Corps of Engineers

Flows from the auxiliary spillway would enter the American River about 1,500 feet downstream of Folsom Dam. This Fish and Wildlife Coordination Act report only addresses Phase 4 of the new auxiliary spillway consisting of the excavation of the proposed spillway approach channel and construction of the spur dike. The other features of the spillway (control structure, discharge chute, etc.) were covered in earlier coordination with the Service (USFWS 2007, 2009, 2010).

PROJECT DESCRIPTION

The project is being phased such that the excavation and construction of the gated control structure is being conducted using the existing topography and natural rock formation (paved overlook/parking area to the east of the Left Wing Dam) as a natural dam or plug. The Corps is evaluating two alternatives in addition to the No Action Alternative (Alternative 1). These are Alternative 2: Approach Channel Excavation with Cutoff Wall and Alternative 3: Approach Channel with Cofferdam.

Alternative 2 was selected as the preferred alternative. In addition to construction of the approach channel and cutoff wall, a spur dike, transload facility, and concrete batch plant are necessary. After the control structure becomes operational, the approach channel and rock plug will be excavated and a cutoff wall will be installed. Construction is slated to begin in the summer/fall of 2013 and would be completed in about 4 years. Construction features and other project details are summarized below.

Reclamation completed the excavation of the spillway chute and stilling basin and a partial excavation for the control structure. The Corps is responsible for the final excavation for the gated control structure and the approach channel, as well as for the construction of concrete structures. The approach channel for the auxiliary spillway is expected to extend about 1,100 feet into the reservoir from the concrete control structure. The invert of the approach channel would be at elevation 362.34 (NAVD 88 datum) and the approach channel excavation would narrow towards the control structure. The approach channel slopes would be 2H:1V in overburden, decomposed and highly weathered rock, and 0.5H:1V in less weathered rock. There would be a 30-foot-wide by 10-foot-deep rock trap at the upstream end of the approach channel apron to block debris from entering the spillway. A spur dike on the north side of the approach channel will be required based on the results of hydraulic model tests (refer to Figure 1).

The first step in the excavation effort for the approach channel would consist of removal of rock plug material between the constructed control structure and the cutoff wall. A combination of ripping and blasting would be required to facilitate rock excavation. Once enough material is removed from this area, the approach channel slab and concrete walls would be installed over an 18 month period. During this timeframe the control structure's bulkhead gates would be completed and operational. Excavation of the rock plug would continue in-the-dry until the approach channel is ready for flooding.

The remaining material from the rock plug would be excavated in-the-wet. Blasting and dredging would be required for this operation. Dredging of soft material and silts on the lake bottom would be conducted first to reduce turbidity during the blasting phase. Large silt containing curtains would be utilized for all operations conducted in-the-wet in order to minimize turbidity. Preferably, this dredging would occur at the lowest lake level available.

After fine materials are removed, the underlying rock would be blasted. Blasted material would be dredged using a barge-mounted clam shell or hydraulic excavator dredge, down to an elevation of 350 feet. The dredging would be performed from barges and would require marine equipment to be mobilized and the transload facility to be operational.

The proposed cutoff wall would be located adjacent to Folsom Reservoir southeast of the left wing dam and east of the auxiliary spillway chute excavation. The cutoff wall would consist of a reinforced concrete secant pile wall socketed into the underlying highly weathered granitic in situ rock. The proposed spur dike, in Folsom Reservoir and an upland site near Dike 8 would serve as permanent disposal sites for the excavated material. The Mormon Island Auxiliary Dam (MIAD) and an upland area near Dike 7 would serve as temporary disposal sites, where excavated material would be eventually removed and used for other purposes. Use of the MIAD site would need to be coordinated with Reclamation's Mormon Island Auxiliary Dam Modification Project. Due to potential conflicts in site use, it is possible this site would not be available during multiple years of construction.

Land-based rock excavation would consist of conventional drilling and blasting methods. Drilling would be performed in lifts and patterns to facilitate thorough pulverization of the granite material. In dry holes, ammonium nitrate-fuel oil (ANFO) would be used and primed with cast boosters. Water-resistant emulsified slurry would be required since water intrusion is anticipated. Explosives would be stored off-site. The explosives storage facility is assumed to be located in Jamestown, California, about 80 miles from the site. Explosives would be trucked to the site on a daily basis.

Blasting would typically consist of 15,000 cubic yards (cys) rock shots. Blasted rock would be excavated with shovels or loaders, placed in haul trucks, and hauled to a disposal area, located within about 1.5 to 2 miles from the excavation area.

Underwater rock excavation would be accomplished by drill and blast methods. Barge platforms would be transported and assembled on-site to accommodate drilling and excavation equipment. Down-the-hole hammer drills would bore 5-inch holes and the holes would be charged with emulsified slurry explosives. Prior to detonations, the drill and fleeting barge would move 300 to 500 feet from the blast area. Each blast would produce about 2,000 cys of rock. The removal of material would be completed in two lifts when the rock depth exceeds 30 to 40 feet. Current estimates are for up to 400 blasts over a 3-year period.

Explosives would be stored off-site. The explosives storage facility is assumed again to be located in Jamestown, California. Explosives would be trucked to the site on a daily basis. After verification all charges have been detonated, a long stick excavator or crane supported clam shell would dredge the shot rock into material barges for tow to the temporary transload facility.

All charges at least 20-charge diameters would be confined by rock burden and crushed stone stemming to limit the blast over-pressures. A bubble curtain may be used to reduce the blast-induced dynamic water pressure that could otherwise be transmitted to the lake (contractor option).

The dredging equipment that could be utilized for this project includes barges and excavators:

- A barge-mounted large long reach excavator, with an effective excavating depth of 90 to 95 feet. Different size buckets exist and they can be changed out for the various soil and rock materials to be encountered during construction. The excavator method is limited by its effective digging depth. Accordingly, the 3½ month (mid-November to end of February) low lake level window would need to be used to effectively dredge to the final grades.

- A 225-ton class barge-mounted crawler crane clam shell unit would supplement the hydraulic excavator to dredge shot rock and common material to grade in periods where the lake level is too high for the hydraulic excavator to dredge to final grade.

The long reach excavator, conventional clam shell, and other overwater equipment would be mounted on portable *"Flexifloat"* units, sized and assembled to maintain stability and manage the excavation sets. The size of the *"Flexifloat"* barges would be about 180 to 200 feet by 40 to 50 feet by 7 feet deep. The barges would be held in position by large winch controlled spuds, or in water over 50 feet deep, by a four-point mooring system using bottom founded anchors.

The proposed spur dike is an embankment designed to direct water into the approach channel. The spur dike would be located directly to the northwest of the approach channel and have a surface area of about 9 acres. The core of the spur dike would be constructed of decomposed granite. This would be followed by a compacted random rock fill followed by a stone riprap cap. The quantity of material estimated to complete the spur dike is about 1.4 million cys. Material for the spur dike construction would come from the excavation of the approach channel excavation, or MIAD. The construction equipment needed to build the spur dike consists of normal scrapers, bulldozers, and sheep-foot rollers for the body of the spur dike, and backhoes, bulldozers, and smooth rollers for the bedding, riprap, and surfacing materials. The construction would take place over 24 months in 2015 and 2017.

A transload facility would be needed for mobilization and demobilization of marine equipment (e.g., sectional barges and heavy cranes), dredged spoil off-loading from barges to trucks, marine equipment fuel and explosives transfer to support barges, equipment maintenance, and marine crew deployment. The proposed transload facility would be comprised of a ramp, crane and crane pad, and a fuel transfer station. The transload facility would be located adjacent to Dike 7. The ramp structure would need to accommodate seasonal and variable lake levels between the elevations of 355 to 475 feet (NAVD 88).

The ramp dimensions are roughly 50 feet wide and 1,500 feet long, with a maximum slope of 10 percent. The width allows large haul trucks the ability to turnaround and two-way passage along the ramp. At about 1,000 feet from the haul road, the ramp would intersect the existing lake bottom. From this point, steel planks would lie on the existing bottom to control mud and minimize siltation and turbidity within the lake.

The ramp would be constructed from about 250,000 cys of compacted 3-inch maximum graded fill with little or no fines. About 20,000 cys of ¼ ton riprap would be placed on top of the main fill for protection from wave action. Aggregate material would be imported from offsite locations. Dredging out an average of 3 feet of material under the footprint of the ramp (about 18,000 cys) may be required depending on the soils at the lake bottom.

Depending on lake levels, the ramp material may be placed directly into the water. The fines content of the ramp material would be reduced as much as possible to limit water turbidity during placement of material. Full depth silt curtains would surround the ramp installation to control turbidity and silt movement into the greater lake body.

The ramp would incur progressive construction, with each stage of horizontal extension dependent upon existing lake level, and depth needed to accommodate the reach to barges. Ramp construction would begin at the shoreline junction with the haul road and extend into the lake. The ramp would be extended as needed in response to fluctuating lake levels during approach channel and cofferdam construction activities. The estimate for complete ramp extension is 4 months.

To off-load the dredged material from barges, a crane would be placed on a level crushed rock pad located near the bottom of the ramp just above lake level. Timber mats would form a work platform for the crane. The pad would need to be relocated to accommodate fluctuating lake levels.

A fuel transfer station would be located on the ramp. The transfer station would include a flexible hose from the ramp, which would be supported intermittently by a small float anchored offshore. The float would be used to service a utility barge with a storage tank, and then recalled to the ramp to prevent severage by boat traffic. The tank would hold one day's supply of fuel for the floating equipment at the project site. Fuel would be delivered by trucks and pumped from the trucks through the fuel transfer facility to the tank on the utility barge.

The transload facility is potentially permanent or may be removed after the completion of the approach channel project in 2017. If the ramp is removed, ramp material would be removed with excavators and hauled for disposal at one of disposal sites.

The construction of the approach channel and cutoff wall would require large quantities of temperature controlled concrete. This would necessitate the use of a contractor-provided, on-site concrete batch plant and deliveries of large quantities of concrete aggregate, concrete sand, and cement. The batch plant would be powered by electricity from overhead Sacramento Municipal Utility District lines. The batch plant would be located either at the Dike 7 staging area, MIAD, the overlook, chute, or the Folsom Prison sites.

About 13,000 cys of concrete would be needed for the approach channel and about 11,200 cys of concrete would be needed for the cutoff wall. The batch plant would produce concrete for the approach channel's 18 month construction period.

The concrete batch plant area would consist of the aggregate storage system, aggregate rescreen system (if needed), rewashing facility (if needed), the batching system, cement storage, ice manufacturing, and the concrete mixing and loading system. The aggregate storage system is designed to have sufficient storage on-hand of input materials to produce about 3,000 cys of concrete. The aggregate storage system consists of three coarse aggregate piles and a fine blended sand pile. The aggregate would be transported to the project in belly type trucks. The trucks would dump the aggregate into a truck unloading hopper, after which it would be conveyed up to an overhead shuttle conveyer, and dropped into respective storage piles.

The sand and the aggregate would be loaded out of the storage piles with a front end loader, placed into bin hoppers, and conveyed to the batching day hoppers. The aggregates would then be mixed and transported into transit agitator trucks or mixer trucks. Once ready for placement, the concrete would be transported by truck or conveyer from the batch plant site across the spillway access road to the concrete conveyor or truck unloading hopper

It is estimated that about 24,200 cys of aggregate material would be needed to provide concrete for the construction of the approach channel. It is anticipated that the aggregates needed for the concrete would come from existing local commercial off-site sources and delivered to the site.

Generally, work associated with the batch plant operations would occur during the hours of 7:00 a.m. to 7:00 p.m., however, it is likely that some batching and placements would have to occur in the very early morning or night-time hours. This is especially true for large volume placements and placements that occur in the hot summer season. Early morning or night-time placements would be subject to traffic and noise limitations of the City of Folsom's ordinances and would have to be coordinated with the City by the contractor.

The description of the batch plant operation would be the same for the cutoff wall; however, the overall production rates would likely be less than those for the approach channel.

BIOLOGICAL RESOURCES

The American River and nearby areas, although highly modified from conditions of 150 years ago, support a diverse and highly valuable area for biological resources. The 23-mile-long reach of the American River Parkway downstream of Folsom Dam encompasses about 4,000 acres, the majority of which are in State designated floodway and contain large areas of annual grasslands, riparian forest and scrub-shrub, oak woodlands, bare sand and gravel, and surface waters of the river and its associated sloughs and dredge ponds (USFWS 2003). The Folsom State Recreation Area includes about 18,000 acres of land and water at Folsom Reservoir and some downstream areas to Nimbus Dam. About 6,000 acres of land around Folsom Reservoir are managed by the State of California.

Vegetation

The terrestrial portion of the project area currently supports limited annual grassland and oak woodland. The annual grassland is characterized by species such as ripgut brome, wild oat, and various forbs. The oak woodland in the project area occurs as single trees to small patches. Typically the understory is dominated by annual grass and other forbs and shrubs such as elderberry. The in-reservoir portion of the project area for the spur dike does not contain any vegetation. However, during prolonged low water periods willows occasionally colonize within the reservoir area.

At the Dike 8 permanent disposal area there is about 15.8 acres of undisturbed habitat, including 30 trees, which would be affected by the use of the site. The landward side of site is primarily non-native grasslands with trees and/or shrub species interspersed throughout the site. The waterward side of the site has a few shrubby willow species with a few areas of annual grasses, most of the area is barren as it is inundated by reservoir storage. The diameter at breast height (dbh) of the affected trees ranges from 4.5 to 55.5 inches (Figure 2). The current plan is to revegetate the disposal site after construction is completed with annual grasses and trees.

Wildlife

The project area including the lower American River corridor provides a mosaic of riparian, riverine, grassland, and oak woodland habitat. These diverse habitats support a corresponding diversity of wildlife.

The lands near the project area provide feeding, resting, and/or nesting habitat for many bird species, many of which require the aquatic areas of the river and backwaters, or the riparian vegetation of the ecosystem. Riparian areas are known to support a species-rich songbird community (Gaines 1977), and the lower American River also provides habitat for many raptors, including Swainson's hawks, red-shouldered hawks, Cooper's hawks, and great-horned owls, all of which require or are closely associated with riparian vegetation. Bald eagles, which are more common around Folsom Reservoir, occasionally use the lower river, which provides roosting and foraging habitat. Waterfowl, particularly mallards and Canada geese, also use the area extensively.

More than 50 species of mammals have been recorded for the area (USFWS 1986). Common species include beaver, black-tailed jackrabbit, striped skunk, Virginia opossum, raccoon, California ground squirrel, gophers, and many small rodents and insectivores including voles, moles, shrews, deer mice, and pocket gophers. Uncommon species include several carnivores, such as badger, long-tailed weasel, river otter, gray fox, coyote, bobcat, and mink.

Reptile species likely found in the area include common kingsnake, western rattlesnake, Gilbert and western skinks, southern alligator lizard, western fence lizard, gopher snake, and several garter snakes. Common amphibians include Pacific treefrog, California newt, California slender salamander, western toad, and the introduced bullfrog.

Relatively little is known about invertebrates in the area, but elderberry plants are fairly common in areas, and provide habitat for the endangered valley elderberry longhorn beetle.

Fish

Folsom Reservoir encompasses about 10,000 surface acres when full (around 1 million acre-feet) and there are about 75 miles of shoreline. The reservoir extends about 15 miles up the North Fork and 10.5 miles up the South Fork of the American River. The reservoir supports a "two-stage" fishery: warmwater species such as bass (largemouth, smallmouth and spotted) and panfish (crappie, bluegill and sunfish) in the upper waters, and trout and landlocked salmon (kokanee and Chinook) in the deeper waters (USFWS 2007). Various common catfish can also

Trees Potentially Affected at the Proposed Dike 8 Disposal Area

Tree No.	Species	Diameter at Breast Height (inches)	Stem DBH (inches)
1	Cottonwood	16.5	
2	Eucalyptus[1]	38.5	
3	Eucalyptus[1,2]	42.5	11, 9, 10, 12.5
4	Willow[2]	55.5	19.5, 10.5, 4.5, 8, 8, 8
5	Willow	33	
6	Cottonwood[2]	12	6 trees, 2 inch each
7	Willow	6.5	
8	Willow	16	
9	Willow	6.5	
10	Willow[2]	27.5	7, 10.5, 10
11	Valley Oak	33.5	
12	Valley Oak	34	
13	Valley Oak	30.5	
14	Conifer, unknown[1]	18	
15	Eucalyptus[1,2]	27.5	12, 15.5
16	Cottonwood[2]	53	10, 40
17	Buckeye	0	
18	Cottonwood[2]	51	14, 20, 17
19	Cottonwood	41	
20	Live Oak[2]	52.5	17.5, 16.5, 18.5
21	Valley Oak	24	
22	Valey Oak	24.5	
23	Valley Oak	15.5	
24	Valley Oak	4.5	
25	Valley Oak	5.5	
26	Live Oak[2]	15.5	6.5, 5, 4
27	Valley Oak	31.5	
28	Valley Oak	13	
29	Valley Oak	26.5	
30	Valley Oak	27.5	
Total		783.5	

Notes: 1 non-native, 2 multi stemed

be found near the bottom of shallower areas. Fish habitat is present within the inundation zone in the forms of young willow dominated riparian habitat which establishes during extended period of drought, as well as brush piles placed there in the past by the California Department of Fish and Game (CDFG) and various sportsman groups. Both warmwater and coldwater fisheries tend to benefit from increased peak spring water storage as this results in better coldwater reserves for the salmonid fishes as well as increasing spawning and rearing for warmwater fish (USFWS 2010). Sport fishing is an important and popular recreation activity at Folsom Reservoir.

The lower American River supports a diverse and abundant fish community; altogether, at least 41 species of fish are known to inhabit the river (USFWS 1986). In recognition of its "outstanding and remarkable" fishery resources, the entire lower American River was included in the Wild and Scenic Rivers System in 1981, which provides some protection for these resources (USFWS 1991). Four anadromous species are important from a commercial and recreational perspective. The lower river supports a large run of fall-run Chinook salmon, a species with both commercial and recreational values. The salmon run is sustained by natural reproduction in the river, and by hatchery production at the Nimbus Salmon and Steelhead Hatchery, operated by CDFG. The average annual run of salmon in the American River is 25,948 (CDFG 2006).

Steelhead, a popular sport fish, are largely sustained in the river by production from the Nimbus Hatchery, because summer water temperatures often exceed the tolerances of juvenile steelhead, which typically spend about 1 year in the river. American shad and striped bass enter the river to spawn; these two species, introduced into the Sacramento River system in the late 1800s, now support popular sport fisheries. In addition to species of economic interest, the lower American River supports many nongame species, including Sacramento pikeminnow, Sacramento sucker, tule perch, and hardhead (USFWS 1994).

Endangered Species

Based on a search of the Folsom USGS quadrangle map dated July 3, 2012, there are federally-listed species which could occur within or near the project area. The species under the jurisdiction of the Service which may be affected by the project include the valley elderberry longhorn beetle. The complete list is included in Enclosure 1 as well as a summary of Federal agencies responsibilities under the Endangered Species Act of 1973, as amended. The Corps initiated section 7 consultation with the Service concerning the effects of the project on the valley elderberry longhorn beetle on October 31, 2012. The completed consultation is included in Enclosure 1.

DISCUSSION

Service Mitigation Policy

The recommendations provided herein for the protection of fish and wildlife resources are in accordance with the Service's Mitigation Policy as published in the Federal Register (46:15; January 23, 1981).

The Mitigation Policy provides Service personnel with guidance in making recommendations to protect or conserve fish and wildlife resources. The policy helps ensure consistent and effective Service recommendations, while allowing agencies and developers to anticipate Service recommendations and plan early for mitigation needs. The intent of the policy is to ensure protection and conservation of the most important and valuable fish and wildlife resources, while allowing reasonable and balanced use of the Nation's natural resources.

Under the Mitigation Policy, resources are assigned to one of four distinct Resource Categories, each having a mitigation planning goal which is consistent with the fish and wildlife values involved. The Resource Categories cover a range of habitat values from those considered to be unique and irreplaceable to those believed to be much more common and of relatively lesser value to fish and wildlife. However, the Mitigation Policy does not apply to threatened and endangered species, Service recommendations for completed Federal projects or projects permitted or licensed prior to enactment of Service authorities, or Service recommendations related to the enhancement of fish and wildlife resources.

In applying the Mitigation Policy during an impact assessment, the Service first identifies each specific habitat or cover-type that may be impacted by the project. Evaluation species which utilize each habitat or cover-type are then selected for Resource Category analysis. Selection of evaluation species can be based on several rationale, as follows: (1) species known to be sensitive to specific land- and water-use actions; (2) species that play a key role in nutrient cycling or energy flow; (3) species that utilize a common environmental resource; or (4) species that are associated with Important Resource Problems, such as anadromous fish and migratory birds, as designated by the Director or Regional Directors of the Fish and Wildlife Service. Based on the relative importance of each specific habitat to its selected evaluation species, and the habitat's relative abundance, the appropriate Resource Category and associated mitigation planning goal are determined.

Mitigation planning goals range from "no loss of existing habitat value" (i.e., Resource Category 1), to "minimize loss of habitat value" (i.e., Resource Category 4). The planning goal of Resource Category 2 is "no net loss of in-kind habitat value;" to achieve this goal, any unavoidable losses would need to be replaced in-kind. "In-kind replacement" means providing or managing substitute resources to replace the habitat value of the resources lost, where such substitute resources are physically and biologically the same or closely approximate those lost.

In addition to mitigation planning goals based on habitat values, Region 8 of the Service, which includes California, has a mitigation planning goal of no net loss of acreage and value for wetland habitat. This goal is applied in all impact analyses.

In recommending mitigation for adverse impacts to fish and wildlife habitat, the Service uses the same sequential mitigation steps recommended in the Council on Environmental Quality's regulations. These mitigation steps (in order of preference) are: avoidance, minimization, rectification of measures, measures to reduce or eliminate impacts over time, and compensation.

Four fish and/or wildlife habitats were identified in the project area which had potential for impacts from the project: oak woodland, annual grassland, and lakebed and "other." The resource categories, evaluation species, and mitigation planning goal for the habitats impacted by the project are summarized in Table 1.

Table 1. Resource categories, evaluation species, and mitigation planning goal for the habitats possibly impacted by the proposed excavation of the Folsom Dam Modification Project, Approach Channel, Sacramento County, California.

COVER-TYPE	EVALUATION SPECIES	RESOURCE CATEGORY	MITIGATION GOAL
Oak Woodland	Acorn woodpecker Turkey Deer	2	No net loss of in-kind habitat value or acreage.
Open water	Freshwater sport fish	3	No net loss of habitat value while minimizing loss of in-kind habitat value.
Annual grassland	Red-tailed hawk	3	No net loss of habitat value while minimizing loss of in-kind habitat value.
Folsom Lakebed	None	4	Minimize loss of habitat value.
Other	None	4	Minimize loss of habitat value.

The evaluation species selected for the oak woodland that would be impacted are acorn woodpecker, turkey, and mule deer. Acorn woodpeckers utilize oak woodlands for nearly all their life requisites; 50-60 percent of the acorn woodpecker's annual diet consists of acorns. Acorn woodpeckers can also represent impacts to other canopy-dwelling species. Turkeys forage and breed in oak woodlands and are abundant in the project area. Mule deer also heavily depend on acorns as a dietary item in the fall and spring; the abundance of acorns and other browse influence the seasonal pattern of habitat use by deer. These latter species represent species which utilize the ground component of the habitat and both have important consumptive and non-consumptive human uses (i.e., hunting and bird watching). Based on the high value of oak woodlands to the evaluation species, and their declining abundance, the Service has determined oak woodlands which would be affected by the project should be placed in Resource Category 2, with an associated mitigation planning goal of "no net loss of in-kind habitat value."

The evaluation species selected for the open water cover-type that would be impacted is freshwater sport fish. The open water cover-type is comprised of Folsom Reservoir. These species were chosen because of their consumptive and recreational value to humans and their importance as prey species to raptors and wading birds. Although this area is highly impacted by recreational activities during portions of the year, it does support significant fishing activity. Therefore, the Service designates the "other" cover-type in the project area as Resource Category 3. Our associated mitigation planning goal for these areas is "no net loss of habitat value while minimizing loss of in-kind habitat value."

The evaluation species selected for the annual grassland cover-type is the red-tailed hawk, which utilizes these areas for foraging. This species was selected because of the Service's responsibility for their protection and management under the Migratory Bird Treaty Act, and their overall high non-consumptive values to humans. Annual grassland areas potentially impacted by the project vary in their relative values to the evaluation species, depending on the degree of human disturbance, plant species composition, and juxtaposition to other foraging and nesting areas. Therefore, the Service designates the annual grassland cover-type in the project area as Resource Category 3. Our associated mitigation planning goal for these areas is "no net loss of habitat value while minimizing loss of in-kind habitat value."

No evaluation species were identified for the Folsom lakebed cover-type. Generally this cover-type would not provide any significant habitat value for wildlife species. Canada geese and other avian species, as well as small mammals, may occasionally forage on the lakebed as waters recede. Therefore, the Service designates the lakebed cover-type in the project area as Resource Category 4. Our associated mitigation planning goal for these areas is "minimize loss of habitat value."

No evaluation species were identified for the "other" cover-type. The "other" cover-type encompasses those areas which do not fall within the other cover-types such as gravel and paved roads, parking areas, buildings, bare ground, riprap, etc. Generally this cover-type would not provide any significant habitat value for wildlife species. Therefore, the Service designates the "other" cover-type in the project area as Resource Category 4. Our associated mitigation planning goal for these areas is "minimize loss of habitat value."

Based on our review of the proposed project most of the potential impacts for wildlife species would be temporal losses of habitat value (for species utilizing nearby annual grasslands and oak woodlands) during construction. Much of this area is already highly disturbed by past and on-going construction activities and the opening of the new Folsom Point Road. Wildlife species utilizing these areas, as well as the lakebed, have been displaced during the on-going construction activities and there would be little, if any, additional temporal loss of habitat values. Mitigation plantings have been put in place or will be put in place for the previous construction activities in this area. If new areas are disturbed (i.e., annual grassland at the Folsom Prison staging site), impacts could be minimized by reseeding all disturbed areas with annual grasses at the completion of construction.

At the Dike 8 disposal area about 15.8 acres of annual grassland/oak woodland would be disturbed including the loss of 30 trees, predominately valley oaks, live oaks and cottonwoods. The site is planned to be restored at completion of construction by establishing annual grasses and tree species. The details of this plan have not yet been developed. In order to be successful it may be necessary to import soil material to intersperse in the upper layers of any rock disposed of at the site as well as to cap the site for revegetation to be successful.

The proposed project would take place over a 37 month period. Construction activities in the spring have the potential for adverse impacts to nesting migratory birds. Construction activities proposed for the spring or summer months should include measures to avoid impacts to migratory birds which may be nesting in affected vegetation and nearby areas around the staging area, haul roads, and MIAD disposal site. Since construction has been occurring in this area for several years any birds choosing to nest in the area should be adapted to the noise and activity levels. However, pre-construction surveys should be performed to determine if there are migratory birds nesting in these areas. If nests are located, work should be monitored to see if there are adverse effects or deferred until any young have fledged the nest.

The potential impacts to the aquatic resources of Folsom Reservoir from the proposed construction range from increasing turbidity and mobilization of existing sediment contaminants to introduction of aquatic invasive species and direct mortality to aquatic species.

Turbidity impacts are being minimized by conducting the excavation work in the dry to the extent possible. Turbidity from underwater excavation and blasting would be minimized by installing silt curtains around the work area. Since there will be heavy equipment operating on the dry lakebed there is the possibility that contaminants (fuels, oils, hydraulic fluids, etc.) could be released into or adjacent the reservoir. A physical barrier has been proposed between the work area and the water to avoid any construction-related activities from affecting the water. Additional measures to minimize introducing contaminants into reservoir waters can be implemented such as restricting fueling and vehicle maintenance to areas outside the reservoir area.

The Service has expressed concern in the past about in water disturbance (dredging and blasting) associated with construction of the various features of the combined Joint Federal Project. The proposed approach channel excavation has the potential to remobilize sediment-bound contaminants, particularly mercury and the possibility for mercury methylation and subsequent bioaccumulation into the food chain. The Corps has conducted sediment testing in the reservoir in the vicinity of the approach channel and offload facility. The mercury elutriate test had a high value. Material excavated from the approach channel and offload facility would be used for construction of the spur dike, placed in the reservoir bottom, or transported and stored at the MIAD or other upland disposal site. A dredging plan has not yet been developed, but it is presumed silt curtains and erosion containment features would be required.

The project has the potential to introduce aquatic nuisance species into Folsom Reservoir through use of watercraft (boats and barges) and other equipment which has been in contact with other bodies of water containing these potentially harmful species if the exploratory borings are conducted by barge. On February 3, 1999, President Clinton signed Executive Order 13112, which directs the agencies of the executive branch of the Federal government to work to prevent and control the introduction and spread of invasive species. Species that are likely to harm the environment, human health, or the economy are of particular concern. The executive order builds on the National Environmental Policy Act of 1969, the Federal Noxious Weed Act of 1974, and the Endangered Species Act of 1973 to prevent the introduction of invasive species; provide for their control; and take measures to minimize economic, ecological, and human health effects.

Since it is currently unknown who the contractor may be or where their equipment may come from it should be a condition that the contractor develop a Hazard Analysis and Critical Control Point Plan (HACCP) based on the following seven principles if in-water work is proposed:

- Conduct a hazard analysis. Prepare a list of steps in the process where significant hazards occur and describe preventive measures.
- Identify the critical control points (CCP) in the process.
- Establish controls for each CCP identified.

- Establish CCP monitoring requirements. Establish procedures for using monitoring results to adjust the process and maintain control.
- Establish corrective actions to be taken when monitoring indicates a deviation from an established critical limit.
- Establish procedures to verify that the HACCP system is working correctly.
- Establish effective record-keeping procedures that document the HACCP system.

To prevent the spread of aquatic nuisance species all vessels and vessel accessories should be thoroughly inspected. For watercraft and vessels with jet drives, impeller areas can contain quagga and zebra mussels and aquatic plants. Once upon the trailer, run the engine for 5 to 10 seconds to blow out excess water, mussels and plants. Before leaving water access, inspect and remove any mussels or plants from intake, steering nozzle, hull, and trailer.

- All vessels should be cleaned with a high pressure wash of hot water. This is especially important if the vessel has been moored for more than a day.
- Remove aquatic plants from boat, motor and trailer. Check all underwater fittings and equipment, such as rollers, axle, bilge and trailer, and above water equipment, such as anchors. Place any aquatic plants in trash if possible.
- Drain any lake or river water from equipment including the motor, bilges, heat exchangers and coolers. Ensure all drained areas are dry. Ensure the watercraft's lower outboard unit is drained and dry.
- Be aware that transferring a vessel that has been in infested waters will allow the spread of quagga mussels, or the closely related zebra mussels. Physically inspect all exposed surfaces. The presence of quagga mussels will feel like sandpaper to the touch. Report presence of quagga mussels to CDFG hotline at (866) 440-9530, open from 8 am to 5 pm PST.
- Any vessel traveling from Lake Mead, Lake Mohave, Lake Havasu, the Colorado River, or lakes that receive water from the Colorado Aqueduct, including: Lake Skinner (Riverside County), Lake Mathews (Riverside County), San Vicente Reservoir (San Diego County), Dixon Lake (San Diego County), Lower Otay Reservoir (San Diego County), and Lake Murray (San Diego County) should remain dry and out of water for a minimum of 5 days.

Wet or underwater blasting is expected to generate very little airborne noise, but has the potential to kill fish in Folsom Reservoir. It is likely that some fish will be killed during wet blasting. Noise potentially causes both auditory and non-auditory effects on fish. Injuries such as swim bladder rupture in fish may be shown only by dissection of exposed individuals. These adverse impacts only occur at high levels of sound, typically within tens, or at most a few hundred meters of underwater blasts, and hence affect relatively small areas and numbers of individuals (Nedwell and Edwards 2004 *in* Nedwell et al. 2007).

Fish response to sound can also be varied, ranging from the classic fright response that results in a startle behavior and sudden burst of short duration and distance swimming, to other responses such as packing or balling, increasing swimming speed, diving, or avoidance. Extremely loud sound levels can have very negative effects on fish including temporary or permanent deafness, tissue damage, and even acute mortality.

Indirect effects usually manifest themselves as a reduction in the ability to evade predation, a change in behavior that leads to increased exposure to predation, or an inability to detect predators or prey effectively (temporary or permanent deafness).

The Corps proposes to have the contractor use the Best Management Practice (BMP) listed below which assume use of the standard practice of linear (rather than spherical) charges, and standard timing separation of 8 milliseconds to reduce cumulative effects between adjacent charges. The BMPs include:

- Designing efficient detonations ("blast design") that fracture the rock with minimal energy released to surrounding water. This can be accomplished by the use of stemming to confine blasts. Efficient detonations are achieved by:
  - Establishing a not-to-exceed peak pressure-change (over-pressure) limit of 100kPa (14.5 psi).
  - Controlling maximum pressure thresholds by establishing cautious charge confinement rules regarding the type and amount of stemming (material placed in the upper portions of blast holes), and the amount of confining rock burden between charges and the free or open face to which they break.
  - Monitoring peak blast-induced pressure and impulse.
  - Requiring the use of multiple time-sequenced charges that will reduce the cumulative impacts on the water environment.
  - Timing blasting when fish tend to be in streams in northern tributaries far from the blast site, e.g., February through June for rainbow trout.
  - Setting off small charges ("scare charges") or firing air-cannons into the water before blasting to chase fish from the blast area.
  - Grouping continuous periods of noisy work or simultaneous noisy work (e.g., multiple drill barges) to prevent the fish from re-entering the area during short quiet periods).
  - Potentially using air curtains or bubble curtains to attenuate pressure waves. Air supply to bubble pipes would be provided by clean-air compressors that contain no oil or other contaminants.
  - Not using ANFO mixtures in or near water because they will not function as desired and if released into water they will dissolve and release toxic by-products (ammonia and nitrates).

The use of a bubble curtain is an option for the contractor, so specific detail on the installation and operation and maintenance of a bubble curtain is not yet available to identify possible adverse effects on fish and /or wildlife resources. Prior to use of a bubble curtain, this information should be provided to the appropriate resources agencies for review. Also, determining the direct and indirect mortality on fish resources would be difficult to quantify. We believe the appropriate mitigation measure for this activity should be three-fold, culminating in the re-stocking of sportfish in the reservoir following CDFG policy after the blasting activities are complete. The mortality impact should be documented by the resource agencies through conducting boat surveys of the blast area after blasting to record any direct fish mortality. This data would then be used by a multi-agency team (resource agencies and the Corps) to develop a stocking strategy, followed by stocking the reservoir.

The project is located away from the American River and thus no direct impacts are anticipated for fish species downstream of Folsom Dam.

RECOMMENDATIONS

The Service recommends:

1. Avoid impacts to native trees, shrubs, and aquatic vegetation outside of the Dike 8 disposal area. Any native trees or shrubs removed with a diameter at breast height of 2 inches or greater should be replaced on-site, in-kind with container plantings so that the combined diameter of the container plantings is equal to the combined diameter of the trees removed. These replacement plantings should be monitored for 5 years or until they are determined to be established and self-sustaining. The planting site(s) should be protected in perpetuity.

2. Avoid future impacts to the site by ensuring all fill material used for the spur dike and to cap permanent disposal sites is free of contaminants.

3. Avoid impacts to migratory birds nesting along the access routes and adjacent to the proposed construction sites by conducting pre-construction surveys for active nests along proposed construction site, haul roads, staging areas, and disposal/stockpile sites. Work activity around active nests should be avoided until the young have fledged. The following protocol from the CDFG for Swainson's hawk would suffice for the pre-construction survey for raptors.

   A focused survey for Swainson's hawk nests will be conducted by a qualified biologist during the nesting season (February 1 to August 31) to identify active nests within 0.25 miles of the project area. The survey will be conducted no less than 14 days and no more than 30 days prior to the beginning of construction. If nesting Swainson's hawks are found within 0.25 miles of the project area, no construction will occur during the active nesting season of February 1 to August 31, or until the young have fledged (as determined by a qualified biologist), unless otherwise negotiated with the California Department of Fish and Game. If work is begun and completed between September 1 and February 28, a survey is not required.

4. Avoid introducing aquatic invasive species into the reservoir by requiring the contractor to develop and implement a HACCP as described above. This plan should be provided to the resource agencies for review and approval prior to any in-water work.

5. Avoid introduction of fuels/lubricants by requiring containment on barges and conducting land-based fueling operation in areas where spills cannot enter the reservoir (containment areas).

6. Minimize impacts to sportfishery resources by implementing the BMPs discussed above for all in-water blasting.

7. Minimize project impacts by reseeding all disturbed areas outside the reservoir area at the completion of construction with forbs and grasses.

8. Minimize potential for mobilizing contaminated sediments outside the immediate work area (sediment removal area and transload facility) by developing a dredging plan prior to construction which utilizes silt curtains or other means to prevent sediment from being released into the lake and potentially the lower American River.

9. Minimize the potential impacts from fuel/oil/lubricant spills by requiring the contractor develop a spill response plan. The plan should include a provision where emergency oil containment boom material and absorbent pads are on-site and workers are properly trained in proper deployment.

10. Compensate for the loss of the 30 trees with a dbh of 2 inches or greater known to be lost by the project by planting 3,134 seedlings (live and valley oaks, cottonwoods) on a 13.34 acre site(s). Development of this site should be coordinated with the Service and CDFG. These plantings should be monitored for 5 years or until they are determined to be established and self-sustaining. The planting site(s) should be protected in perpetuity.

Note: The compensation identified in Recommendation #10 above was derived by totaling the dbh of the 30 impacted trees (783.5 inches) and multiplying it by 4 (assumes each seedling is ¼-inch in diameter) to get 3,134 trees. The area for plantings was based on information provided by the Corps on planting densities used for oak woodland (235/acre) on other projects.

11. Compensate for losses to fish resources by re-stocking Folsom Reservoir at the end of construction. The species and quantity of stocking should be developed by a work group comprised of the Corps and resources agencies.

12. Contact National Oceanic and Atmospheric Administration Fisheries for possible effects of the project on federally-listed species under their jurisdiction.

13. Contact the CDFG regarding possible effects of the project on State listed species.

REFERENCES

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__________. 2009. Fish and Wildlife Coordination Act Report for the American River Watershed Investigation: Joint Federal Project-Folsom Auxiliary Approach Channel Project. U.S. Fish and Wildlife Service, Sacramento, California.

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ENCLOSURE 1

FEDERAL ENDANGERED AND THREATENED SPECIES CONSULTATION

Appendix K

Special Status Species Coordination

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA, 95814-2922

REPLY TO
ATTENTION OF

Environmental Resources Branch

OCT 31 2012

Ms. Susan Moore, Field Supervisor
U.S. Fish and Wildlife Service
2800 Cottage Way, Suite W2605
Sacramento, California 95825-1846

Dear Ms. Moore:

We are writing to initiate formal consultation for the Federally listed valley elderberry longhorn beetle (*Desmocerus californicus*) (VELB) under Section 7(a) of the Endangered Species Act, as amended (16 U.S.C. 1531 et seq.), for the Folsom Dam Modification Project, Sacramento County, California. We are requesting formal consultation under the programmatic agreement 1-1-96-F-66 dated September 19, 1996. The project is located in the city of Folsom at Folsom Dam, approximately 20 miles northeast of Sacramento (Enclosure 1). Folsom Dam and Reservoir are located downstream from the confluence of the north and south forks of the American River.

The Folsom Dam Modification Project, also referred to as the Folsom Dam Safety/Flood Damage Reduction Project or the Folsom Joint Federal Project (Folsom JFP), is a cooperative effort between the U.S. Department of Interior, Bureau of Reclamation (USBR), the U.S. Army Corps of Engineers (Corps), the State of California Central Valley Flood Protection Board (CVFPB), and the Sacramento Area Flood Control Agency (SAFCA). The Folsom JFP was authorized by the Water Resources Development Act of 2007 to implement dam safety and security features along with flood damage reduction features at Folsom Dam and its associated facilities. An auxiliary spillway adjacent to Folsom Dam was selected as the plan to meet USBR's dam safety risk reduction objective and the Corps' flood damage reduction objective to form the Folsom JFP. The proposed alternatives, potential environmental effects, and proposed mitigation associated with the Folsom Modification Project was assessed in the Folsom Dam Safety and Flood Damage Reduction Final Environmental Impact Statement/Environmental Impact Report (2007 FEIS/EIR), issued by USBR in March 2007. The Corps was a cooperating agency for the preparation of the 2007 FEIS/EIR and adopted the findings of the 2007 FEIS/EIR in a joint record of decision (ROD) that was issued in May 2007.

The 2007 FEIS/EIR conducted a programmatic or general analysis of proposed design features available at that time. The 2007 Final EIS/EIR stated that the design of the spillway approach channel would be determined in the Corps' pre-construction, engineering, and design phase and if needed, supplemental NEPA/CEQA documentation would be prepared. As construction of the Folsom JFP progresses, it has been determined that the active treatment system (ATS) needs to be relocated from its current location. The proposed action consists of removing the ATS in Spring 2013 and leveling the approximate 3-acre area for use as a contractor staging area. In addition, Dike 8 would be used as a permanent disposal area for material excavated from the approach channel. These actions would require removal of the vegetation in the area including elderberry shrubs (*Sambucus sp.*) (Enclosures 2 and 3).

The Folsom JFP project area is highly disturbed areas of Federal land and largely devoid of vegetation, with the exception of small areas of annual grasses and forbs. The area where the ATS is located has been developed under previous actions of the Folsom JFP and is an active construction zone. The area provides little to no habitat for wildlife and has little to no vegetation or ground cover.

The habitat at Dike 8 consists of an open water/reservoir shoreline fluctuation zone, transitional wetland, and ruderal herbaceous vegetation (Enclosure 4). Folsom Reservoir experiences extreme seasonal water level fluctuations ranging from elevation 425 feet to 466 feet, which corresponds with the minimum and maximum pool volumes for the reservoir. Following the recession of lake waters, the shoreline zone is seasonally vegetated with a mix of ruderal (disturbed, weedy) and grassland species, with large areas of shoreline that remain barren with rip rap on the upper slopes. Willow shrubs (*Salix sp.*) are sporadic at the very lowest elevations of the shore. Open water habitat provides foraging habitat for waterfowl and other wetland species.

The ruderal herbaceous vegetation community is a native community that occurs in and around the Dike 8. Oak trees are sporadic within this area. The predominant oak species include valley oak and live oak. Ruderal herbaceous community provides cover and foraging habitat for resident and migratory songbirds, small mammals, and reptiles. Between the haul road and the ruderal herbaceous habitat there is transitional wetland habitat. This area floods through a culvert beneath the haul road when reservoir levels are high, but remains dry when reservoir levels are low. When flooded, this area provides foraging habitat for waterfowl and other wetland species.

Surveys were conducted June 6, June 11, and August 8, 2012 with U.S. Fish and Wildlife Service (USFWS) staff to collect data on the elderberry shrubs. At the ATS site, three elderberry shrubs were measured with one stem 3 to 5 inches in diameter, and two stems 1 to 3 inches in diameter at ground level (Enclosure 5). Four shrubs were measured at Dike 8 with 2 stems 1 to 3 inches in diameter, and 2 stems greater than 5 inches in diameter at ground level (Enclosure 6). No exit holes were observed. The project area is considered non-riparian. After further review with USFWS, the Corps determined that all seven of these shrubs will be impacted by the project and need to be transplanted. Since the work may begin in Spring 2013, the Corps proposes to transplant the shrubs within the approved window for elderberry shrubs to minimize the adverse effects to the beetle.

In addition, the Corps proposes to implement the following conservation measures to minimize the effect on the beetle.

- Dust suppression measures would be used.

- Construction representatives and contractor personnel would be given awareness training relating to the beetle and its habitat.

- The Corps would purchase 2.4 credits at USFWS approved mitigation bank.

- Disturbed areas would be restored to the pre-project condition and reseeded with native grasses.

The Corps has determined that removing the ATS to create a contractor use area and the use of Dike 8 as a permanent disposal area is likely to adversely affect the VELB or its habitat. No VELB critical habitat exists in the project area, therefore none will be adversely modified by the proposed project. Based on the information described above, the Corps is requesting that USFWS append this project to the VELB Programmatic Biological Opinion dated September 19, 1996.

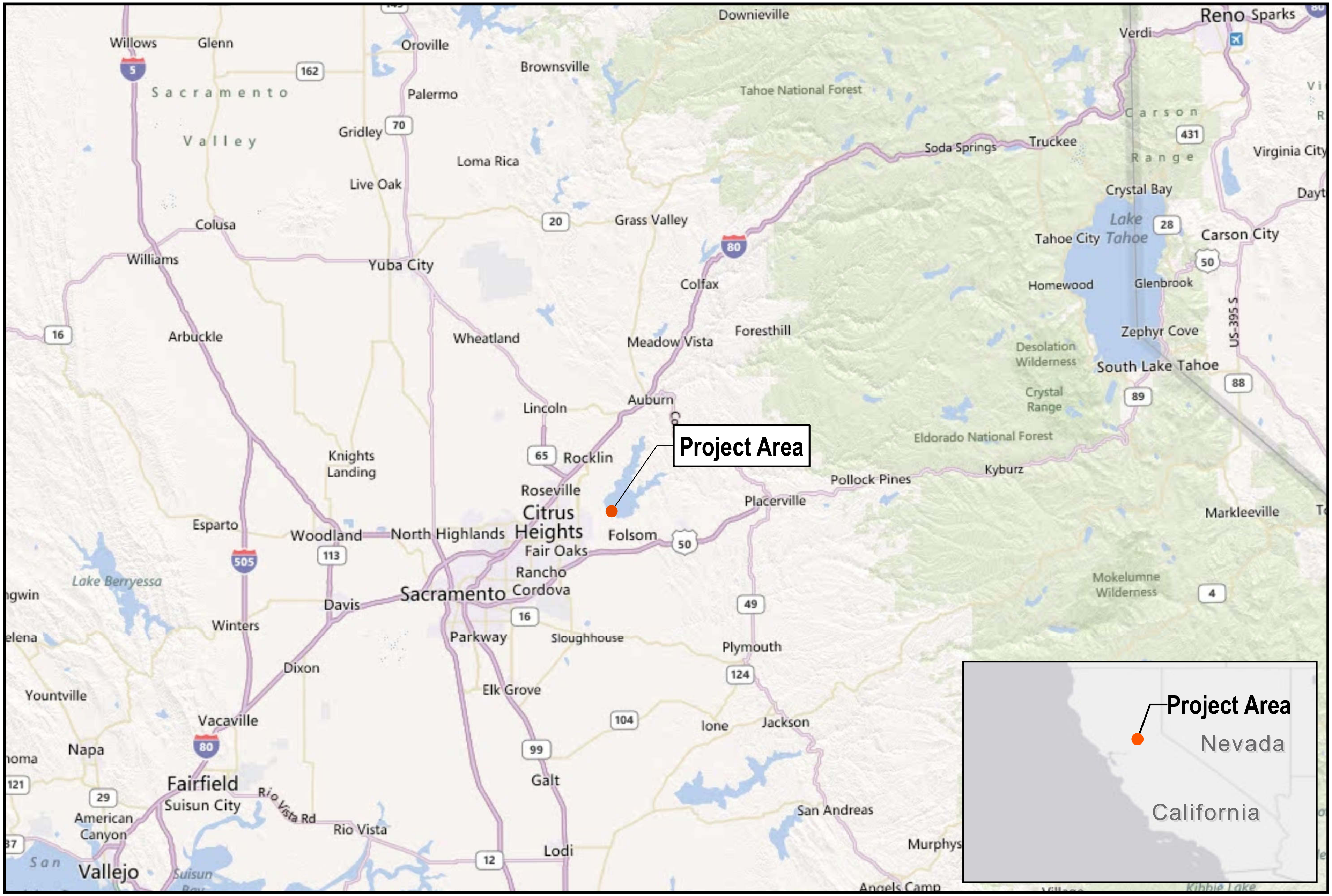
If you need additional information or have questions regarding this project, please contact Ms. Jamie LeFevre, Environmental Resources Branch, at (916) 557-6693 or e-mail: Jamie.M.LeFevre@usace.army.mil. Thank you for your coordination on this project.

Sincerely,

Alicia E. Kirchner
Chief, Planning Division

Enclosures

Copies Furnished:
Mr. Doug Weinrich, U.S. Fish and Wildlife Service, 2800 Cottage Way, Room W-2605, Sacramento, California 95825-1846



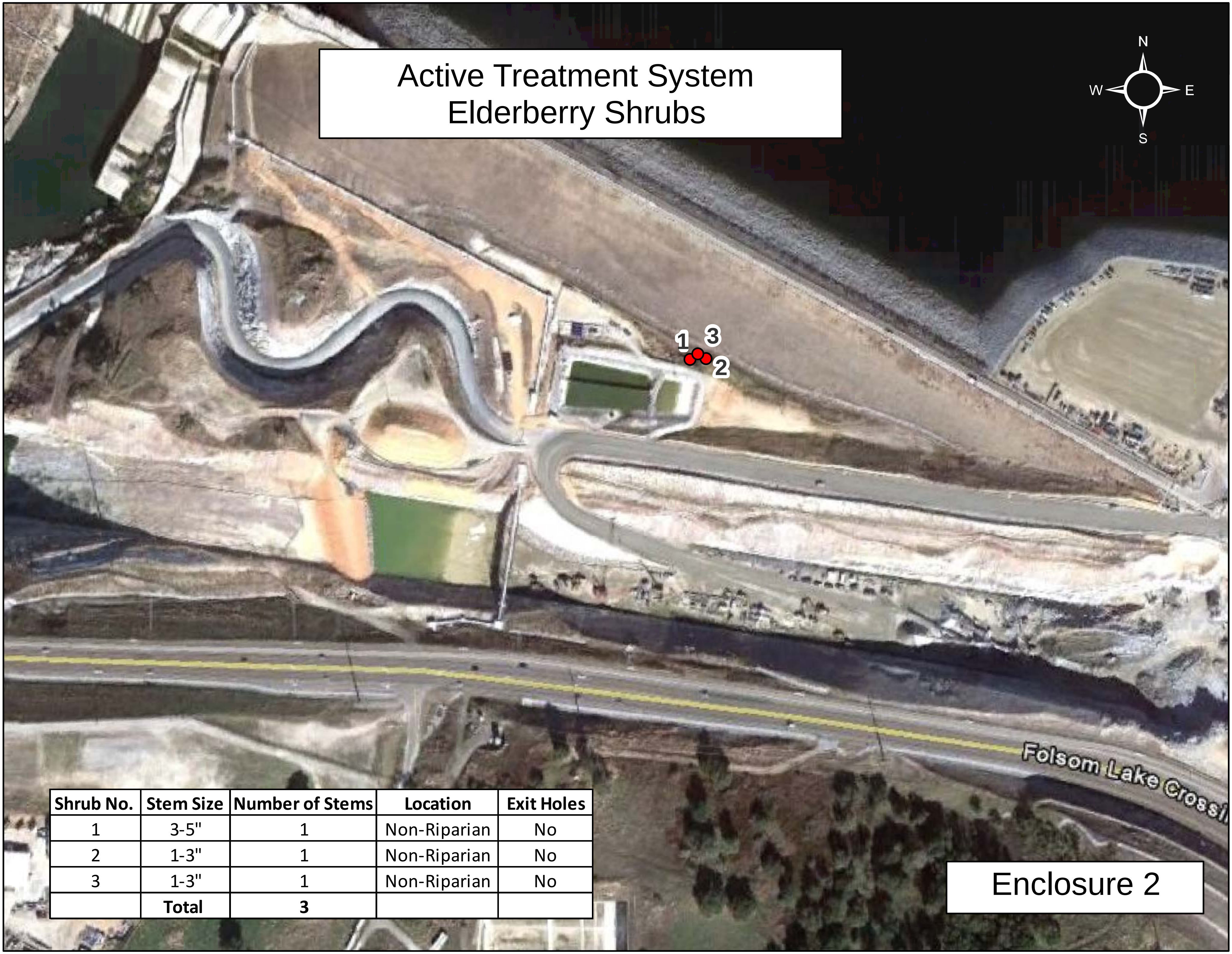
Project Vicinity Map

Folsom Dam Safety and Flood Damage Reduction, Joint Federal Project

US Army Corps of Engineers
Sacramento District

Enclosure 1

Active Treatment System
Elderberry Shrubs



Shrub No.	Stem Size	Number of Stems	Location	Exit Holes
1	3-5"	1	Non-Riparian	No
2	1-3"	1	Non-Riparian	No
3	1-3"	1	Non-Riparian	No
	Total	**3**		

Enclosure 2

Dike 8 Disposal Area
Elderberry Shrubs

Shrub No.	Stem Size	Number of Stems	Location	Exit Holes
1	5” +	1	Non-Riparian	No
2	1-3”	1	Non-Riparian	No
3	1-3”	1	Non-Riparian	No
4	5” +	1	Non-Riparian	No
	Total	**4**		

Enclosure 3

US Army Corps of Engineers
Sacramento District

Folsom Dam Safety and Flood Damage Reduction, Joint Federal Project

Habitat Map

Enclosure 4

AMERICAN RIVER WATERSHED INVESTIGATION
JOINT FEDERAL PROJECT
Elderberry Shrub Stem Count Data

OBSERVERS Weinrich LeFevre **DATE** 8/8/12

Shrub #	Riparian Habitat?	Stem Size At Ground Level			Exit Holes Present?
		≥ 1" & ≤ 3"	> 3" & < 5"	≥ 5"	
1	NO		1		No
2	No	1			NO
3	No	1			No

Enclosure 5

AMERICAN RIVER WATERSHED INVESTIGATION
FOLSOM DAM APPROACH CHANNEL
Elderberry Shrub Stem Count Data

OBSERVERS Weinrich, LeFevre **DATE** 6/6/12

Dyke 8 spoil area 6/11/12

	Shrub #	Riparian Habitat?	Stem Size At Ground Level			Exit Holes Present?
			≥ 1" & ≤ 3"	> 3" & < 5"	≥ 5"	
6/6/12	1	No			1	No
	2	No	1			No
	3	No	1			No
6/11/12	4	No			1	No
	Ec.	~ 23"	estimated			
	Willow	~ 25"	could not measure due to high lake level and			
	Cottonwood	~ 25"	fence.			
4-5	small cottonwoods	1" ea.				
Cottonwood	13"		Eucalyptus 23.5		conifer 18"	
Cottonwood	38.5"					
	Species	dbh				

Cottonwood 36"
Cottonwood (3 stem) 14", 21", 16"
V. Oak 25"
V. Oak 31.5"
Live oak 9"

Live Oak 18, 20
V. oak 15.5"
V. oak 4"
V. oak 4"
L. oak 9"
(3) → L oak 1.0, 1.0, 1.0

V. oak 12.5"
V. oak 31."
Buckeye 8, 8, 11.5, 7
L oak 2.5
L oak 2.0

Enclosure 6

Affected elderberry plant minimization ratios based on location, stem diameter, and presence of exit holes

Worksheet				**elderberry ratios**	**elderberry planting**	**associated native planting**	**native ratios**
location	**stems**	**holes**	**Enter number of stems**	**multi. No. of stems by**			
non-riparian	greater than or = 1" & less than or = 3"	No	**4**	1	4	**4**	**1**
		yes	**0**	2	0	**0**	2
non-riparian	greater than 3" & less than 5"	No	**1**	2	2	**2**	1
		yes	**0**	4	0	**0**	2
non-riparian	greater than or = 5"	No	**2**	3	6	**6**	1
		yes	**0**	6	0	**0**	2
riparian	greater than or = 1" & less than or = 3"	No	**0**	2	0	**0**	1
		yes	**0**	4	0	**0**	2
riparian	greater than 3" & less than 5"	No	**0**	3	0	**0**	1
		yes	**0**	6	0	**0**	2
riparian	greater than or = 5"	No	**0**	4	0	**0**	1
		yes	**0**	8	0	**0**	2
totals			**7**		12	12	

Calculations:	natives-elderberrys	0
basins	2.4	0
total basins=	2.4	
	4320	
total acres need for compensation	0.099173554	

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In reply refer to:
08ESMF00-2013-F-0044

NOV - 1 2012

Alicia E. Kirchner
Chief, Planning Division
Corps of Engineers, Sacramento District
1325 J Street
Sacramento, California 95825-2922

Subject: Request to Append the Folsom Dam Modification Project, Sacramento County, California, to the *Programmatic Formal Consultation Permitting Projects with Relatively Small Effects on the Valley Elderberry Longhorn Beetle Within the Jurisdiction of the Sacramento Field Office, California* (1-1-96-F-66)

Dear Ms. Kirchner:

This letter is in response to your October 31, 2012, request for initiation of formal consultation with the U.S. Fish and Wildlife Service (Service) on the proposed Folsom Dam Modification Project (project), in Sacramento County. Your request was received by the Service on October 31, 2012. The Service has reviewed the biological information submitted by the U.S. Army Corps of Engineers (Corps) describing the effects of the proposed project on the federally-listed as threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (beetle).

The Corps has determined that the project is likely to adversely affect the beetle. The Service concurs with this determination, and has concluded the project can be appended to the *Programmatic Formal Consultation Permitting Projects with Relatively Small Effects on the Valley Elderberry Longhorn Beetle Within the Jurisdiction of the Sacramento Field Office, California* (programmatic consultation) (Enclosure 1).

Although critical habitat has been designated for the beetle, the proposed project is not within the critical habitat area. Therefore, critical habitat for the beetle will not be affected. This response is in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

The findings and recommendations in this formal consultation are based on: 1) your October 31, 2012, letter requesting formal consultation; 2) phone and email conversations between Corps and Service staff; 3) site visits on June 6, 2012, June 11, 2012, and August 8, 2012; and 4) other information available to the Service.

Description of the Proposed Project

The Folsom Dam Modification Project, also referred to as the Folsom Dam Safety/Flood Damage Reduction Project or the Folsom Joint Federal Project (Folsom JFP), is a cooperative effort between the U.S. Department of Interior, Bureau of Reclamation (Reclamation), Corps, the State of California Central Valley Flood Protection Board, and the Sacramento Area Flood Control Agency. The Folsom JFP was authorized by the Water Resources Development Act of 2007 to implement dam safety and security features along with flood damage reduction features at Folsom Dam and its associated facilities. An auxiliary spillway adjacent to Folsom Dam was selected as the plan to meet USBR's dam safety risk reduction objective and the Corps' flood damage reduction objective to form the Folsom JFP. The proposed alternatives, potential environmental effects, and proposed mitigation associated with the Folsom Modification Project was assessed in the Folsom Dam Safety and Flood Damage Reduction Final Environmental Impact Statement/Environmental Impact Report (2007 FEIS/EIR), issued by Reclamation in March 2007. The Corps was a cooperating agency for the preparation of the 2007 FEIS/EIR and adopted the findings of the 2007 FEIS/EIR in a joint record of decision that was issued in May 2007.

The 2007 FEIS/EIR conducted a programmatic or general analysis of proposed design features available at that time. The 2007 Final EIS/EIR stated that the design of the spillway approach channel would be determined in the Corps' pre-construction, engineering, and design phase and if needed, supplemental NEPA/CEQA documentation would be prepared.

As construction of the Folsom JFP progresses, it has been determined that the active treatment system (ATS) for storm runoff needs to be relocated from its current location. The proposed action consists of removing the ATS in Spring 2013 and leveling the approximate 3-acre area for use as a contractor staging area. In addition, an area near Dike 8 would be used as a permanent disposal area for material excavated from the approach channel. These actions would require removal of the vegetation in the area including elderberry shrubs (*Sambucus sp.*).

The Folsom JFP project area is highly disturbed areas of Federal land from on-going construction activities and is largely devoid of vegetation, with the exception of small areas of annual grasses and forbs. The area where the ATS is located has been developed under previous actions of the Folsom JFP and is an active construction zone. The area provides little to no habitat for wildlife and has little to no vegetation or ground cover.

The habitat at Dike 8 consists of an open water/reservoir shoreline fluctuation zone, transitional wetland, and ruderal herbaceous. Folsom Reservoir experiences extreme seasonal water level fluctuations ranging from elevation 425 feet to 466 feet, which corresponds with the minimum and maximum pool volumes for the reservoir. Following the recession of lake waters, the shoreline zone is seasonally vegetated with a mix of ruderal (disturbed, weedy) and grassland species, with large areas that remain mostly barren shorelines with rip rap on the upper slopes. Willow shrubs (*Salix sp.*) are sporadic at the very lowest elevations of the shore. Open water habitat provides foraging habitat for waterfowl and other wetland species.

The ruderal herbaceous community is a native community that occurs in and around the Dike 8. Oak trees are sporadic within this area. The predominant oak species include valley oak and live oak. The ruderal herbaceous community provides cover and foraging habitat for resident and migratory songbirds, small mammals, and reptiles. Between the haul road and the ruderal herbaceous habitat there is transitional wetland habitat. This area is flooded when reservoir levels are high by a culvert beneath the haul route, but remains dry when reservoir levels are low. When flooded, this area provides foraging habitat for waterfowl and other wetland species.

A total of seven elderberry shrubs have been recorded at the ATS site and proposed Dike 8 disposal area near Folsom Dam. The Corps has determined that all seven shrubs, the obligate host plant of the beetle, will be disturbed by construction activity and will result in adverse effects to individual beetles, pupae, or larvae, as well as loss of habitat.

The elderberry plants that cannot be avoided will be transplanted to a Service-approved conservation area in accordance with the Service's conservation guidelines (Enclosure 2) for the beetle. Each elderberry stem measuring 1.0 inch or greater in diameter at ground level that is adversely affected (i.e., transplanted or destroyed) will be replaced in the conservation area with elderberry seedlings or cuttings as shown in Table 1. If the Service determines that the elderberry plants on the proposed project site are unsuitable candidates for transplanting, additional plantings will be made to offset the additional habitat loss.

Table 1.

Location	Stem Diameter	Number of Stems Impacted	Exit Holes Present on Shrub (Y/N)	Elderberry Seedling Ratio	Elderberry Seedling Plantings	Associated Native Plant Ratio	Associated Native Plantings
Non Riparian	1"-3"	4	No	1:1	4	1:1	4
	3"-5"	1	No	2:1	2	1:1	2
	> 5"	2	No	3:1	6	1:1	6
Total		7			12		12
24/10=2.4 basins * 1800 = 0.10 acre							

Conservation Measures

The Corps will implement the following conservation measures proposed in the October 31, 2012, letter in addition to those listed in the programmatic consultation.

1. Dust suppression measures would be used.

2. Construction representatives and contractor personnel would be given awareness training relating to the beetle and its habitat.

3. The Corps would purchase 2.4 credits at a Service-approved conservation bank.

4. Disturbed areas would be restored to the pre-project condition and reseeded with native grasses.

The Corps will assure that the conservation measures described above and the terms and conditions of the programmatic consultation are implemented.

Appending to the Programmatic Biological Opinion

The Service has determined that it is appropriate to append the proposed project to the programmatic consultation. This letter is an agreement by the Service to append the proposed project to the programmatic consultation and represents the Service's biological opinion on the effects of the proposed project. Compensation implemented through the programmatic should lead to the development of protected habitat areas distributed across the landscape. These protected areas can then be used as foundations for future habitat conservation plans by local communities.

The Service is tracking losses of beetle habitat permitted under the programmatic consultation. The Service reevaluates the effectiveness of this programmatic consultation at least every 6 months to ensure continued implementation will not result in unacceptable effects to the species or the habitat upon which it depends.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." For the proposed action, the Service considers the action area to be the footprint for the proposed auxiliary spillway for Folsom Dam, including the construction staging areas, access routes and haul roads, permanent and temporary excavated material disposal areas, and the habitat within one hundred feet of any elderberry shrubs associated with the proposed project in which construction activities take place.

Effects of the Proposed Action

The proposed action will affect all valley elderberry longhorn beetles inhabiting seven elderberry plants with at least one stem measuring 1.0 inch or greater in diameter at ground level. All seven elderberry plants will be transplanted to a conservation area. Removing these elderberry shrubs will adversely affect the valley elderberry longhorn beetle. Any beetle larvae occupying these plants are likely to be killed when the plants are removed.

To compensate for these effects, each elderberry shrub that has one or more stems measuring 1.0 inch or greater in diameter at ground level that is adversely affected will be replaced at Service-approved conservation area. Replacement will be done with elderberry seedlings or cuttings at a ratio of 1:1 to 3:1 (new plantings to affected stems) and will be planted along with associated native species in accordance with Conservation Guidelines for the Valley Elderberry Longhorn Beetle (Enclosure 2).

Transplantation of elderberry shrubs that are or could be used by beetle larvae is expected to adversely affect the beetle. Beetle larvae may be killed or the beetle's life cycle interrupted during or after the transplanting process. For example:

1. Transplanted elderberry shrubs may experience stress or become unhealthy due to changes in soil, hydrology, microclimate, or associated vegetation. This may reduce their quality as habitat for the beetle, or impair their production of habitat-quality stems in the future.

2. Elderberry shrubs may die as a result of transplantation.

3. Branches containing larvae may be cut, broken, or crushed as a result of the transplantation process.

Conclusion

After reviewing the current status of the valley elderberry longhorn beetle, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the project to be permitted under this programmatic biological opinion, as proposed, is not likely to jeopardize the continued existence of the threatened valley elderberry longhorn beetle. Our opinion is based on the relatively small numbers of elderberry stems that will be impacted and the new plantings that will be done to provide habitat for the beetle in perpetuity. Although critical habitat has been designated for the beetle, the proposed action would not affect its critical habitat.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act prohibits take (i.e. to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harass is defined as intentional or negligent acts that create the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Harm is defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Incidental take is any taking of listed animal species which results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary and must be implemented by the Corps so that they become binding conditions of any grant or permit issued to an applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps: (1) fails to require applicants to adhere to the terms and conditions of this incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take the Corps must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

Amount or Extent of Take

The Service has determined that implementation of the programmatic process authorized by this biological opinion will result in the loss of all valley elderberry longhorn beetles inhabiting as many as, but no more than, four stems between 1 and 3 inches in diameter at ground level, one stem between 3 and 5 inches in diameter at ground level, and two stems greater than 5 inches in diameter at ground level.

Effect of the Take

In the accompanying biological opinion, the Service has determined that this level of anticipated take is not likely to result in jeopardy to the valley elderberry longhorn beetle or destruction or adverse modification of critical habitat.

This concludes the Service's review of the proposed project as outlined in your request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or, (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions or concerns the Folsom Dam Modification Project please contact Doug Weinrich, Chief, Habitat Conservation Division at (916) 414-6563.

Sincerely,

Daniel Welsh
Acting Field Supervisor

Enclosures

cc:
Jamie LeFevre, COE, Sacramento, CA
Regional Manager, CDFG, Rancho Cordova, CA
Central Valley Flood Protection Board, Sacramento, CA
SAFCA, Sacramento, CA

ENCLOSURE 1

Programmatic Formal Consultation Permitting Projects with Relatively Small Effects on the Valley Elderberry Longhorn Beetle Within the Jurisdiction of the Sacramento Field Office, California (1-1-96-F-66)

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Sacramento Field Office
3310 El Camino Avenue, Suite 130
Sacramento, California 95821-6340

IN REPLY REFER TO:

1-1-96-F-66

September 19, 1996

Mr. Tom Coe
Regulatory Branch
Department of the Army
U.S. Army Engineer District, Sacramento
Corps of Engineers
1325 J Street
Sacramento, CA 95814-2922

Subject: Programmatic Formal Consultation Permitting Projects with Relatively Small Effects on the Valley Elderberry Longhorn Beetle Within the Jurisdiction of the Sacramento Field Office, California (Corps File #199600065)

Dear Mr. Coe:

This document is in response to your request for formal consultation pursuant to section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (Act), regarding actions that the U.S. Army Corps of Engineers (Corps) may take on projects with limited impacts on the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (beetle) or its habitat. Your February 23, 1996, request for formal consultation was received on February 27, 1996. This consultation addresses the effects of these projects on the federally threatened beetle and its elderberry host-plant (*Sambucus* species). The geographic scope of this consultation is the area within the jurisdiction of the Sacramento Field Office of the U.S. Fish and Wildlife Service (Service). This consultation document has been prepared pursuant to 50 CFR §402 of our interagency regulations governing section 7 of the Act.

The purpose of this programmatic document is to expedite consultations on proposed projects with relatively small impacts on the beetle. Future projects that meet the conditions specified below, or that the Service determines will have similar impacts, may be appended to this programmatic consultation.

This consultation document is based on information provided in biological assessments and biological reports provided to the Service by the Corps and other project applicants and consultants. Information obtained by members of my staff during site visits and at meetings with other agency personnel, applicants, and consultants has also been used. Natural history museums, universities, and the scientific literature have also contributed to knowledge of the beetle and its habitat. This information aided the development of appropriate mitigation measures, which are discussed in the Mitigation Guidelines for the beetle (Appendix).

The Service will re-evaluate this programmatic consultation at least every six (6) months to ensure that its continued application will not result in unacceptable effects on the beetle or its ecosystem. Restricting this programmatic consultation to projects with small impacts will limit the effects of the programmatic process on the beetle and its habitat. Tracking and restricting project impacts over time will serve to minimize cumulative effects at local and regional levels.

BIOLOGICAL OPINION

Description of the Proposed Action

This consultation collectively covers projects with small effects on the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) or its host plant, elderberry (*Sambucus* species), in or along the margins of the Sacramento and San Joaquin valleys (Central Valley) of California (Figure 1). The area mapped roughly follows the 3000-foot elevation contour on the east and the watershed of the Central Valley on the west. All or portions of 31 counties are included: Alameda, Amador, Butte, Calaveras, Colusa, Contra Costa, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Madera, Mariposa, Merced, Napa, Nevada, Placer, Sacramento, San Benito, San Joaquin, San Luis Obispo, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba. The Service may treat individual projects from outside this area under this programmatic consultation at its discretion.

All projects implemented under this programmatic consultation will meet the following four criteria, or will be determined by the Service to have impacts similar in nature:

1. no designated critical habitat [50 CFR §17.95(i)] will be affected,

2. twenty-five (25) or fewer elderberry plants, each with at least one stem measuring 1.0 inch or greater in diameter at ground level, exist in the action area (action area is defined under 50 CFR §402.02 as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action), *and*

3. between one (1) and two hundred (200) elderberry stems measuring 1.0 inch or greater in diameter at ground level exist in the action area, *and*

4. less than 250 linear feet (76 m) of undeveloped watercourse exists in the action area, measured down the centerline. An undeveloped watercourse is one without human-made levees, channelization, rip-rap, or other artificial alteration, and may be either permanent or seasonal. This requirement may be waived if no elderberry plants occur in the vicinity of the watercourse(s).

In order to be considered for inclusion under this programmatic document, the biological assessment for the project (50 CFR §402.12), or equivalent document(s) provided to the Service, will include a description of the project, a vicinity map, a legal location description, and the results of a survey for the beetle and for elderberry plants, performed by a qualified biologist. The written report on the survey will include at least the following information:

1. a map showing the boundaries of the project site on a U. S. Geological Survey 7.5 minute quadrangle and identifying the county or counties in which the project is to occur,

2. a map (scale 1" = 100' or 1" = 200') delineating the major vegetation communities present on the site,

3. the acreage to be affected by the project that:

a. lies within 50 feet of any elderberry plant,
b. lies within riparian vegetation of any kind, and
c. lies outside of riparian vegetation but within 50 feet of an elderberry plant.

If the project lies in more than one county, these figures will be provided for each county separately as well as in total,

4. a map showing the precise location of all elderberry plants on-site, and the precise or estimated location of other elderberry plants that may be affected by the project,

5. an accounting of the number of elderberry plants present in the action area, and an accounting for each plant that will include the estimated height, number of stems greater than 1.0 inch in diameter at ground level, and presence or absence of exit holes of the beetle,

6. an assessment of potential habitat for the beetle within 2000 feet of the site boundary if accessible; if not accessible, an estimate of potential habitat for the beetle and a general description of the unaccessible area(s),

7. an analysis of the effects of the project on the beetle and its habitat, including cumulative effects as defined under 50 CFR §402.02 as those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation, and,

8. a similar analysis of effects of the alternate actions considered.

The information provided in the biological assessment will be used by the Service to assess and monitor the local, county-level, and regional impacts of the programmatic consultation on the beetle. Projects that are not consistent with these conditions may be appended to this biological opinion only as the Service deems appropriate. For example, the Service may elect to treat under this programmatic consultation a project that affects 40 elderberry plants, but has effects similar in nature and scope to those analyzed here, and is implemented in a manner consistent with the process described in this biological opinion. Projects with other listed or proposed species present will undergo individual review, but, upon determination by the Service, may have the beetle included as part of this consultation.

The following process will be used when proposed projects are presented for inclusion under this programmatic biological opinion:

1. After reviewing the proposed action, the Corps will forward to the Service's Sacramento Field Office:

a. a letter requesting that the proposed project be appended to this biological opinion; and

b. the biological assessment for the project, or equivalent document(s), along with all other pertinent information, including a complete description of the project, the field survey report, and maps, as described above. Any other threatened, endangered, or proposed species that may be affected by the project will be included in the biological assessment.

2. The Service will designate a staff biologist to serve as the contact and lead. The Service will review the proposed project. If the effects of the proposed project do not meet the criteria for inclusion in this programmatic biological opinion, the Service will inform the Corps within 15 days of the date the request for initiation of consultation was received by the Service, and the Service will recommend a separate consultation. Otherwise;

3. The Service will take one of three actions:

   a. If the proposed mitigation is adequate, the Service will deliver to the Corps a letter approving the proposed mitigation and appending the proposed project to this programmatic consultation.

   b. If the proposed mitigation is inadequate, the Service may deliver to the Corps a letter appending the proposed project to this programmatic consultation, provided that additional measures (terms and conditions) specified in the Service's letter are undertaken by the applicant in order to adequately mitigate the effects of the proposed action; or,

   c. if the proposed mitigation is inadequate, the Service may deliver to the Corps a letter instructing the applicant to contact the Service's staff biologist (identified in the letter) for assistance in determining the applicant's mitigation responsibilities.

4. The Corps will forward the above letter to the applicant. If the proposed mitigation has not been approved, the Corps will instruct the applicant to contact the Service's staff biologist (identified in the Service's letter) for assistance in determining the applicant's mitigation responsibilities.

Appropriate measures have been developed to reduce the impacts of a variety of projects on the beetle. These measures have been implemented and tested in the form of Mitigation Guidelines for the Valley Elderberry Longhorn Beetle, issued and revised periodically by the Service (USFWS 1996) (Guidelines). Projects that will be authorized under this biological opinion will minimize impacts to the valley elderberry longhorn beetle by following these Guidelines or by otherwise mitigating in a manner acceptable to the Service. These Guidelines are attached (Appendix). These Guidelines are also available from this office as a separate document with examples.

Tracking and Reassessment of the Programmatic Process by the Service

To ensure that incremental losses of habitat are not so great that they jeopardize the continued existence of the valley elderberry longhorn beetle in any county, the Service will implement a system to track the effects of this programmatic consultation. Every six (6) months from the date of this biological opinion, the Service will re-evaluate the impacts and effectiveness of the programmatic process.

It is not possible to accurately assess the amount of existing habitat that remains (i.e., the number and location of all elderberry plants within the beetle's range). Therefore, to access the effects of this programmatic consultation, the Service will track, for each county, the total amount of potential habitat (i.e., the number of acres, elderberry shrubs, and stems) for the beetle that is affected by projects permitted under this biological opinion and the total amount of habitat that is created and restored as a result of mitigation for these effects. Potential habitat acres will be defined as all area within 50 feet of any elderberry plant, or within riparian areas suitable for the growth of elderberry plants.

Mitigation may be on-site or off-site with Service approval. To the extent practical and when it contributes to the recovery of the beetle, mitigation will occur in the same general areas as impacts. Mitigation may be coordinated with local planning efforts with Service approval. Mitigation responsibilities may also be met by purchasing the appropriate number of acres in a mitigation bank that meets the compensation requirements (i.e., meets or exceeds the required number of plantings and provides for transplantation of effected elderberry shrubs) identified in the Guidelines.

Because precise information on the existing environmental baseline (number of elderberry plants occurring in the Central Valley and adjacent foothills) cannot be assessed at this time, the amount of incidental take that will be allowed under this programmatic consultation has been determined based on the amount of incidental take that has been permitted during the last two years. The Service has determined that this amount of take has not jeopardized the continued existence of the valley elderberry longhorn beetle. Based on this information, effects of all projects permitted under this programmatic consultation within a six-month period will be limited to no more than 250 elderberry shrubs with one or more stems measuring 1.0 inch or greater in diameter at ground level or no more than 2000 stems measuring 1.0 inch or greater in diameter at ground level, whichever number is smaller.

A comprehensive review of the effects and mitigation (i.e., the number and location of acres, shrubs, and stems destroyed and created/restored within each county) will be conducted at the end of each six-month period. As a result of these reviews, it may be determined that: (1) small projects effecting the beetle may continue to be appended to this programmatic consultation for another six-month period with the current mitigation process in place, (2) proposed project effects may need to the limited in specific areas, (3) changes in the mitigation process are needed, or (4) further impacts in specific areas may jeopardize the beetle or other listed species, and use of this programmatic consultation is not appropriate for these areas. The Service will work closely with recovery efforts to ensure that created and restored areas are distributed across the landscape in such a manner as to allow them to function effectively and contribute to the recovery of the beetle.

Status of the Species

On August 8, 1980, the valley elderberry longhorn beetle was listed as a threatened species (45 FR 52803). Two areas along the American River in the Sacramento metropolitan area have been designated as critical habitat for the beetle. In addition, an area along Putah Creek, Solano County, and the area east of Nimbus Dam along the American River Parkway, Sacramento County, are considered essential habitat, according to the Recovery Plan for the beetle (USFWS 1984). These areas support large numbers of mature elderberry shrubs with extensive evidence of use by the beetle.

The valley elderberry longhorn beetle is dependent on its host plant, elderberry (*Sambucus* species), which is a common component of the remaining riparian forests of the Central Valley. Use of the plants by the animal, a wood borer, is rarely apparent. Frequently, the only exterior evidence of the shrub's use by the beetle is an exit hole created by the larva just prior to the pupal stage. Recent field work along the Cosumnes River and in the Folsom Lake area indicates that larval galleries can be found in elderberry stems with no evidence of exit holes; the larvae either succumb prior to constructing an exit hole or are not far enough along in the developmental process to construct an exit hole. Larvae appear to be distributed in stems which are 1.0 inch or greater in diameter at ground level. The Valley Elderberry Longhorn Beetle Recovery Plan (USFWS 1984) and Barr (1991) contain further details on the beetle's life history.

Population densities of the beetle are probably naturally low (USFWS 1984); and it has been suggested, based on the spatial distribution of occupied shrubs (Barr 1991), that the beetle is a poor disperser. Low density and limited dispersal capability may cause the beetle to be vulnerable to the negative effects of the isolation of small subpopulations due to habitat fragmentation.

Environmental Baseline

Extensive destruction of California's Central Valley riparian forests has occurred during the last 150 years due to agricultural and urban development (Katibah 1984, Katibah et al. 1984, Smith 1977, Thompson 1961). Based on a 1979 aerial survey, only about 102,000 acres out of an estimated 922,000 acres of Central Valley riparian forest remain (Katibah et al. 1981). More extreme figures were given by Frayer et al. (1989), who reported that approximately 85% of all wetland acreage in the Central Valley was lost before 1939; and that from 1939 to the mid-1980's, the acreage of wetlands dominated by forests and other woody vegetation declined from 65,400 acres to 34,600 acres. Differences in methodology may explain the differences between the studies. In any case, the historical loss of riparian habitat in the Central Valley strongly suggests that the range of the beetle has been reduced and its distribution greatly fragmented. Loss of non-riparian habitat where elderberry occurs (e.g. savanna and grassland adjacent to riparian areas, oak woodland, mixed chaparral-woodland), and where the beetle has been recorded (Barr 1991), suggests further reduction of the beetle's range and increased fragmentation of its upland habitat.

The beetle's current distribution is patchy throughout the remaining habitat of the Central Valley from Redding to Bakersfield. Surveys conducted in 1991 (Barr 1991) found evidence of beetle activity at 28 percent of the 230 sites with elderberry. The beetle appears to be only locally common, i.e., found in population clusters which are not evenly distributed across available elderberry shrubs. Frequently only particular clumps or trees in the study areas were found to harbor the beetle. Plants used by the beetle usually show evidence of repeated use over a period of several years, but sometimes only one or two exit holes are present. Similar observations on the clustered distribution of exit holes were made by Jones and Stokes (1987). Barr (1991) noted that elderberry shrubs and trees with many exit holes were most often large, mature plants; young stands were seldom occupied.

The action area of this programmatic consultation covers the known range of the beetle, since projects that may be authorized under this biological opinion are likely to exist throughout its range. Therefore, the environmental baseline for the beetle in the action area is equivalent to the rangewide status of the beetle, which is addressed above. To summarize, the Service believes that the valley elderberry longhorn beetle, though wide-ranging, is in long-term decline due to widespread alteration and fragmentation of its riparian, and to a lesser extent, its upland, habitats by human activities.

Effects of the Proposed Action

The proposed action may affect all valley elderberry longhorn beetles inhabiting as many as 250 elderberry plants with at least one stem measuring 1.0 inch or greater in diameter at ground level or as many as 2000 elderberry stems measuring 1.0 inch or greater in diameter at ground level in or adjacent to the Central Valley within a six-month period. This action will adversely affect the valley elderberry longhorn beetle. Any beetle larvae occupying these plants are likely to be killed when the plants are removed.

To mitigate for these effects, projects permitted under this programmatic consultation would relocate (transplant) elderberry shrubs that have one or more stems measuring 1.0 inch or greater in diameter at ground level and would plant additional elderberry, in the form of seedlings or cuttings, and associated native species in accordance with Mitigation Guidelines for the Valley Elderberry Longhorn Beetle (Appendix).

Transplantation of elderberry shrubs that are or could be used by beetle larvae is expected to adversely affect the beetle. Beetle larvae may be killed or the beetles' life cycle interrupted during or after the transplanting process. For example:

1. Transplanted elderberry shrubs may experience stress or become unhealthy due to changes in soil, hydrology, microclimate, or associated vegetation. This may reduce their quality as habitat for the beetle, or impair their production of habitat-quality stems in the future.

2. Elderberry shrubs may die as a result of transplantation.

3. Branches containing larvae may be cut, broken, or crushed as a result of the transplantation process.

Elderberry plants which are too small to be likely to support larval beetles (i.e., consist of no stems measuring 1.0 inch or greater in diameter at ground level) may be destroyed without transplantation or compensation. However, were they not destroyed, such small plants could potentially grow larger and produce stems capable of serving as habitat for the beetle.

Temporal loss of habitat will occur. Although mitigation for impacts on the beetle involve creation or restoration of habitat, it generally takes five or more years for elderberry plants to become large enough to support beetles, and it generally takes 25 years or longer for riparian habitats to reach their full value (USFWS 1994). Temporal loss of habitat will temporarily reduce the amount of habitat available to beetles and may cause fragmentation of habitat and isolation of subpopulations.

The construction and operation of proposed projects which may be appended to this programmatic may have indirect effects on the beetle. Impacts to the beetle from construction and operation of the projects, in relative proximity to elderberry host plants, may include but are not limited to: fragmentation of habitat, altered hydrology, leaching or drift of fertilizers or pesticides (including herbicides), trampling by increased pedestrian traffic, disturbance of mating or dispersal by increased artificial lighting, and increased fungal parasitism due to elevated humidity near irrigated areas. Also, accidental grading in areas designated as avoidance areas, or other careless handling of heavy equipment during construction, could destroy or injure elderberry plants used by the beetle.

The Mitigation Guidelines provided by the Service (Appendix), which will be followed by projects approved under this programmatic consultation, are intended to take into account and offset these adverse effects, in part by incorporating elevated habitat replacement ratios. Elderberry plants will be transplanted whenever possible and habitat will be created or restored for the beetle to offset these adverse effects.

Cumulative Effects

Cumulative effects are those effects of future State, local, or private actions on endangered and threatened species or critical habitat that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The Service is not aware of specific projects that might affect the beetle or its critical habitat that are currently under review by State, county, and local authorities. Nevertheless, continued human population growth in the Central Valley and other parts of California is expected to drive further development of agriculture, cities, industry, transportation, and water resources in the foreseeable future. Some of these future activities will not be subject to Federal jurisdiction (and thus are considered to enter into cumulative effects), and are likely to result in loss of the riparian and other habitats where elderberry plants and the beetle live. On the other hand, this programmatic consultation is intended to have a somewhat positive net effect on the survival and recovery of the beetle, achieved either through the present or revised compensation measures. Thus, at the present time, the Service neither foresees with certainty any effects cumulative to this consultation that might endanger the beetle, nor anticipates that the net effect of this consultation will worsen any unforeseen cumulative effects.

Conclusion

After reviewing the current status of the valley elderberry longhorn beetle, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the projects to be permitted under this programmatic biological opinion, as proposed, are not likely to jeopardize the continued existence of the threatened valley elderberry longhorn beetle. Although critical habitat has been designated for the beetle, the proposed action would not affect critical habitat.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act prohibits take (i.e. to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harass is defined as intentional or negligent acts that create the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Harm is defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Incidental take is any taking of listed animal species which results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary and must be implemented by the Corps so that they become binding conditions of any grant or permit issued to an applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps: (1) fails to require applicants to adhere to the terms and conditions of this incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Amount or Extent of Incidental Take

The Service has determined that implementation of the programmatic process authorized by this biological opinion will result in the loss of all valley elderberry longhorn beetles inhabiting as many as, but no more than, 250 elderberry plants, each with at least one stem measuring 1.0 inch or greater in diameter at ground level, or 2000 elderberry stems measuring 1.0 inch or greater in diameter at ground level in or adjacent to the Central Valley within a six-month period.

Effect of the Take

In the accompanying biological opinion, the Service has determined that this level of anticipated take is not likely to result in jeopardy to the valley elderberry longhorn beetle or destruction or adverse modification of critical habitat.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize incidental take of the valley elderberry longhorn beetle:

> Minimize the effects of project impacts to the valley elderberry longhorn beetle and to elderberry plants (habitat) on all proposed project sites.

Terms and Conditions

To be exempt from the prohibitions of section 9 of the Act, the Corps will ensure implementation of the following term and condition, which implements the reasonable and prudent measure described above. This term and condition is non-discretionary.

> All applicants shall comply with the Mitigation Guidelines for the Valley Elderberry Longhorn Beetle (Appendix).

The reasonable and prudent measure, with its implementing term and condition, is designed to minimize incidental take that might otherwise result from the proposed action. With implementation of this measure the Service believes that no more than 25 elderberry plants, each with at least one stem measuring 1.0 inch or greater in diameter at ground level, or 200 elderberry stems measuring 1.0 inch or greater in diameter at ground level, which provide habitat for the threatened valley elderberry longhorn beetle, will be incidentally taken as a result of each project appended to this programmatic consultation. And, with implementation of this measure, the Service believes that the programmatic process, as described, will result in the incidental taking of no more than 250 elderberry plants, each with at least one stem measuring 1.0 inch or greater in diameter at ground level, or 2000 elderberry stems measuring 1.0 inch or greater in diameter at ground level, which provide habitat for the threatened valley elderberry longhorn beetle, in and adjacent to the Central Valley within a six-month period. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring review of the reasonable and prudent measures provided. The Corps must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measure or the suitability of the proposed project for inclusion under this programmatic consultation.

Reporting Requirements

The Service's Sacramento Field Office is to be notified within three working days of the finding of any dead, sick, or injured valley elderberry longhorn beetles or any unanticipated harm to beetles or elderberry plants associated with projects authorized under this incidental take statement. The Service contact person for this information is the entomologist for the Central Valley Branch, Endangered Species Division, at (916) 979-2728. Any dead or severely injured beetles found (adults, pupae, or larvae) that are not required for pesticide analysis shall be deposited in the Entomology Department of the California Academy of Sciences. The Academy's contact is the Senior Curator of Coleoptera at (415) 750-7239. All observations of valley elderberry longhorn beetles—live, injured, or dead—or fresh beetle exit holes shall be recorded on California Natural Diversity Data Base (NDDB) field sheets and sent to the California Department of Fish and Game, 1220 S Street, Sacramento, California 95814.

Any other federally listed or proposed species found on or adjacent to the site must be reported within three working days of its finding. The Service contact for this information is the Assistant Field Supervisor, Endangered Species Division, at (916) 979-2725.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The Service recommends that the Corps assist in the recovery of the valley elderberry longhorn beetle by supporting an assessment of where beetle habitat is most needed along riparian corridors within its range (e.g. where gaps in suitable habitat occur along riparian courses). This information should then be made available to the Service, other agencies, project applicants, and conservation organizations, in an effort to coordinate the needs of both the development and environmental conservation communities. In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of this recommendation.

REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the actions outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions concerning this biological opinion, please contact Deborah Mead of my staff at (916) 979-2732, extension 421.

Sincerely,

Joel A Medlin

Joel Medlin
Field Supervisor

cc: AES, Portland, OR
SFO, Sacramento, CA (Attn: Wetlands Branch)
SFO, Sacramento, CA (Attn: Corps Branch)
CDFG, Environmental Services, Sacramento, CA (Attn: Darlene McGriff)
CDFG, Environmental Services, Rancho Cordova, CA (Attn: David Zezulak)
California Academy of Sciences, San Francisco, CA (Attn: Thomas Moritz)

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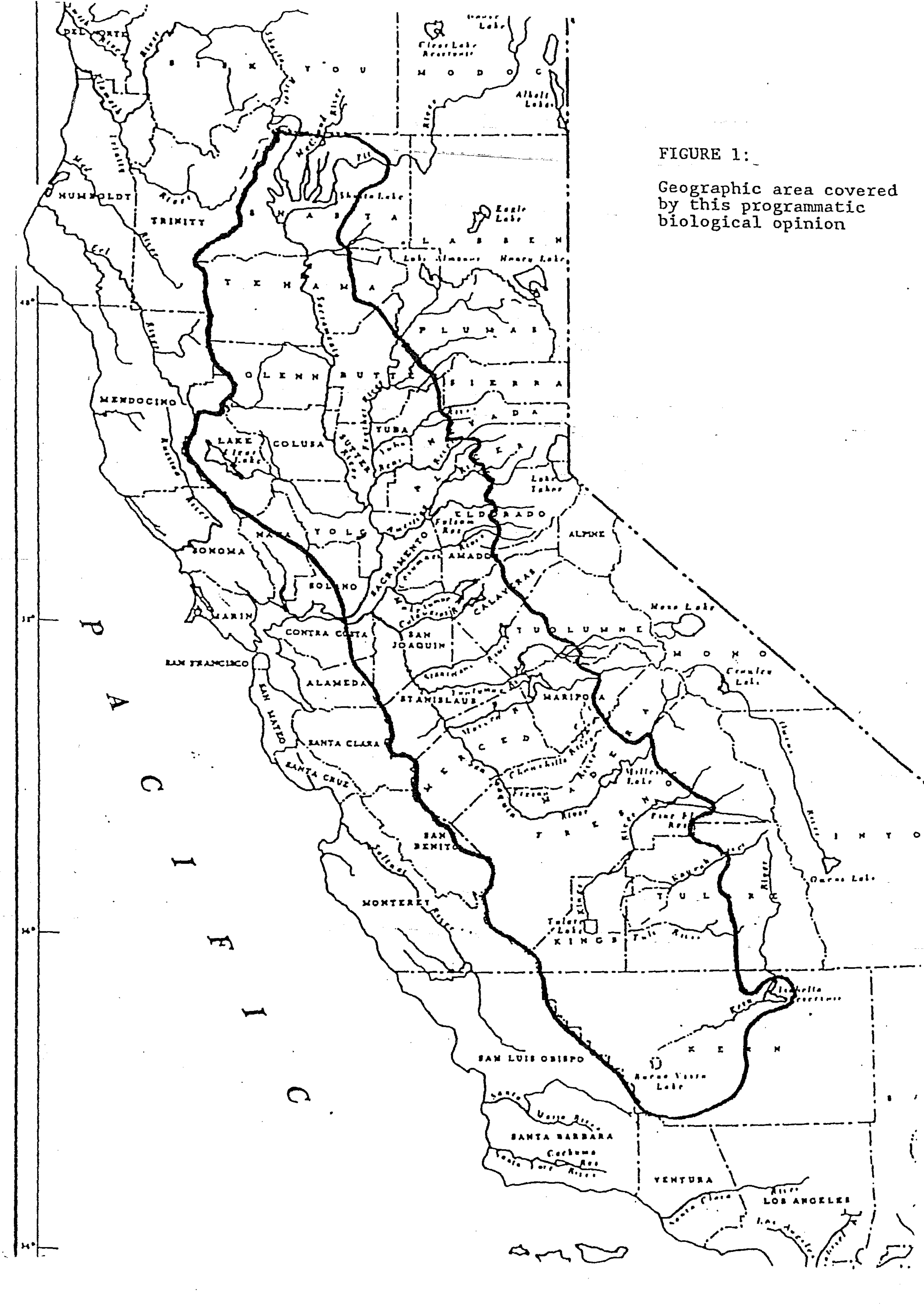

FIGURE 1:

Geographic area covered by this programmatic biological opinion

ENCLOSURE 2

Conservation Guidelines for the Valley Elderberry Longhorn Beetle

Revised July 9, 1999

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United States Department of the Interior
Fish and Wildlife Service
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825

Conservation Guidelines for the Valley Elderberry Longhorn Beetle

Revised July 9, 1999

The following guidelines have been issued by the U.S. Fish and Wildlife Service (Service) to assist Federal agencies and non-federal project applicants needing incidental take authorization through a section 7 consultation or a section 10(a)(1)(B) permit in developing measures to avoid and minimize adverse effects on the valley elderberry longhorn beetle. The Service will revise these guidelines as needed in the future. The most recently issued version of these guidelines should be used in developing all projects and habitat restoration plans. The survey and monitoring procedures described below are designed to avoid any adverse effects to the valley elderberry longhorn beetle. Thus a recovery permit is not needed to survey for the beetle or its habitat or to monitor conservation areas. If you are interested in a recovery permit for research purposes please call the Service's Regional Office at (503) 231-2063.

Background Information

The valley elderberry longhorn beetle (Desmocerus californicus dimorphus), was listed as a threatened species on August 8, 1980 (Federal Register 45: 52803-52807). This animal is fully protected under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). The valley elderberry longhorn beetle (beetle) is completely dependent on its host plant, elderberry (Sambucus species), which is a common component of the remaining riparian forests and adjacent upland habitats of California's Central Valley. Use of the elderberry by the beetle, a wood borer, is rarely apparent. Frequently, the only exterior evidence of the elderberry's use by the beetle is an exit hole created by the larva just prior to the pupal stage. The life cycle takes one or two years to complete. The animal spends most of its life in the larval stage, living within the stems of an elderberry plant. Adult emergence is from late March through June, about the same time the elderberry produces flowers. The adult stage is short-lived. Further information on the life history, ecology, behavior, and distribution of the beetle can be found in a report by Barr (1991) and the recovery plan for the beetle (USFWS 1984).

Surveys

Proposed project sites within the range of the valley elderberry longhorn beetle should be surveyed for the presence of the beetle and its elderberry host plant by a qualified biologist. The beetle's range extends throughout California's Central Valley and associated foothills from about the 3,000-foot elevation contour on the east and the watershed of the Central Valley on the west (Figure 1). All or portions of 31 counties are included: Alameda, Amador, Butte, Calaveras, Colusa, Contra Costa, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Madera, Mariposa, Merced, Napa, Nevada, Placer, Sacramento, San Benito, San Joaquin, San Luis Obispo, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba.

If elderberry plants with one or more stems measuring 1.0 inch or greater in diameter at ground level occur on or adjacent to the proposed project site, or are otherwise located where they may be directly or indirectly affected by the proposed action, minimization measures which include planting replacement habitat (conservation planting) are required (Table 1).

All elderberry shrubs with one or more stems measuring 1.0 inch or greater in diameter at ground level that occur on or adjacent to a proposed project site must be thoroughly searched for beetle exit holes (external evidence of beetle presence). In addition, all elderberry stems one inch or greater in diameter at ground level must be tallied by diameter size class (Table 1). As outlined in Table 1, the numbers of elderberry seedlings/cuttings and associated riparian native trees/shrubs to be planted as replacement habitat are determined by stem size class of affected elderberry shrubs, presence or absence of exit holes, and whether a proposed project lies in a riparian or non-riparian area.

Elderberry plants with no stems measuring 1.0 inch or greater in diameter at ground level are unlikely to be habitat for the beetle because of their small size and/or immaturity. Therefore, no minimization measures are required for removal of elderberry plants with no stems measuring 1.0 inch or greater in diameter at ground level with no exit holes. Surveys are valid for a period of two years.

Avoid and Protect Habitat Whenever Possible

Project sites that do not contain beetle habitat are preferred. If suitable habitat for the beetle occurs on the project site, or within close proximity where beetles will be affected by the project, these areas must be designated as avoidance areas and must be protected from disturbance during the construction and operation of the project. When possible, projects should be designed such that avoidance areas are connected with adjacent habitat to prevent fragmentation and isolation of beetle populations. Any beetle habitat that cannot be avoided as described below should be considered impacted and appropriate minimization measures should be proposed as described below.

Avoidance: Establishment and Maintenance of a Buffer Zone

Complete avoidance (i.e., no adverse effects) may be assumed when a 100-foot (or wider) buffer is established and maintained around elderberry plants containing stems measuring 1.0 inch or greater in diameter at ground level. Firebreaks may not be included in the buffer zone. In buffer areas construction-related disturbance should be minimized, and any damaged area should be promptly restored following construction. The Service must be consulted before any disturbances within the buffer area are considered. In addition, the Service must be provided with a map identifying the avoidance area and written details describing avoidance measures.

Protective Measures

1. Fence and flag all areas to be avoided during construction activities. In areas where encroachment on the 100-foot buffer has been approved by the Service, provide a minimum setback of at least 20 feet from the dripline of each elderberry plant.

2. Brief contractors on the need to avoid damaging the elderberry plants and the possible penalties for not complying with these requirements.

3. Erect signs every 50 feet along the edge of the avoidance area with the following information: "This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs should be clearly readable from a distance of 20 feet, and must be maintained for the duration of construction.

4. Instruct work crews about the status of the beetle and the need to protect its elderberry host plant.

Restoration and Maintenance

Restore any damage done to the buffer area (area within 100 feet of elderberry plants) during construction. Provide erosion control and re-vegetate with appropriate native plants.

Buffer areas must continue to be protected after construction from adverse effects of the project. Measures such as fencing, signs, weeding, and trash removal are usually appropriate.

No insecticides, herbicides, fertilizers, or other chemicals that might harm the beetle or its host plant should be used in the buffer areas, or within 100 feet of any elderberry plant with one or more stems measuring 1.0 inch or greater in diameter at ground level.

The applicant must provide a written description of how the buffer areas are to be restored, protected, and maintained after construction is completed.

Mowing of grasses/ground cover may occur from July through April to reduce fire hazard. No mowing should occur within five (5) feet of elderberry plant stems. Mowing must be done in a manner that avoids damaging plants (e.g., stripping away bark through careless use of mowing/trimming equipment).

Transplant Elderberry Plants That Cannot Be Avoided

Elderberry plants must be transplanted if they can not be avoided by the proposed project. All elderberry plants with one or more stems measuring 1.0 inch or greater in diameter at ground level must be transplanted to a conservation area (see below). At the Service's discretion, a plant that is unlikely to survive transplantation because of poor condition or location, or a plant that would be extremely difficult to move because of access problems, may be exempted from transplantation. In cases where transplantation is not possible the minimization ratios in Table 1 may be increased to offset the additional habitat loss.

Trimming of elderberry plants (e.g., pruning along roadways, bike paths, or trails) with one or more stems 1.0 inch or greater in diameter at ground level, may result in take of beetles. Therefore, trimming is subject to appropriate minimization measures as outlined in Table 1.

1. Monitor. A qualified biologist (monitor) must be on-site for the duration of the transplanting of the elderberry plants to insure that no unauthorized take of the valley elderberry longhorn beetle occurs. If unauthorized take occurs, the monitor must have the authority to stop work until corrective measures have been completed. The monitor must immediately report any unauthorized take of the beetle or its habitat to the Service and to the California Department of Fish and Game.

2. Timing. Transplant elderberry plants when the plants are dormant, approximately November through the first two weeks in February, after they have lost their leaves. Transplanting during the non-growing season will reduce shock to the plant and increase transplantation success.

3. Transplanting Procedure.

a. Cut the plant back 3 to 6 feet from the ground or to 50 percent of its height (whichever is taller) by removing branches and stems above this height. The trunk and all stems measuring 1.0 inch or greater in diameter at ground level should be replanted. Any leaves remaining on the plant should be removed.

b. Excavate a hole of adequate size to receive the transplant.

c. Excavate the plant using a Vemeer spade, backhoe, front end loader, or other suitable equipment, taking as much of the root ball as possible, and replant immediately at the conservation area. Move the plant only by the root ball. If the plant is to be moved and transplanted off site, secure the root ball with wire and wrap it with burlap. Dampen the burlap with water, as necessary, to keep the root ball wet. Do not let the roots dry out. Care should be taken to ensure that the soil is not dislodged from around the roots of the transplant. If the site receiving the transplant does not have adequate soil moisture, pre-wet the soil a day or two before transplantation.

d. The planting area must be at least 1,800 square feet for each elderberry transplant. The root ball should be planted so that its top is level with the existing ground. Compact the soil sufficiently so that settlement does not occur. As many as five

(5) additional elderberry plantings (cuttings or seedlings) and up to five (5) associated native species plantings (see below) may also be planted within the 1,800 square foot area with the transplant. The transplant and each new planting should have its own watering basin measuring at least three (3) feet in diameter. Watering basins should have a continuous berm measuring approximately eight (8) inches wide at the base and six (6) inches high.

e. Saturate the soil with water. Do not use fertilizers or other supplements or paint the tips of stems with pruning substances, as the effects of these compounds on the beetle are unknown.

f. Monitor to ascertain if additional watering is necessary. If the soil is sandy and well-drained, plants may need to be watered weekly or twice monthly. If the soil is clayey and poorly-drained, it may not be necessary to water after the initial saturation. However, most transplants require watering through the first summer. A drip watering system and timer is ideal. However, in situations where this is not possible, a water truck or other apparatus may be used.

Plant Additional Seedlings or Cuttings

Each elderberry stem measuring 1.0 inch or greater in diameter at ground level that is adversely affected (i.e., transplanted or destroyed) must be replaced, in the conservation area, with elderberry seedlings or cuttings at a ratio ranging from 1:1 to 8:1 (new plantings to affected stems). Minimization ratios are listed and explained in Table 1. Stock of either seedlings or cuttings should be obtained from local sources. Cuttings may be obtained from the plants to be transplanted if the project site is in the vicinity of the conservation area. If the Service determines that the elderberry plants on the proposed project site are unsuitable candidates for transplanting, the Service may allow the applicant to plant seedlings or cuttings at higher than the stated ratios in Table 1 for each elderberry plant that cannot be transplanted.

Plant Associated Native Species

Studies have found that the beetle is more abundant in dense native plant communities with a mature overstory and a mixed understory. Therefore, a mix of native plants associated with the elderberry plants at the project site or similar sites will be planted at ratios ranging from 1:1 to 2:1 [native tree/plant species to each elderberry seedling or cutting (see Table 1)]. These native plantings must be monitored with the same survival criteria used for the elderberry seedlings (see below). Stock of saplings, cuttings, and seedlings should be obtained from local sources. If the parent stock is obtained from a distance greater than one mile from the conservation area, approval by the Service of the native plant donor sites must be obtained prior to initiation of the revegetation work. Planting or seeding the conservation area with native herbaceous species is encouraged. Establishing native grasses and forbs may discourage unwanted non-native species from becoming established or persisting at the conservation area. Only stock from local sources should be used.

Examples

Example 1

The project will adversely affect beetle habitat on a vacant lot on the land side of a river levee. This levee now separates beetle habitat on the vacant lot from extant Great Valley Mixed Riparian Forest (Holland 1986) adjacent to the river. However, it is clear that the beetle habitat located on the vacant lot was part of a more extensive mixed riparian forest ecosystem extending farther from the river's edge prior to agricultural development and levee construction. Therefore, the beetle habitat on site is considered riparian. A total of two elderberry plants with at least one stem measuring 1.0 inch or greater in diameter at ground level will be affected by the proposed action. The two plants have a total of 15 stems measuring over 1.0 inch. No exit holes were found on either plant. Ten of the stems are between 1.0 and 3.0 inches in diameter and five of the stems are greater than 5.0 inches in diameter. The conservation area is suited for riparian forest habitat. Associated natives adjacent to the conservation area are box elder (Acer negundo californica), walnut (Juglans californica var. hindsii), sycamore (Platanus racemosa), cottonwood (Populus fremontii), willow (Salix gooddingii and S. laevigata), white alder (Alnus rhombifolia), ash (Fraxinus latifolia), button willow (Cephalanthus occidentalis), and wild grape (Vitis californica).

Minimization (based on ratios in Table 1):

- Transplant the two elderberry plants that will be affected to the conservation area.

- Plant 40 elderberry rooted cuttings (10 affected stems compensated at 2:1 ratio and 5 affected stems compensated at 4:1 ratio, cuttings planted:stems affected)

- Plant 40 associated native species (ratio of associated natives to elderberry plantings is 1:1 in areas with no exit holes):

  5 saplings each of box elder, sycamore, and cottonwood

  5 willow seedlings

  5 white alder seedlings

  5 saplings each of walnut and ash

  3 California button willow

  2 wild grape vines

  Total: 40 associated native species

- Total area required is a minimum of 1,800 sq. ft. for one to five elderberry seedlings and up to 5 associated natives. Since, a total of 80 plants must be planted (40 elderberries and 40 associated natives), a total of 0.33 acre (14,400 square feet) will be required for conservation plantings. The conservation area will be seeded and planted with native grasses and forbs, and closely monitored and maintained throughout the monitoring period.

Example 2

The project will adversely affect beetle habitat in Blue Oak Woodland (Holland 1986). One elderberry plant with at least one stem measuring 1.0 inch or greater in diameter at ground level will be affected by the proposed action. The plant has a total of 10 stems measuring over 1.0 inch. Exit holes were found on the plant. Five of the stems are between 1.0 and 3.0 inches in diameter and five of the stems are between 3.0 and 5.0 inches in diameter. The conservation area is suited for elderberry savanna (non-riparian habitat). Associated natives adjacent to the conservation area are willow (Salix species), blue oak (Quercus douglasii), interior live oak (Q. wislizenii), sycamore, poison oak (Toxicodendron diversilobum), and wild grape.

Minimization (based on ratios in Table 1):

- Transplant the one elderberry plant that will be affected to the conservation area.

- Plant 30 elderberry seedlings (5 affected stems compensated at 2:1 ratio and 5 affected stems compensated at 4:1 ratio, cuttings planted:stems affected)

- Plant 60 associated native species (ratio of associated natives to elderberry plantings is 2:1 in areas with exit holes):

  20 saplings of blue oak, 20 saplings of sycamore, and 20 saplings of willow, and seed and plant with a mixture of native grasses and forbs

- Total area required is a minimum of 1,800 sq. ft. for one to five elderberry seedlings and up to 5 associated natives. Since, a total of 90 plants must be planted (30 elderberries and 60 associated natives), a total of 0.37 acre (16,200 square feet) will be required for conservation plantings. The conservation area will be seeded and planted with native grasses and forbs, and closely monitored and maintained throughout the monitoring period.

Conservation Area—Provide Habitat for the Beetle in Perpetuity

The conservation area is distinct from the avoidance area (though the two may adjoin), and serves to receive and protect the transplanted elderberry plants and the elderberry and other native plantings. The Service may accept proposals for off-site conservation areas where appropriate.

1. Size. The conservation area must provide at least 1,800 square feet for each transplanted elderberry plant. As many as 10 conservation plantings (i.e., elderberry cuttings or seedlings and/or associated native plants) may be planted within the 1800 square foot area with each transplanted elderberry. An additional 1,800 square feet shall be provided for every additional 10 conservation plants. Each planting should have its own watering basin measuring approximately three feet in diameter. Watering basins should be constructed with a continuous berm measuring approximately eight inches wide at the base and six inches high.

The planting density specified above is primarily for riparian forest habitats or other habitats with naturally dense cover. If the conservation area is an open habitat (i.e., elderberry savanna, oak woodland) more area may be needed for the required plantings. Contact the Service for assistance if the above planting recommendations are not appropriate for the proposed conservation area.

No area to be maintained as a firebreak may be counted as conservation area. Like the avoidance area, the conservation area should connect with adjacent habitat wherever possible, to prevent isolation of beetle populations.

Depending on adjacent land use, a buffer area may also be needed between the conservation area and the adjacent lands. For example, herbicides and pesticides are often used on orchards or vineyards. These chemicals may drift or runoff onto the conservation area if an adequate buffer area is not provided.

2. Long-Term Protection. The conservation area must be protected in perpetuity as habitat for the valley elderberry longhorn beetle. A conservation easement or deed restrictions to protect the conservation area must be arranged. Conservation areas may be transferred to a resource agency or appropriate private organization for long-term management. The Service must be provided with a map and written details identifying the conservation area; and the applicant must receive approval from the Service that the conservation area is acceptable prior to initiating the conservation program. A true, recorded copy of the deed transfer, conservation easement, or deed restrictions protecting the conservation area in perpetuity must be provided to the Service before project implementation.

Adequate funds must be provided to ensure that the conservation area is managed in perpetuity. The applicant must dedicate an endowment fund for this purpose, and designate the party or entity that will be responsible for long-term management of the conservation area. The Service must be provided with written documentation that funding and management of the conservation area (items 3-8 above) will be provided in perpetuity.

3. Weed Control. Weeds and other plants that are not native to the conservation area must be removed at least once a year, or at the discretion

of the Service and the California Department of Fish and Game. Mechanical means should be used; herbicides are prohibited unless approved by the Service.

4. Pesticide and Toxicant Control. Measures must be taken to insure that no pesticides, herbicides, fertilizers, or other chemical agents enter the conservation area. No spraying of these agents must be done within one 100 feet of the area, or if they have the potential to drift, flow, or be washed into the area in the opinion of biologists or law enforcement personnel from the Service or the California Department of Fish and Game.

5. Litter Control. No dumping of trash or other material may occur within the conservation area. Any trash or other foreign material found deposited within the conservation area must be removed within 10 working days of discovery.

6. Fencing. Permanent fencing must be placed completely around the conservation area to prevent unauthorized entry by off-road vehicles, equestrians, and other parties that might damage or destroy the habitat of the beetle, unless approved by the Service. The applicant must receive written approval from the Service that the fencing is acceptable prior to initiation of the conservation program. The fence must be maintained in perpetuity, and must be repaired/replaced within 10 working days if it is found to be damaged. Some conservation areas may be made available to the public for appropriate recreational and educational opportunities with written approval from the Service. In these cases appropriate fencing and signs informing the public of the beetle's threatened status and its natural history and ecology should be used and maintained in perpetuity.

7. Signs. A minimum of two prominent signs must be placed and maintained in perpetuity at the conservation area, unless otherwise approved by the Service. The signs should note that the site is habitat of the federally threatened valley elderberry longhorn beetle and, if appropriate, include information on the beetle's natural history and ecology. The signs must be approved by the Service. The signs must be repaired or replaced within 10 working days if they are found to be damaged or destroyed.

Monitoring

The population of valley elderberry longhorn beetles, the general condition of the conservation area, and the condition of the elderberry and associated native plantings in the conservation area must be monitored over a period of either ten (10) consecutive years or for seven (7) years over a 15-year period. The applicant may elect either 10 years of monitoring, with surveys and reports every year; or 15 years of monitoring, with surveys and reports on years 1, 2, 3, 5, 7, 10, and 15. The conservation plan provided by the applicant must state which monitoring schedule will be followed. No change in monitoring schedule will be accepted after the project is initiated. If conservation planting is done in stages (i.e., not all planting is implemented in the same time period), each stage of conservation planting will have a different start date for the required monitoring time.

Surveys. In any survey year, a minimum of two site visits between February 14 and June 30 of each year must be made by a qualified biologist. Surveys must include:

1. A population census of the adult beetles, including the number of beetles observed, their condition, behavior, and their precise locations. Visual counts must be used; mark-recapture or other methods involving handling or harassment must not be used.

2. A census of beetle exit holes in elderberry stems, noting their precise locations and estimated ages.

3. An evaluation of the elderberry plants and associated native plants on the site, and on the conservation area, if disjunct, including the number of plants, their size and condition.

4. An evaluation of the adequacy of the fencing, signs, and weed control efforts in the avoidance and conservation areas.

5. A general assessment of the habitat, including any real or potential threats to the beetle and its host plants, such as erosion, fire, excessive grazing, off-road vehicle use, vandalism, excessive weed growth, etc.

The materials and methods to be used in the monitoring studies must be reviewed and approved by the Service. All appropriate Federal permits must be obtained prior to initiating the field studies.

Reports. A written report, presenting and analyzing the data from the project monitoring, must be prepared by a qualified biologist in each of the years in which a monitoring survey is required. Copies of the report must be submitted by December 31 of the same year to the Service (Chief of Endangered Species, Sacramento Fish and Wildlife Office), and the Department of Fish and Game (Supervisor, Environmental Services, Department of Fish and Game, 1416 Ninth Street, Sacramento, California 95814; and Staff Zoologist, California Natural Diversity Data Base, Department of Fish and Game, 1220 S Street, Sacramento, California 95814). The report must explicitly address the status and progress of the transplanted and planted elderberry and associated native plants and trees, as well as any failings of the conservation plan and the steps taken to correct them. Any observations of beetles or fresh exit holes must be noted. Copies of original field notes, raw data, and photographs of the conservation area must be included with the report. A vicinity map of the site and maps showing where the individual adult beetles and exit holes were observed must be included. For the elderberry and associated native plants, the survival rate, condition, and size of the plants must be analyzed. Real and likely future threats must be addressed along with suggested remedies and preventative measures (e.g. limiting public access, more frequent removal of invasive non-native vegetation, etc.).

A copy of each monitoring report, along with the original field notes, photographs, correspondence, and all other pertinent material, should be deposited at the California Academy of Sciences (Librarian, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118) by December 31 of the year that monitoring is done and the report is prepared. The Service's Sacramento Fish and Wildlife Office should be provided with a copy of the receipt from the Academy library acknowledging receipt of the material, or the library catalog number assigned to it.

Access. Biologists and law enforcement personnel from the California Department of Fish and Game and the Service must be given complete access to the project site to monitor transplanting activities. Personnel from both these agencies must be given complete access to the project and the conservation area to monitor the beetle and its habitat in perpetuity.

Success Criteria

A minimum survival rate of at least 60 percent of the elderberry plants and 60 percent of the associated native plants must be maintained throughout the monitoring period. Within one year of discovery that survival has dropped below 60 percent, the applicant must replace failed plantings to bring survival above this level. The Service will make any determination as to the applicant's replacement responsibilities arising from circumstances beyond its control, such as plants damaged or killed as a result of severe flooding or vandalism.

Service Contact

These guidelines were prepared by the Endangered Species Division of the Service's Sacramento Fish and Wildlife Office. If you have questions regarding these guidelines or to request a copy of the most recent guidelines, telephone (916) 414-6600, or write to:

U.S. Fish and Wildlife Service
Ecological Services
2800 Cottage Way, W-2605
Sacramento, CA 95825

Literature Cited

Barr, C. B. 1991. The distribution, habitat, and status of the valley elderberry longhorn beetle Desmocerus californicus dimorphus. U.S. Fish and Wildlife Service; Sacramento, California.

Holland, R.F. 1986. Preliminary descriptions of the terrestrial natural communities of California. Unpublished Report. State of California, The Resources Agency, Department of Fish and Game, Natural Heritage Division, Sacramento, California.

USFWS. 1980. Listing the valley elderberry longhorn beetle as a threatened species with critical habitat. Federal Register 45:52803-52807.

USFWS. 1984. Recovery plan for the valley elderberry longhorn beetle. U.S. Fish and Wildlife Service, Endangered Species Program; Portland, Oregon.

Table 1: Minimization ratios based on location (riparian vs. non-riparian), stem diameter

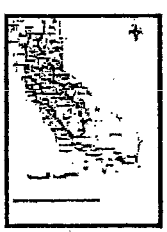
of affected elderberry plants at ground level, and presence or absence of exit holes.

Location	Stems (maximum diameter at ground level)	Exit Holes on Shrub Y/N (quantify) 1	Elderberry Seedling Ratio2	Associated Native Plant Ratio3
non-riparian	stems $ 1" & # 3"	No:	1:1	1:1
		Yes:	2:1	2:1
non-riparian	stems > 3" & < 5"	No:	2:1	1:1
		Yes:	4:1	2:1
non-riparian	stems $ 5"	No:	3:1	1:1
		Yes:	6:1	2:1
riparian	stems $ 1" & # 3"	No:	2:1	1:1
		Yes:	4:1	2:1
riparian	stems > 3" & < 5"	No:	3:1	1:1
		Yes:	6:1	2:1
riparian	stems $ 5"	No:	4:1	1:1
		Yes:	8:1	2:1

[1] All stems measuring one inch or greater in diameter at ground level on a single shrub are considered occupied when exit holes are present anywhere on the shrub.

[2] Ratios in the Elderberry Seedling Ratio column correspond to the number of cuttings or seedlings to be planted per elderberry stem (one inch or greater in diameter at ground level) affected by a project.

[3] Ratios in the Associated Native Plant Ratio column correspond to the number of associated native species to be planted per elderberry (seedling or cutting) planted.



Click for range map

Endangered Species Div., Sacramento Fish & Wildlife Office, U.S. Fish & Wildlife Service

Selected Elements by Scientific Name

California Department of Fish and Game

California Natural Diversity Database

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFG SSC or FP
Accipiter cooperii Cooper's hawk	ABNKC12040	None	None	G5	S3	WL
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	None	G2G3	S2	SSC
Andrena blennospermatis Blennosperma vernal pool andrenid bee	IIHYM35030	None	None	G2	S2	
Antrozous pallidus pallid bat	AMACC10010	None	None	G5	S3	SSC
Ardea alba great egret	ABNGA04040	None	None	G5	S4	
Ardea herodias great blue heron	ABNGA04010	None	None	G5	S4	
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S2	SSC
Branchinecta lynchi vernal pool fairy shrimp	ICBRA03030	Threatened	None	G3	S2S3	
Ceanothus roderickii Pine Hill ceanothus	PDRHA04190	Endangered	Rare	G1	S1	1B.2
Chlorogalum grandiflorum Red Hills soaproot	PMLIL0G020	None	None	G3	S3	1B.2
Clarkia biloba ssp. brandegeeae Brandegee's clarkia	PDONA05053	None	None	G4G5T3	S3	1B.2
Desmocerus californicus dimorphus valley elderberry longhorn beetle	IICOL48011	Threatened	None	G3T2	S2	
Downingia pusilla dwarf downingia	PDCAM060C0	None	None	G2	S2	2.2
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3	FP
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Falco columbarius merlin	ABNKD06030	None	None	G5	S3	WL
Fremontodendron decumbens Pine Hill flannelbush	PDSTE03030	Endangered	Rare	G1	S1	1B.2
Galium californicum ssp. sierrae El Dorado bedstraw	PDRUB0N0E7	Endangered	Rare	G5T1	S1	1B.2
Haliaeetus leucocephalus bald eagle	ABNKC10010	Delisted	Endangered	G5	S2	FP
Helianthemum suffrutescens Bisbee Peak rush-rose	PDCIS020F0	None	None	G2Q	S2.2	3.2
Hydrochara rickseckeri Ricksecker's water scavenger beetle	IICOL5V010	None	None	G1G2	S1S2	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFG SSC or FP
Lasionycteris noctivagans silver-haired bat	AMACC02010	None	None	G5	S3S4	
Linderiella occidentalis California linderiella	ICBRA06010	None	None	G3	S2S3	
Navarretia myersii ssp. myersii pincushion navarretia	PDPLM0C0X1	None	None	G1T1	S1.1	1B.1
Northern Hardpan Vernal Pool Northern Hardpan Vernal Pool	CTT44110CA	None	None	G3	S3.1	
Northern Volcanic Mud Flow Vernal Pool Northern Volcanic Mud Flow Vernal Pool	CTT44132CA	None	None	G1	S1.1	
Orcuttia viscida Sacramento Orcutt grass	PMPOA4G070	Endangered	Endangered	G1	S1	1B.1
Packera layneae Layne's ragwort	PDAST8H1V0	Threatened	Rare	G2	S2	1B.2
Phalacrocorax auritus double-crested cormorant	ABNFD01020	None	None	G5	S3	WL
Rana draytonii California red-legged frog	AAABH01022	Threatened	None	G4T2T3	S2S3	SSC
Sagittaria sanfordii Sanford's arrowhead	PMALI040Q0	None	None	G3	S3	1B.2
Spea hammondii western spadefoot	AAABF02020	None	None	G3	S3	SSC
Valley Needlegrass Grassland Valley Needlegrass Grassland	CTT42110CA	None	None	G3	S3.1	
Wyethia reticulata El Dorado County mule ears	PDAST9X0D0	None	None	G2	S2	1B.2

Record Count: 34

U.S. Fish & Wildlife Service

Sacramento Fish & Wildlife Office

Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the Counties and/or U.S.G.S. 7 1/2 Minute Quads you requested

Document Number: 120613030801

Database Last Updated: September 18, 2011

Quad Lists

Listed Species

Invertebrates

Branchinecta conservatio
Conservancy fairy shrimp (E)

Branchinecta lynchi
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Lepidurus packardi
vernal pool tadpole shrimp (E)

Fish

Hypomesus transpacificus
delta smelt (T)

Oncorhynchus mykiss
Central Valley steelhead (T) (NMFS)
Critical habitat, Central Valley steelhead (X) (NMFS)

Oncorhynchus tshawytscha
Central Valley spring-run chinook salmon (T) (NMFS)
winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

Ambystoma californiense
California tiger salamander, central population (T)

Rana draytonii
California red-legged frog (T)

Reptiles

Thamnophis gigas
giant garter snake (T)

Plants

Calystegia stebbinsii
Stebbins's morning-glory (E)

Ceanothus roderickii
Pine Hill ceanothus (E)

Fremontodendron californicum ssp. decumbens
Pine Hill flannelbush (E)

Galium californicum ssp. sierrae

El Dorado bedstraw (E)

Orcuttia viscida

Critical habitat, Sacramento Orcutt grass (X)

Sacramento Orcutt grass (E)

Senecio layneae

Layne's butterweed (=ragwort) (T)

Quads Containing Listed, Proposed or Candidate Species:

CLARKSVILLE (511A)

FOLSOM (511B)

County Lists

No county species lists requested.

Key:

(E) *Endangered* - Listed as being in danger of extinction.

(T) *Threatened* - Listed as likely to become endangered within the foreseeable future.

(P) *Proposed* - Officially proposed in the Federal Register for listing as endangered or threatened.

(NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service. Consult with them directly about these species.

Critical Habitat - Area essential to the conservation of a species.

(PX) *Proposed Critical Habitat* - The species is already listed. Critical habitat is being proposed for it.

(C) *Candidate* - Candidate to become a proposed species.

(V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.

(X) *Critical Habitat* designated for this species

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, **or may be affected by** projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the surrounding quads through the California Native Plant Society's online Inventory of Rare and Endangered Plants.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist and/or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list. See our Protocol and Recovery Permits pages.

For plant surveys, we recommend using the Guidelines for Conducting and Reporting Botanical Inventories. The results of your surveys should be published in any environmental documents prepared for your project.

Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

> Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal consultation with the Service.

  During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.

- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.

  Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our Map Room page.

Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Species of Concern

The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts. More info

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6520.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be September 11, 2012.

Appendix L

Public Involvement

Organization of Appendix K

Appendix K is organized into the following sections.

Section 1 explains the purpose of this response to comments appendix.

Section 2 provides responses to comments sorted by the resource categories of the EIS/EIR and has been provided so that the reader may easily find all responses to any specific resource category.

Section 3 contains copies of comments received. The comments are organized, according to the affiliation of the commenter, into five categories: Federal Agency, State Agency, Regional and Local Agency, and General Public. Specific issues within comments received have been assigned a response report identification number. Response identification number(s) are shown in parenthesis following the comment listing.

Section 4 contains the comments received from the Notice of Preparation.

Section 1 Introduction

Purpose

This is Appendix K of the Folsom Dam Safety and Flood Damage Reduction, Folsom Dam Joint Federal Project Folsom Dam Modification Project Approach Channel Final Supplemental Environmental Impact Statement/Environmental Impact Report (EIS/EIR). This appendix contains the responses to comments received on the Draft Supplemental EIS/EIR. The 45-day public review period for the draft document began on July 25, 2012 and ended on September 10, 2012. A notice of availability (NOA) of the draft SEIS/EIR was published in the Federal Register July 20 prior to public review. A public workshop and hearing were held on August 23, 2012 at Folsom City Hall to provide additional opportunities for comments on the Draft SEIS/EIR. As required by environmental regulatory policies – National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA), the U.S. Army Corps of Engineers (Corps) and the State of California Central Valley Flood Protection Board (CVFPB), as lead agencies for the Final Supplemental EIS/EIR, are required to respond to substantive environmental issues raised during the review and consultation process.

During the public review period, comments were received on the Draft Supplemental EIS/EIR from Federal, State, and local agencies, and the general public. Comments were received in a variety of media, including letters, emails, telephone, and public workshop verbal comment transcriptions. These are collectively referred to as “comments” throughout this appendix. This appendix contains copies of all written and email comments received on the Draft Supplemental EIS/EIR and all verbal comments received at the August 23, 2012 workshop (in the form of the written transcripts of the meeting).

Seven comment letters were received on the draft SEIS/EIR from Federal, State, and local agencies and one letter and one personal conversation from members of the public. Most comments were focused around air quality, water quality, blasting and disposal of materials, recreational impacts and public safety, and site restoration.

Section 2 Comments and Responses on Draft EIS/EIR

Comments and Responses
on
Draft SEIS/EIR for Folsom Dam Safety and Flood Damage Reduction
Folsom Dam Joint Federal Project, Folsom Dam Modification Project
Approach Channel
December 2012

No.	**Agency**	**Comment**	**Response**
1.	U.S. Bureau of Reclamation	“Reclamation suggests installing signage at the boat launches explaining the purpose of the barrier around the blast site and the effects that underwater blasting can have on people if they are in the water and in range of the blast.	Discussion in Section 4.7.6 has been revised to include explaining the purpose of the safety barriers and blasting effects in the public outreach.
2.	U.S. Bureau of Reclamation	“Concerning disposal of material in the reservoir: If fine dredge material is placed in the reservoir will it be close enough that it will mobilize when the spillway is operated?	Mobilized sediment from the Dike 7 disposal area is highly unlikely based on the distance from the channel. Modeling was performed to determine if the new channel configuration will induce vortices. The model confirmed the velocities are not great enough to mobilize these sediments.
3.	U.S. Bureau of Reclamation	“2.4.6, page 27: Reclamation refers to the work at MIAD as the Morman Island Auxiliary Dam Modification Project	Discussion in Section 2.4.6 has been revised to include the project name.
4.	U.S. Bureau of Reclamation	“4.7.4, page 189: Impacts to recreation (exclusion of public access) should be assessed should be analyzed using the average surface area during peak use periods.	Recreation effects were analyzed using gross pool to address the maximum surface area affected by the safety and exclusion boundary. Topography is a steep grade along the south shoreline of Folsom Lake, including proximity to Folsom Dam, and with decline of lake level, the surface area of Folsom Lake does not change substantially. The safety boundary would cover less than 3% of Folsom Lake’s surface area at average summer elevation. Section 4.7.4 has been revised to include the following: "Recreation access and reservoir levels would not be affected by the recreation safety boundary. The boundary will not change as

			reservoir levels change."
5.	U.S. Bureau of Reclamation	"Figure 17: Placement of the safety boundary looks like it would isolate the Folsom Point boat launch at lower levels. Is this the case and if so how will these impacts be mitigated?	Figure 17 has been updated with the new safety and exclusion boundary. Folsom Point boat launch access would not be affected at low lake levels.
6.	U.S. Department of Interior	The Department of the Interior has received and reviewed the subject document and has no comments to offer.	Thank you for your comment.
7.	U.S. Environmental Protection Agency	EPA has reviewed this document and rated it Environmental Concerns- Insufficient Information (EC-2) (see enclosed "Summary of Rating Definitions")….We continue to urge implementation of aggressive mitigation measures to reduce project-related emissions to the maximum extent feasible.	The Corps is adopting unprecedented measures to lower emissions including adoption of Green Construction policies in the use of higher tiered and electrified equipment.
8.	U.S. Environmental Protection Agency	We commend the Army Corps of Engineers' commitment to use the cleanest on-road vehicles available and the most recent pollution control equipment for all off-road and marine equipment… We recommend that the Supplemental Final EIS and Record of Decision (ROD) include a clear commitment to these project refinements and the list of control measures with their emission reduction data.	It is with the SMAQMD's cooperation and support that the Corps has been able to accomplish these actions. A clear commitment will be reflected in the Final EIS, ROD and Contract Specifications for the project.
9.	U.S. Environmental Protection Agency	Additionally, Table 30 - "Comparison of Mitigated Alternative 2 and Alternative 3 Total Emissions" is unclear. This table is labeled as being in tons/year, but it is also labeled as being "total emissions." The project is anticipated to be constructed over five years. EPA urges the Corps to explain this discrepancy.	This has been corrected to read "tons".
10.	U.S. Environmental Protection Agency	Please note that, starting October 1,2012, EPA Headquarters will not accept paper copies or CDs of EISs for official filing purposes. Submissions on or after October 1, 2012 must be made through EPA's new electronic EIS submittal tool: e-NEPA.	This is noted and EIS submission will be made electronically.
11.	U.S. Environmental Protection Agency	Please send a copy of the Supplemental Final EIS to the above address (mail code: CED-2) when it becomes available.	The USEPA will continue to be on the mailing list.
12.	California State Parks, Gold Fields District	DPR is unsure if the Draft EIR/EIS fully describes and addresses the potential human health and public safety issues regarding the underwater blasting and aquatic recreation, we believe the final document should disclose and address these issues.	Discussion in Section 3.1.6 has been updated to included additional information on underwater blasting.

13.	California State Parks, Gold Fields District	It is our understanding that the report produced for the Corps on the underwater blasting – "Fish Protection Against Waterborne Pressures" by Ben C. Gerwick, Inc recommended a bubble curtain to mitigate potential impacts from blasting. We are interested in better understanding why this measure will not be required.	The Corps decided to provide the contractor with contract flexibility and instead instituted a safety limitation on the underwater production blasts of 5.8 psi at 2,500 feet. Test blasts will be limited in size up to one fifth of production blasts with constant monitoring to ensure the limit is not exceeded. Implementation of a bubble curtain remains an option for the contractor. The bubble curtain is not a requirement in order to allow contract flexibility for the contractor. This protective option was not requested by regulatory agencies.
14.	California State Parks, Gold Fields District	It appears the Corps may be leaving some of the decisions and mitigation regarding underwater blasting for the contractor to determine... DPR would like to see the Corps define a maximum pressure or intensity at the blast location, or some other means, to ensure the required safety exclusion zone will be effective.	The contractor will be required to meet a safe blasting pressure limitation of 5.8 psi at 2,500 feet. This is a conservative value that is expected to provide full protection to recreational swimmers.
15.	California State Parks, Gold Fields District	It is our understanding that the test blasting and the production blasting program will not require closure of any Folsom Lake SRA recreation facility. If the project did require closure of any recreation facility, such as Folsom Point, there would be impacts to visitor use and DPR revenues.	Closure of Folsom Point and/or other Folsom Lake SRA recreation facilities is not anticipated during test blasting. Coordination between the Corps and State Parks would continue throughout the project.
16.	California State Parks, Gold Fields District	We would like to confirm that the contractor will be required to install a continuous log boom to exclude boats from the blasting safety zone in Folsom Reservoir and will have adequate warning signs/buoys and patrol boats in the area. It is our understanding that the Corps will be limiting blasting intensity so that this safety exclusion zone can be sized so it will not impact public access to Folsom Lake at Folsom Point or Beals Point and that the public can be effectively excluded from the safety zone area by the contractor or Corps.	The contractor will be required to construct a physical barrier 3,000 feet from the blast zone which will be maintained throughout the construction period. Blasting pressures will be limited in order to provide public underwater safety and allow full access to Folsom Point launch. The safety exclusion barrier will also permit full access from the Folsom Point boat launch. Boat patrols will be required before, during and immediately after blasts. Discussion on page 194 has been revised accordingly.
17.	California State Parks, Gold Fields District	DPR's interests are ensuring public safety, minimizing the impact on recreation use and public disclosure of potential effects from underwater blasting on human health.	Interruption to recreation is anticipated to be minimal during the project. Every effort will be made to ensure public health and safety.
18.	California State Parks,	After all construction activities, DPR would like to see a portion of the haul road from the spillway gate construction site to Folsom Point made available for development of a recreation trail (including potentially a paved trail) from Dike 7 to Folsom Point and across the top of	The haul road would be regraded and revegetated with native grasses to return the area to a natural state consistent with the shoreline of Folsom Lake.

	Gold Fields District	MIAD to the intersection of Green Valley Rd and Sophia Parkway.	Further development of recreational trails would need to be coordinated with USBR. This comment will be forwarded to USBR.
19.	California State Parks, Gold Fields District	After all construction activities, DPR would like to see the area around Dike 7 – which is a spoils deposition site - made available for recreation facilities, including a potential future trailhead facility and parking area at Dike 7.	The work sites and staging areas would be restored to pre-project conditions. Any un-vegetated areas disturbed during construction would be hydro-seeded with native grass species. Further development of recreational facilities on lands under jurisdiction of the USBR would require coordination with USBR. This comment will be forwarded to USBR.
20.	Central Valley Regional WQ Control Board	"Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore our comments will address concerns surrounding those issues."	All required permits related to water quality will be obtained by the Corps and contractor prior to initiation of construction. The Corps will ensure that the contractor complies with certification and permit requirements to be implemented during construction.
21.	Sac Metro AQ Management District	(Page 53) Clarify in the Attainment Status section that General Conformity thresholds are for ozone "precursors."	GC thresholds have been clarified in the document.
22.	Sac Metro AQ Management District	(Page 54) In the Attainment Status section, remove "threshold" in reference to the 1-hour ozone NAAQS.	"Threshold" has been removed from this section.
23.	Sac Metro AQ Management District	(Page 54) The status of SIP planning regarding ozone needs to include both the 1994 1-hour ozone and 1997 8-hour ozone SIPs. Details may be obtained from the following website: http://www.airquality.org/plans/federal/ozone/index.shtml.	The details have been obtained and both 1- hour and 8-hour ozone SIPs have been included in the document.
24.	Sac Metro AQ Management District	(Page 54) The status of SIP planning regarding PM2.5 needs to be updated based on the request to USEPA Region 9 to find the region in attainment of the PM2.5 NAAQS. (5/9/12 CARB letter, website reference: http://www.airquality.org/plans/federal/pm/PM2.5/SacRegCleanDataTransmitalAndEnclosure-signed.pdf) SMAQMD is preparing a redesignation request and maintenance plan for submission in early 2013.	The SIP planning status has been updated in the document.
25.	Sac Metro AQ Management District	(Page 123) In the Basis of Significance section, two clarifications are needed: a. Change ROG from 50 tons/year to 25 tons/year to reflect the General Conformity requirement, which is consistent with Table 18. b. Clarify that for PM10 a significant impact may occur if the project emits PM10 at a level that substantially contributes to an existing or projected violation of the PM10 California Ambient Air Quality Standards (CAAQS), which is 5% of the CAAQS. SMAQMD does not	The clarifications have been added to the document.

		meet the PM10 CAAQS, therefore the substantial contribution threshold is used, which is much lower than the actual CAAQS listed. (SMAQMD Threshold Table, website reference: http://www.airquality.org/ceqa/cequguideupdate/Ch2TableThresholds.pdf)	
26.	Sac Metro AQ Management District	(Page 124) The SMAQMD CEQA Thresholds section states the "SMAQMD has not designated construction thresholds for PM2.5, ROG, CO or SO2." The SMAQMD's Threshold Table (referenced in comment 5.b. above) indicates that the CAAQS are concentration thresholds for both construction and operational emissions.	This statement has been removed from the document.
27.	Sac Metro AQ Management District	(Page 125) Similar to comment 5.b. above, Table 19 needs to be updated to recognize the PM10 threshold as a substantial contribution to an existing or projected violation of the ambient air quality standards listed.	Table 19 in Section 4.2.2 has been updated to include this statement.
28.	Sac Metro AQ Management District	(Page 125) Table 19 needs to be corrected to show the concentrations and units either µg/m3 or ppm as noted in the SMAQMD's Thresholds of Significance Table: http://www.airquality.org/ceqa/cequguideupdate/Ch2TableThresholds.pdf.	Table 19 has been corrected.
29.	Sac Metro AQ Management District	(Pages 124, 129 (table 24) and 133 (table 29)) The mitigation fee rate noted in various sections of the document is $16,640 per ton of NOX. As of July 1, 2012 that fee rate changed to $17,080.	The fee rate has been changed to $ 17,080.
30.	Sac Metro AQ Management District	(Page 125) Provide justification for selecting 3 pounds/hour as the significance threshold for diesel particulate matter emissions.	This statement has been removed from the document.
31.	Sac Metro AQ Management District	(Page 137) Clarify that Interim Tier 4 and/or Final Tier 4 off-road equipment will be used beginning in 2015.	Clarification has been made for Tier 4 equipment in Section 4.2.7.
32.	Sac Metro AQ Management District	(Page 137) Add language to the mitigation that in addition to using Tier 3 and Tier 4 off-road equipment, contractors must report their equipment specifications to the SMAQMD and the Army Corps to ensure the mitigation is being implemented.	Language has been added in Section 4.2.7 that contractors must report equipment specifications to SMAQMD.
33.	Sac Metro AQ Management District	(Pages 138 and 139) Clarify that MY 2010 or newer haul trucks will be used for the duration of the project and that use of those trucks will guarantee the best available emission controls for NOx and PM emissions, not Tier 3 emissions.	Clarification that MY 2010 or newer haul trucks will be used to guarantee best emissions controls has been added to Section 4.2.7.

34.	Sac Metro AQ Management District	(Page 138) To ensure there won't be confusion at the time of construction, please add that the NOx Mitigation Fee applies to all emissions from the project: on-road (on- and off-site), off-road, portable, marine and stationary equipment and vehicles.	Application to all emissions from the project has been added to Section 4.2.7.
35.	Sac Metro AQ Management District	(Page 225) In the discussion of Unavoidable Adverse Effects there is a statement that NOx levels are reduced to zero. NOx levels are being reduced to 85 pounds/day, the SMAQMD's threshold of significance, not zero.	This statement has been corrected in Section 4.2.7.
36.	Sac Metro AQ Management District	(Pages 229, 250 and ES-13) There is not a climate change SIP as noted in Tables 51, 54 and ES-1).	SIP references have been removed from climate change.
37.	Sac Metro AQ Management District	(Page 244) Does the Army Corps plan to coordinate construction timing with other agencies to reduce cumulative emissions to less than significant, or is a significant and unavoidable cumulative impact being determined?	The Corps is not able to coordinate construction timing with other agencies to reduce cumulative emissions. This statement has been removed.
38.	Rennie James	I would like this project to increase to the maximum the greatest capacity of the reservoir to contain water. I believe that silting of the reservoir over the decades has reduced the stated capacity. To assist in this effort I would like to see all material in the water side of the dam and associated dikes that is disturbed be removed from that wet side and deposited on the dry side of the projected final high water shore line and not within any wetland or potential flood zone. Simply put if you have to move material within the projected final high water elevation then that material must be deposited outside that area. You may accomplish that by: a. depositing the material to bulk up the dikes and Morman Island Auxiliary Dam (MIAD) on the dry side. b. allow large area materials resource companies to bid on the rock and fines and allow them to transport it off site. c. when material suppliers bring concrete building materials require them to transport out excess site materials. d. utilize the material to construct an auxiliary parking area for overflow vehicles at Folsom Point where the MIAD deposit site is currently growing and plant oaks around the site.	Manipulated water levels within the reservoir are outside the scope of this EIS/EIR, but will be addressed by the NEPA/CEQA process for the Folsom Dam Raise Project and Folsom Dam Water Control Manual update. The site(s) used for disposal of excavated material will be decided by the contractor to provide for contract flexibility. Two terrestrial sites will be available for disposal of excavated material; these sites are Dike 8 and MIAD as delineated in the SEIS/EIR. Dike 8 will serve as permanent storage, and temporary disposal material at MIAD will be available for transport off-site. Materials transport will be a contractor decision – agencies may request rock and fines material for other projects. Overflow parking at Folsom Point is outside the scope of this project and is under the jurisdiction of the USBR, but this recommendation will be forwarded to USBR. Oaks that are removed will be replaced per USFWS recommendations.
39.	Rennie James	Mitigation of trees and bushes should be on site rather than Mississippi Bar when possible. Oaks and Elderberry can be replanted on site to restore habitation for wildlife.	Construction would be implemented in a manner that minimizes disturbance. Native trees, shrubs, and aquatic vegetation will be avoided to the greatest extent feasible. Compensatory mitigation would be

			completed onsite when possible. Off-site mitigation would be necessary to compensate for impacts to wetlands and open water habitat. The USBR would conduct additional native vegetative plantings after project completion outside the scope of the Corps project work.
40.	Rennie James	The dry side of Dike 8 between the dike and church could be used to deposit material and planted with trees to improve the view from the church and new homes facing the dry side of the dike. It is a relatively small space devoid of significant vegetation other than invasive plants. The trees could be resourced from the City of Folsom as an improvement project.	Dike 8 is proposed as a site for disposal of up to 720, 000 cy of excavated material, however, USBR has withdrawn the dry side from consideration for disposal due to dike safety concerns. Native trees and shrubs will be protected and left in place wherever possible. The USBR will conduct native vegetation plantings after project completion. Recommendations for planting the unused side of Dike 8 will be provided to the USBR.
41.	Rennie James	I prefer alternative 3 as it will require less concrete to be installed than alternative 2….	Preference for Alternative 3 is noted. The Corps has chosen Alternative 2 as the preferred alternative due to reduced construction risk and time savings in the schedule. This decision was made in the interest of public safety to ensure the fastest completion of the spillway.
42.	Rennie James	Store the excess material in the area underneath the new bridge and or on Folsom Prison property above any potential flood level and the prison may be able to use the area for future activities or construction projects.	The prison has been offered excavation material, but has not requested material at this time.
43.	Rennie James	I would like to see emergency response equipment and materials on scene for immediate use during a spill of contaminates, be it diesel, gasoline…	The contractor will be required to provide a detailed contaminants containment plan and exhibit emergency response and spill containment equipment and materials before construction begins. Water quality thresholds would be required of the Corps by the Central Valley Regional Water Quality Control Board to protect drinking water; these standards will be strictly complied with during the project.
44.	Folsom Church of Christ, Pastor	Personal communication – September 12 and 13, 2012. Concern was expressed by representatives of the Folsom Church of Christ primarily regarding an existing drainage issue at the southern base of Dike 8 and potential amplification of the drainage issues resulting from	Engineering expertise was offered for a meeting to address drainage issues. However, after the draft EIS/EIR was issued, USBR removed the southern

	Posey; Steve Dickey	construction material disposal on the southern side of Dike 8.	half of Dike 8 for consideration, which appears to alleviate drainage concerns for the church; the remaining drainage area is directed down to the lake on the north side of the dike, away from Folsom Church of Christ.

Section 3 Comments Letters on Draft EIS/EIR

LeFevre, Jamie M SPK

From: Stewart, Chelsea D [CStewart@usbr.gov]
Sent: Monday, September 10, 2012 4:49 PM
To: Sandburg, Nancy H SPK; LeFevre, Jamie M SPK
Subject: Re: Comments on Folsom Dam Modification Project Draft SEIS/EIR

Hi Jamie/Nancy,

My comments are as follows:

-Reclamation suggests installing signage at the boat launches explaining the purpose of the barrier around the blast site and the effects that underwater blasting can have on people if they are in the water and in range of the blast.

-Concerning disposal of material in the reservoir: If fine dredge material is placed in the reservoir will it be close enough that it will mobilize when the spillway is operated?

-2.4.6, page 27: Reclamation refers to the work at MIAD as the Morman Island Auxiliary Dam Modification Project.

-4.7.4, page 189: Impacts to recreation (exclusion of public access) should be assessed should be analyzed using the average surface area during peak use periods.

-Figure 17: Placement of the safety boundary looks like it would isolate the Folsom Point boat launch at lower levels. Is this the case and if so how will these impacts be mitigated?

Thank you for the opportunity to comment,

Chelsea Stewart

Natural Resource Specialist

Bureau of Reclamation

(916)989-7155

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Pacific Southwest Region
333 Bush Street, Suite 515
San Francisco, CA 94104

IN REPLY REFER TO:
(ER 12/524)

Filed Electronically

05 September 2012

U.S. Army Corps of Engineers
Sacramento District
Attn: Mr. Todd Plain
Auxiliary Spillway Project
1325 J Street, Room 1513
Sacramento, CA 95814

Subject: Review of the Draft Supplemental Environmental Impact Statement (DSEIS) for the Folsom Dam Modification Project Approach Channel, Placer and El Dorado Counties, CA

Dear Mr. Plain:

The Department of the Interior has received and reviewed the subject document and has no comments to offer.

Thank you for the opportunity to review this project.

Sincerely,

Patricia Sanderson Port

Patricia Sanderson Port
Regional Environmental Officer

cc:
Director, OEPC
Loretta Sutton, OEPC Staff Contact

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

SEP 10 2012

Alicia E. Kirchner
Chief, Planning Division
U.S. Army Corps of Engineers
1325 J Street
Sacramento, CA 95814

Subject: Supplemental Draft Environmental Impact Statement for the Folsom Dam Modification Project Approach Channel (CEQ# 20120239)

Dear Ms. Kirchner:

The U.S. Environmental Protection Agency (EPA) has reviewed the Supplemental Draft Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act.

The Supplemental Draft EIS was prepared by the Corps to augment the 2007 Record of Decision (ROD) for the Folsom Dam Safety and Flood Damage Reduction Project. EPA has reviewed this document and rated it Environmental Concerns- Insufficient Information (EC-2) (see enclosed "*Summary of Rating Definitions*"). EPA appreciates the additional information regarding the construction of the auxiliary spillway approach channel that was evaluated programmatically in the previous EIS. We continue to urge implementation of aggressive mitigation measures to reduce project-related emissions to the maximum extent feasible.

We commend the Army Corps of Engineers' commitment to use the cleanest on–road vehicles available and the most recent pollution control equipment for all off-road and marine equipment, use of electrical power for all stationary equipment, reduction of haulage miles, and scheduling changes to minimize the overlap of emission producing activities. These emission control measures will be essential to meet Federal General Conformity *de minimis* thresholds and reduce air quality impacts to the greatest extent possible. We recommend that the Supplemental Final EIS and Record of Decision (ROD) include a clear commitment to these project refinements and the list of control measures with their emission reduction data.

Additionally, Table 30 - "Comparison of Mitigated Alternative 2 and Alternative 3 Total Emissions" is unclear. This table is labeled as being in tons/year, but it is also labeled as being "total emissions." The project is anticipated to be constructed over five years. EPA urges the Corps to explain this discrepancy.

Please note that, starting October 1, 2012, EPA Headquarters will not accept paper copies or CDs of EISs for official filing purposes. Submissions on or after October 1, 2012 must be made through EPA's new electronic EIS submittal tool: *e-NEPA*. To begin using *e-NEPA*, you must first register with EPA's electronic reporting site - https://cdx.epa.gov/epa_home.asp. Electronic filing with EPA Headquarters does not change the requirement to submit a hard copy to the EPA Region 9 Office for review.

We appreciate the opportunity to review this Supplemental Draft EIS. Please send a copy of the Supplemental Final EIS to the above address (mail code: CED-2) when it becomes available. If you have any questions, please contact me at 415-972-3521, or contact Stephanie Skophammer, the lead reviewer for this project, at 415-972-3098 or Skophammer.stephanie@epa.gov.

Sincerely,

Connell Dunning

For Kathleen Martyn Goforth, Manager
Environmental Review Office
Communities and Ecosystems Division

Enclosure: Summary of Rating Definitions

SUMMARY OF EPA RATING DEFINITIONS*

This rating system was developed as a means to summarize the U.S. Environmental Protection Agency's (EPA) level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the Environmental Impact Statement (EIS).

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

ADEQUACY OF THE IMPACT STATEMENT

"Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, Policy and Procedures for the Review of Federal Actions Impacting the Environment.

From:	Micheaels, Jim
To:	Sandburg, Nancy H SPK
Cc:	Green, Matt; Preston, Rich
Subject:	Comments regarding Approach Channel DEIR/DEIS
Date:	Friday, August 31, 2012 5:03:16 PM

Nancy –

Please consider this note the comments of the Gold Fields District of California State Parks regarding the Draft Supplemental EIR/EIS for the Folsom Dam Modification Approach Channel. Gold Fields District staff appreciates the recent meetings and information the Corps has provided regarding the project, including the provisions for underwater blasting. We also appreciate some of the changes the Corps is making to minimize the impacts of underwater blasting on recreation use and the public. The current version of the DEIR/DEIS does not fully address all of the issues regarding underwater blasting and public safety and we understand the Corps will be making changes to the final document to address some of these issues. Here are some specific comments based on our current understanding of the project and safety provisions the Corps is putting in place.

-DPR is unsure if the Draft EIR/EIS fully describes and addresses the potential human health and public safety issues regarding the underwater blasting and aquatic recreation, we believe the final document should disclose and address these issues.

-It is our understanding that the report produced for the Corps on the underwater blasting – "Fish Protection Against Waterborne Pressures" by Ben C. Gerwick, Inc recommended a bubble curtain to mitigate potential impacts from blasting. We are interested in better understanding why this measure will not be required.

-It appears the Corps may be leaving some of the decisions and mitigation regarding underwater blasting for the contractor to determine. As an example, instead of requiring a bubble curtain to minimize the potential effects of underwater blasting on humans, the Corps is leaving it up to the contractor to assess if a curtain will be needed. The Corps is specifying a certain pressure at a certain distance from the blasting and will be monitoring the blasting and addressing with the contractor when blasts exceed the standard. This after-the-fact monitoring doesn't absolutely ensure that there will be no safety concern for aquatic recreation. DPR would like to see the Corps define a maximum pressure or intensity at the blast location, or some other means, to ensure the required safety exclusion zone will be effective.

-It is our understanding that the test blasting and the production blasting program will not require closure of any Folsom Lake SRA recreation facility. If the project did require closure of any recreation facility, such as Folsom Point, there would be impacts to visitor use and DPR revenues.

-We would like to confirm that the contractor will be required to install a continuous log boom to exclude boats from the blasting safety zone in Folsom Reservoir and will have adequate warning signs/buoys and patrol boats in the area. It is our understanding that the Corps will be limiting blasting intensity so that this safety exclusion zone can be sized so it will not impact public access to Folsom Lake at Folsom Point or Beals Point and that the public can be effectively excluded from the safety zone area by the contractor or Corps.

-DPR's interests are ensuring public safety, minimizing the impact on recreation use and public disclosure of potential effects from underwater blasting on human health.

Other items that we have mentioned before in past comment letters on the Folsom Dam Modification Project which remain interests and concerns are:

-After all construction activities, DPR would like to see a portion of the haul road from the spillway gate construction site to Folsom Point made available for development of a recreation trail (including potentially a paved trail) from Dike 7 to Folsom Point and across the top of MIAD to the intersection of Green Valley Rd and Sophia Parkway.

-After all construction activities, DPR would like to see the area around Dike 7 – which is a spoils deposition site - made available for recreation facilities, including a potential future trailhead facility and parking area at Dike 7.

Thank you.

Jim Micheaels, Senior Park & Recreation Specialist

Gold Fields District

7806 Folsom-Auburn Road

Folsom, CA 95630

(916) 988-0513

(916) 988-9062 fax

20 August 2012

David Martasian
Central Valley Flood Protection Board
3310 El Camino Avenue, Room 151
Sacramento, CA 95821

CERTIFIED MAIL
7011 2970 0003 8939 1736

COMMENTS TO THE DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT, FOLSOM DAM MODIFICATION PROJECT, SCH NO. 2012072039, SACRAMENTO COUNTY

Pursuant to the State Clearinghouse's 20 July 2012 request, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) has reviewed the *Draft Supplemental Environmental Impact Statement/Environmental Impact Report* for the Folsom Dam Modification Project, located in Sacramento County.

Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore our comments will address concerns surrounding those issues.

Construction Storm Water General Permit

Dischargers whose project disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction Activities (Construction General Permit), Construction General Permit Order No. 2009-009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP).

For more information on the Construction General Permit, visit the State Water Resources Control Board website at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml.

Phase I and II Municipal Separate Storm Sewer System (MS4) Permits[1]
The Phase I and II MS4 permits require the Permittees reduce pollutants and runoff flows from new development and redevelopment using Best Management Practices (BMPs) to the maximum extent practicable (MEP). MS4 Permittees have their own development standards, also known as Low Impact Development (LID)/post-construction standards that include a hydromodification component. The MS4 permits also require specific design concepts for LID/post-construction BMPs in the early stages of a project during the entitlement and CEQA process and the development plan review process.

For more information on which Phase I MS4 Permit this project applies to, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/municipal_permits/.

Industrial Storm Water General Permit
Storm water discharges associated with industrial sites must comply with the regulations contained in the Industrial Storm Water General Permit Order No. 97-03-DWQ.

For more information on the Industrial Storm Water General Permit, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/industrial_general_permits/index.shtml.

Clean Water Act Section 404 Permit
If the project will involve the discharge of dredged or fill material in navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed from the United States Army Corps of Engineers (USACOE). If a Section 404 permit is required by the USACOE, the Central Valley Water Board will review the permit application to ensure that discharge will not violate water quality standards. If the project requires surface water drainage realignment, the applicant is advised to contact the Department of Fish and Game for information on Streambed Alteration Permit requirements.

If you have any questions regarding the Clean Water Act Section 404 permits, please contact the Regulatory Division of the Sacramento District of USACOE at (916) 557-5250.

Clean Water Act Section 401 Permit – Water Quality Certification
If an USACOE permit, or any other federal permit, is required for this project due to the disturbance of waters of the United States (such as streams and wetlands), then a Water Quality Certification must be obtained from the Central Valley Water Board prior to initiation of project activities. There are no waivers for 401 Water Quality Certifications.

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[1] Municipal Permits = The Phase I Municipal Separate Storm Water System (MS4) Permit covers medium sized Municipalities (serving between 100,000 and 250,000 people) and large sized municipalities (serving over 250,000 people). The Phase II MS4 provides coverage for small municipalities, including non-traditional Small MS4s, which include military bases, public campuses, prisons and hospitals.

Waste Discharge Requirements
If USACOE determines that only non-jurisdictional waters of the State (i.e., "non-federal" waters of the State) are present in the proposed project area, the proposed project will require a Waste Discharge Requirement (WDR) permit to be issued by Central Valley Water Board. Under the California Porter-Cologne Water Quality Control Act, discharges to all waters of the State, including all wetlands and other waters of the State including, but not limited to, isolated wetlands, are subject to State regulation.

For more information on the Water Quality Certification and WDR processes, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/help/business_help/permit2.shtml.

If you have questions regarding these comments, please contact me at (916) 464-4684 or tcleak@waterboards.ca.gov.

Trevor Cleak

Trevor Cleak
Environmental Scientist

cc: State Clearinghouse Unit, Governor's Office of Planning and Research, Sacramento

SACRAMENTO METROPOLITAN
AIR QUALITY
MANAGEMENT DISTRICT

Larry Greene
AIR POLLUTION CONTROL OFFICER

August 29, 2012

SENT VIA E-MAIL ONLY

Mr. Todd Plain
Public Affairs Specialist
U.S. Army Corps of Engineers, Sacramento District
1325 J Street
Sacramento, CA 95814

Folsom Dam Modification Project, Approach Channel Draft Supplemental EIS/EIR (SAC200500806I)

Dear Mr. Plain:

Thank you for providing the Draft Supplemental Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) for the Folsom Dam Modification Project, Approach Channel to the Sacramento Metropolitan Air Quality Management District (SMAQMD) for review. Because the Army Corps coordinated extensively with SMAQMD on the air quality analysis and mitigation associated with the project, minor comments on the EIS/EIR are being provided.

1. (Page 53) Clarify in the Attainment Status section that General Conformity thresholds are for ozone "precursors."
2. (Page 54) In the Attainment Status section, remove "threshold" in reference to the 1-hour ozone NAAQS.
3. (Page 54) The status of SIP planning regarding ozone needs to include both the 1994 1-hour ozone and 1997 8-hour ozone SIPs. Details may be obtained from the following website: http://www.airquality.org/plans/federal/ozone/index.shtml.
4. (Page 54) The status of SIP planning regarding PM2.5 needs to be updated based on the request to USEPA Region 9 to find the region in attainment of the PM2.5 NAAQS.
   (5/9/12 CARB letter, website reference:
   http://www.airquality.org/plans/federal/pm/PM2.5/SacRegCleanDataTransmitalAndEnclosure-signed.pdf)
   SMAQMD is preparing a redesignation request and maintenance plan for submission in early 2013.
5. (Page 123) In the Basis of Significance section, two clarifications are needed:
   a. Change ROG from 50 tons/year to 25 tons/year to reflect the General Conformity requirement, which is consistent with Table 18.
   b. Clarify that for PM10 a significant impact may occur if the project emits PM10 at a level that substantially contributes to an existing or projected violation of the PM10 California Ambient Air Quality Standards (CAAQS), which is 5% of the CAAQS. SMAQMD does not meet the PM10 CAAQS, therefore the substantial contribution threshold is used, which is much lower than the actual CAAQS listed. (SMAQMD Threshold Table, website reference: http://www.airquality.org/ceqa/cequguideupdate/Ch2TableThresholds.pdf)
6. (Page 124) The SMAQMD CEQA Thresholds section states the "SMAQMD has not designated construction thresholds for PM2.5, ROG, CO or SO2." The SMAQMD's Threshold Table (referenced in comment 5.b.

above) indicates that the CAAQS are concentration thresholds for both construction and operational emissions.

7. (Page 125) Similar to comment 5.b. above, Table 19 needs to be updated to recognize the PM10 threshold as a substantial contribution to an existing or projected violation of the ambient air quality standards listed.
8. (Page 125) Table 19 needs to be corrected to show the concentrations and units either µg/m3 or ppm as noted in the SMAQMD's Thresholds of Significance Table: http://www.airquality.org/ceqa/cequguideupdate/Ch2TableThresholds.pdf.
9. (Pages 124, 129 (table 24) and 133 (table 29)) The mitigation fee rate noted in various sections of the document is $16,640 per ton of NOX. As of July 1, 2012 that fee rate changed to $17,080.
10. (Page 125) Provide justification for selecting 3 pounds/hour as the significance threshold for diesel particulate matter emissions.
11. (Page 137) Clarify that Interim Tier 4 and/or Final Tier 4 off-road equipment will be used beginning in 2015.
12. (Page 137) Add language to the mitigation that in addition to using Tier 3 and Tier 4 off-road equipment, contractors must report their equipment specifications to the SMAQMD and the Army Corps to ensure the mitigation is being implemented.
13. (Pages 138 and 139) Clarify that MY 2010 or newer haul trucks will be used for the duration of the project and that use of those trucks will guarantee the best available emission controls for NOx and PM emissions, not Tier 3 emissions.
14. (Page 138) To ensure there won't be confusion at the time of construction, please add that the NOx Mitigation Fee applies to all emissions from the project: on-road (on- and off-site), off-road, portable, marine and stationary equipment and vehicles.
15. (Page 225) In the discussion of Unavoidable Adverse Effects there is a statement that NOx levels are reduced to zero. NOx levels are being reduced to 85 pounds/day, the SMAQMD's threshold of significance, not zero.
16. (Pages 229, 250 and ES-13) There is not a climate change SIP as noted in Tables 51, 54 and ES-1).
17. (Page 244) Does the Army Corps plan to coordinate construction timing with other agencies to reduce cumulative emissions to less than significant, or is a significant and unavoidable cumulative impact being determined?

Please contact me at 916-874-4881 or khuss@airquality.org if you have any questions regarding these comments.

Sincerely,

Karen Huss

Karen Huss
Associate Air Quality Planner/Analyst
Land Use and Mobile Sources Division

Cc: Larry Robinson, SMAQMD
Charles Anderson, SMAQMD
Nancy Sandburg, U.S. Army Corps of Engineers

From: Sandburg, Nancy H SPK
Sent: Tuesday, September 04, 2012 8:31 AM
To: Sandburg, Nancy H SPK
Subject: REnnie James comments (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Nancy,

Thank you for assisting me with the proper web address. However, I had difficulty getting this document to complete the process so I am sending it to you in hopes you will forward it to the proper persons.

Thank you again,

Rennie James

125 Landrum Circle

Folsom, CA 95630

From: spk-pao@usace.army.mil
To: CESPK-PD@usace.army.mil, rennie1@comcast.net
Sent: Tuesday, August 28, 2012 6:13:55 PM
Subject: Sacramento District Contact Form: Folsom Dam Modification Approach Channel SEIS/EIR

This message was sent from the Sacramento District website.

Message From: Rennie James
Email: rennie1@comcast.net
Response requested: Yes

Message:

Dear Madam or Sir,
I participated in a public event in Folsom on 23August 2012 to review the project and it's plans and projected impacts on the area. I have a few preferences that I as a neighbor to the project would like you to consider.
1. I would like this project to increase to the maximum the greatest capacity of the reservoir to contain water, I believe that silting of the reservoir over the decadades has reduced the stated capacity. To assist in this effort I would like to see all material in the wet side of the dam and associated dikes that is disturbed be removed from that wet side and deposited on the dry side of the projected final high water shore line and not within any wetland or potential flood zone. Simply put if you have to move material within the projected final high water elevation then that materal must be deposited outside that area.

You may accomplish that by: a. depositing the material to bulk up the dikes and Morman Island Auxilary Dam (MIAD)on the dry side. b. allow large area materials resouce companies to bid on the rock and fines and allow them to transport it off site. c. when material suppliers bring concrete building materials require them to transport out excess site materials. d. utilize the material to construct an auxilary parking area for overflow vehicles at Folsom Point where the MIAD deposit site is currently growing and plant oaks around the site.
2. Mitigation of trees and bushes should be on site rather than Mississippi Bar when possible. Oaks and Elderberry can be replanted on site to restore habitation for wildlife.
3. The dry side of Dike 8 between the dike and church could be used to deposit material and planted with trees to improve the view from the church and new homes facing the dry side of the dike. It is a relatively small spave devoid of significant vegetation other than invasive plants. The trees could be resourced from the City of Folsom as an improvement project.
4. I prefer alternative 3 as it will require less concrete to be installed than alternative 2. Alternative 2 requires concrete be brought in, errected as a barrier then dismanteled and removed. Alternative 3 allows the use of dredged material to be used for the coffer dam and then remove it from the wet side of the projected high water mark and placed outside any potential water storage area.
5. Store the excess material in the area underneath the new bridge and or on Folsom Prison property above any potential flood level and the prison may be able to use the area for future activities or construction projects.
6. There are at least two manufacturing companies that have moved to Folsom specifically for water quality, Kikkoman and Gekkeikan Sake. I would like to see emergency response equipment and materials on scene for immediate use during a spill of contaminates, be it diesel, gasoline or some other material I am not familiar with. Simply having a plan without onsite material is inadequate in my estimation.
In summation I would like to thank you for providing me with the opportunity to have input for this project. I have followed it for my grandchildren more than anything else. I have followed the project closely and appreciate the work so far completed and the care for the community that managers of this JPA has shown.
Thank you very sincerely, Rennie James 125 Landrum Circle, Folsom, CA 95630

Classification: UNCLASSIFIED
Caveats: NONE

Nancy H. Sandburg
Biological Sciences Environmental Manager
Planning, Environmental Analysis Section
U.S. Army Corps of Engineers
1325 J Street
Sacramento, CA 95814
(916)-557-7134; nancy.h.sandburg@usace.army.mil

Section 4 Comments Letters on NOI/NOP

U.S. Department of Homeland Security
FEMA Region IX
1111 Broadway, Suite 1200
Oakland, CA. 94607-4052

FEMA

RECEIVED
OCT 19 2011
BY:

October 11, 2011

David Martasian
Central Valley Flood Protection Board
3310 El Camino Avenue, Room 147
Sacramento, California 95821

Dear Mr. Martasian:

This is in response to your request for comments on the Notice of Preparation (Revised) of Draft Supplemental EIS/EIR and Notice of Public Scoping Meeting regarding the Folsom Dam Safety/Flood Damage Reduction – Auxiliary Spillway Approach Channel Project.

Please review the current effective Flood Insurance Rate Maps (FIRMs) for the City of Folsom (Community Number 060263), Maps dated September 30, 1992; Sacramento County (Community Number 060262), Maps revised December 8, 2008; El Dorado County (Community Number 060040), Maps revised September 26, 2008; and Placer County (Community Number 060239), Maps dated November 21, 2001. Please note that the above-referenced communities are participants in the National Flood Insurance Program (NFIP). The minimum, basic NFIP floodplain management building requirements are described in Vol. 44 Code of Federal Regulations (44 CFR), Sections 59 through 65.

A summary of these NFIP floodplain management building requirements are as follows:

- All buildings constructed within a riverine floodplain, (i.e., Flood Zones A, AO, AH, AE, and A1 through A30 as delineated on the FIRM), must be elevated so that the lowest floor is at or above the Base Flood Elevation level in accordance with the effective Flood Insurance Rate Map.

- If the area of construction is located within a Regulatory Floodway as delineated on the FIRM, any ***development*** must not increase base flood elevation levels. **The term *development* means any man-made change to improved or unimproved real estate, including but not limited to buildings, other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, and storage of equipment or materials.** A hydrologic and hydraulic analysis must be performed *prior* to the start of development, and must demonstrate that the development would not cause any rise in base flood levels. No rise is permitted within regulatory floodways.

- All buildings constructed within a coastal high hazard area, (any of the "V" Flood Zones as delineated on the FIRM), must be elevated on pilings and columns, so that the lowest horizontal structural member, (excluding the pilings and columns), is elevated to or above the base flood elevation level. In addition, the posts and pilings foundation and the structure attached thereto, is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components.

- Upon completion of any development that changes existing Special Flood Hazard Areas, the NFIP directs all participating communities to submit the appropriate hydrologic and hydraulic data to FEMA for a FIRM revision. In accordance with 44 CFR, Section 65.3, as soon as practicable, but not later than six months after such data becomes available, a community shall notify FEMA of the changes by submitting technical data for a flood map revision. To obtain copies of FEMA's Flood Map Revision Application Packages, please refer to the FEMA website at http://www.fema.gov/business/nfip/forms.shtm.

Please Note:

Many NFIP participating communities have adopted floodplain management building requirements which are more restrictive than the minimum federal standards described in 44 CFR. Please contact the local community's floodplain manager for more information on local floodplain management building requirements. The City of Folsom floodplain manager can be reached by calling David Miller, Community Development Director, at (916) 355-7224. The Sacramento County floodplain manager can be reached by calling George Booth, Senior Civil Engineer, at (916) 874-6484. The El Dorado County floodplain manager can be reached by calling Roger Trout at (530) 621-5775. The Placer County floodplain manager can be reached by calling Ken Grehm, Floodplain Administrator, at (530) 745-7588.

If you have any questions or concerns, please do not hesitate to call Cynthia McKenzie at (510) 627-7190 and/or Michael Hornick at (510) 627-7260 of the Mitigation staff.

Sincerely,

Gregor Blackburn, CFM, Branch Chief
Floodplain Management and Insurance Branch

cc:
David Miller, Community Development Director, City of Folsom
George Booth, Senior Civil Engineer, County of Sacramento, Department of Water Resources
Roger Trout, El Dorado County
Ken Grehm, Floodplain Administrator, Placer County
Ray Lee, WREA, State of California, Department of Water Resources, North Central Region Office
Cynthia McKenzie, Senior Floodplanner, CFM, DHS/FEMA Region IX
Michael Hornick, Floodplanner, CFM, DHS/FEMA Region IX
Alessandro Amaglio, Environmental Officer, DHS/FEMA Region IX

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814-4700

OCT 17 2011

RECEIVED
OCT 20 2011
BY: CR

Dave Martasian
Central Valley Flood Protection Board
Room 147
3310 El Camino Avenue
Sacramento, California 95821

Dear Mr. Martasian:

I am writing in response to the "Notice of Preparation (Revised) of Draft Supplemental EIS/EIR" for the "Folsom Dam Safety/Flood Damage Reduction – Auxiliary Spillway Approach Channel Project." NOAA's National Marine Fisheries Service (NMFS) is responsible for the management and protection of anadromous fish resources and their habitats.

In the American River, the anadromous species listed under the Federal Endangered Species Act include the threatened California Central Valley steelhead (*Oncorhynchus mykiss)* distinct population segment (DPS), and the threatened Southern DPS of North American green sturgeon (*Acipenser medirostris*). In addition, NMFS is responsible for reviewing projects that may affect the designated critical habitats for these species (steelhead and North American green sturgeon). NMFS is also responsible for Chinook salmon (*O. tshawytscha*), and for reviewing actions for potential adverse effects to the Essential Fish Habitat for Pacific salmon (*Oncorhynchus* spp.) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act. NMFS responsibilities include consulting in accordance with the provisions of the Fish and Wildlife Coordination Act of 1934, as amended.

NMFS requests the Central Valley Flood Protection Board address any potential effects of the proposed project on anadromous species in the supplemental environmental impact statement and environmental impact report. Specifically, we request the following potential impacts be addressed:

(1) Identify changes in existing operations and how those changes will affect the Folsom Reservoir cold water pool, and water temperatures in the lower American River;
(2) identify potential effects downstream to the San Francisco Bay;
(3) identify how the proposed project will affect fish passage of anadromous fish upstream of Folsom Dam, including collection of downstream migrating fish,
(4) identify potential effects on flows and ramping in the American River; and
(5) Identify potential water quality effects.

Because flood operations potentially result in take of federally listed species, NMFS also recommends that U.S. Army Corps of Engineers include this project in a request for consultation under the Federal Endangered Species Act for the California Central Valley Flood Control Project.

If you have any questions concerning this project, or require additional information, please contact Gary Sprague at (916) 930-3615, or via email at: Gary.Sprague@noaa.gov. Thank you for the opportunity to provide comments on the scoping for this project.

Sincerely,

Maria Rea

Maria Rea
Supervisor, Central Valley Office

cc: Copy to File ARN: 151422SWR2004SA9097
NMFS-PRD, Long Beach, CA

State of California • Natural Resources Agency

Edmund G. Brown Jr., *Governor*

DEPARTMENT OF PARKS AND RECREATION

Ruth Coleman, *Director*

Gold Fields District
7806 Folsom Auburn Road
Folsom, CA 95630

RECEIVED
NOV 01 2011
BY: CB

October 26, 2011

David Martasian
Central Valley Flood Protection Board
3310 El Camino Avenue, Room 147
Sacramento, CA 95821

Dear Mr. Martasian,

This letter is to express the comments and concerns of the Gold Fields District of California State Parks in response to the Notice of Preparation regarding the Auxiliary Spillway Approach Channel Project (SCH# 2006022091). The Gold Fields District of California State Parks manages recreation and public use at Folsom Lake State Recreation Area through an agreement with the U.S. Bureau of Reclamation. There are approximately 1.5 million visitors to Folsom Lake SRA annually. The proposed approach channel Project would occur within portions of the land and waters within Folsom Lake SRA. State Parks staff have provided preliminary input to U.S. Corps of Engineers staff who are working on this project. State Parks has previously commented on other aspects of the Auxiliary Spillway Joint Federal Project, including a January 26, 2007 letter to the U.S. Bureau of Reclamation regarding the Folsom Dam Safety and Flood Damage Reduction Draft EIR/EIS.

One of State Parks' key concerns regarding the Approach Channel Project is the potential impacts to recreation and public access at Folsom Point or elsewhere within Folsom Lake SRA. This would include closure of Folsom Point for construction staging, spoils transfer or project elements. The recreation facilities at Folsom Point include a boat ramp and 125 vehicle parking lot, and picnic area. As noted in our 2007 letter, approximately 112,000 visitors recreate at Folsom Point annually. Closure of the Folsom Point or other recreation areas for the Approach Channel, either temporary or longer term, would not only impact visitation but also user fee revenues collected.

In the 2007 Record of Decision for the Folsom Dam Safety and Flood Damage Reduction EIS, Reclamation indicated the public would have near continuous access to the main recreation facilities at Folsom Lake throughout the construction period. State Parks hopes this commitment remains true for the Approach Channel phase of the project. We understand that the U.S. Corps of Engineers is designing a temporary transload facility in the vicinity of Dike 7 which would be used to transfer spoil material from barges to trucks and transport the material via the existing haul road to the Mormon Island Auxiliary Dam (MIAD) disposal site. This approach would avoid impacts to public access and recreation at Folsom Point. The Folsom Point overpass of the haul road to the MIAD disposal site was specifically constructed to maintain public access to Folsom Point.

State Parks has a general concern about in-water blasting and excavation activities and the safety of recreational users on Folsom Lake. Recreational use on Folsom Lake includes boating, water skiing and wakeboarding, fishing, canoeing, kayaking, windsurfing and swimming. We presume the lead agencies will take appropriate actions, including an adequate exclusion zone around the work area to avoid any safety issues with the recreating public.

State Parks also has a general concern about potential water quality impacts in Folsom Lake and downstream from the in-water excavation activities. Again, we presume appropriate measures will be taken to contain turbidity and prevent water quality impacts down stream in Lake Natoma.

State Parks has previously commented (in our 1/26/07 letter to Reclamation) on the desire to see that the spillway haul road, from Dike 7 to Folsom Point, is able to be utilized as the alignment for a paved bike path following the Dam Safety and Flood Protection construction activities. State Parks does not expect that the Dam Safety and Flood Protection Project would construct the actual trail, but that the haul road could be restored to or left in a condition that would make it suitable for a future paved trail. Development of a paved bike path route between Dike 7 and Folsom Point is included in the guidelines for the General Plan/Resource Management Plan for Folsom Lake SRA, completed in 2009. A paved trail alignment in this area is also acknowledged in the City of Folsom Bikeway Master Plan. A paved trail between Dike 7 and Folsom Point would connect to the paved bike path on the new Folsom Lake Crossing Bridge and the City of Folsom proposed bicycle overcrossing of the Folsom Lake Crossing Road. The trail could also connect across the top of MIAD to the trailhead and parking area at Mormon Island Cove (Sophia Parkway).

State Parks also has an interest in the final disposition of the areas where spoils are being deposited at Dike 7. The Dike 7 area has the potential to be developed as a trailhead access point and/or potentially other recreation facilities in the future. While the construction of the haul road and the deposition area at Dike 7 are not necessarily part of the Approach Channel Project, they are part of the larger Dam Safety and Flood Protection Project and may be utilized for the construction of the Approach Channel.

Thank you for considering these comments. If you have questions regarding this letter please contact District Planner Jim Micheaels at (916) 988-0513.

Sincerely,

Scott Nakaji
Gold Fields District Superintendent

CC Mike Finnegan, U.S. Bureau of Reclamation
Nancy Sandburg, U.S. Army Corps of Engineers

U.S. Department of Homeland Security
United States Coast Guard

Commander
Eleventh District

U.S. Coast Guard Island
Building 50-2
Alameda, CA 94501-5100
Staff Symbol: (dpw)
Phone: (510) 437-3514
Fax: (510) 437-5836

16591
American River
East of Folsom Dam
November 2, 2011

Central Valley Flood Protection Board
Attn: Mr. Jay S. Punia
3310 El Camino Ave., Rm 151
Sacramento, CA 95821

Dear Mr. Punia:

We have completed our review of the Central Valley Flood Protection Board Notice of Preparation of Draft Supplemental EIS/EIR dated October 3, 2011, for the Folsom Dam Safety/ Flood Damage Reduction project, East of Folsom Dam, Folsom Lake, American River, City of Folsom, Counties of Sacramento/Folsom/El Dorado, CA.

It appears the project involves no bridges or bridge related projects across navigable waters of the United States, under the jurisdiction of the Coast Guard. Therefore, The General Bridge Act of 1946 does not apply and the Coast Guard will not exercise jurisdiction for bridge permitting purposes.

We appreciate the opportunity to comment on this project.

Sincerely,

DAVID H. SULOUFF
Chief, Bridge Section
Eleventh Coast Guard District
By direction of the District Commander

Copy: Corps of Engineers

SRCSD

Wastewater Management

Main Office

10060 Goethe Road

Sacramento, CA 95827-3553

Tele: [916] 876-6000

Fax: [916] 876-6160

Sacramento Regional Wastewater

Treatment Plant

8521 Laguna Station Road

Elk Grove, CA 95758-9550

Tele: [916] 875-9000

Fax: [916] 875-9068

RECEIVED
NOV 15 2011
BY: CS

November 8, 2011

David Martasian
Central Valley Flood Protection Board
3310 El Camino Ave, Room 147
Sacramento CA 95821

Subject: The Folsom Dam Safety/Flood Damage Reduction – Auxiliary Spillway Approach Channel Project

Dear Mr. Martasian:

Sacramento Regional County Sanitation District (SRCSD) has received the Folsom Dam Safety/Flood Damage Reduction – Auxiliary Spillway Approach Channel Project and has the following comments:

Currently SRCSD operates the Arden Force Main and the Northeast Interceptor which both cross under the American River. The Arden Force Main consists of two parallel 60-inch sewer force mains within twin 72-inch casings that convey as much as 100 million gallons of wastewater per day. The depth of the Arden Force Main ranges from 30 to 40 feet beneath the American River.

The Northeast Interceptor Section 3 is a triple siphon undercrossing which consists of three 48-inch pipelines that are buried approximately 10 feet below the American River bottom. There is two feet of rip-rap protection above the crown of the pipeline. These pipelines convey up to 75 million gallons of wastewater per day.

Changes that have the potential of increasing scouring velocities of the American river may affect the ability of Northeast Interceptor and the Arden Force Main crossings to convey wastewater. Decreased pipe cover on both of these river crossings have the potential to cause significant impacts to these two pipelines and could pose issues to both the environment and human health and safety.

If you have any questions regarding these comments, please contact me at (916) 876-9994.

Sincerely,

Sarenna Moore

Sarenna Moore
SRCSD/SASD
Policy and Planning

cc: Prabhakar Somavarapu
Dave Ocenosak
Michael Meyer
SRCSD Development Services
SASD Development Services

Technology in balance with nature